Lake Minnetonka Vegetation and Aquatic Invasive Species Plan

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EXECUTIVE SUMMARY

This Lake Vegetation and AIS Master Plan is the first phase of an evolving plan to respond to changing aquatic invasive species (AIS) threats and determine the Lake Minnetonka Conservation District's (LMCD) role in that response.

The LMCD initiated this study to inform future decisions about aquatic vegetation management (weed harvesting program), develop an AIS strategy for Lake Minnetonka and determine suitable roles for LMCD in lake management issues. This study was guided using stakeholder feedback including a Technical Advisory Group (TAG) that met as a group and individually, as well as citizen and other stakeholder input throughout the process. LMCD developed web-based, email, and other outreach materials to solicit input for interested parties, residents, and lake users.

This Plan summarizes aquatic vegetation and AIS management, evaluates the LMCD's role in AIS management and aquatic vegetation harvesting , and identifies next steps in the coordination of a cost-effective lake vegetation and AIS management strategy for Lake Minnetonka. Lake management needs are constantly evolving to encompass the many complicating factors at play, including weather and climate conditions, transportation, land use changes, and technological advances. Additionally, there are many entities involved in AIS management on Lake Minnetonka and the roles and responsibilities of those entities may change overtime.

The framework of this plan is modular to facilitate adaptations and revisions as new information is revealed and as the roles of entities expand or change over time. This modular format is designed so that any changes to one chapter will not affect the integrity of another chapter. Portions of this plan, particularly Chapters 4 and 5, should be workshopped with other entities at a later date to accurately reflect the priorities and commitments from all players in vegetation and AIS management. Additionally, as new information is revealed about the presence of AIS, the spread of AIS, or the best management options for AIS, this information will be reflected in the plan. The AIS modules in Chapters 2 and 3 of this plan serve as a guide to slow or prevent AIS spread and introduction. They include two categories of approaches: *Prevention and Early Detection*, and *Management & Control*. The approach that should be taken depends on whether the AIS has not been introduced or was very recently introduced or if the AIS has established itself in the Lake. These AIS modules should be changed accordingly with changes to the scope and scale of the AIS within Lake Minnetonka.

Important Work Completed in 2019

- Outreach- communications, survey, web mapping, establishing TAG & CAG (Citizen Advisory Group), and opportunities for public feedback
- Aquatic Vegetation Harvesting Program Review
- Starry Stonewort Prevention and Early Detection Plan
- Lake Minnetonka AIS Master Plan- Framework Document
- Establishment of a 3-year aquatic vegetation management program that utilizes contractors for nuisance weed harvesting rather than restarting the LMCD in-house weed harvesting program.

In 2020, the LMCD intends to contract with a Lake Management Professional to help facilitate 2020 activities. Feedback obtained from the TAG representatives and other stakeholders indicated that acquiring a Lake Management Professional to assist and support AIS and Vegetation management activities would be beneficial for Lake Minnetonka and its stakeholders.

Chapter 1: Introduction

- A Brief History of Lake Minntonka
- Definition of AIS
- Purpose of the Plan
- Plan Development Process
- Utilization of the Plan

1. INTRODUCTION

1.1. A Brief History of Lake Minnetonka and the LMCD

Lake Minnetonka's system of lakes and bays includes over 14,000 acres with over 100 miles of shoreline. It is located just 15 miles northwest of Minnehaha Creek headwaters, making the location an ideal setting for the tribal communities prior to European settlement. The Dakota Sioux, Cheyenne, Iowa, and Ojibwa people first occupied Lake Minnetonka's shores until the mid-1800s when European settlers began to recognize the value of this lake. In 1851, the Treaty of Mendota transferred 2 million acres of American Indian land to the U.S. Government, which included Lake Minnetonka (Lake Access n.d.); and in 1852, Governor Alexander Ramsey named the lake "Lake Minnetonka", because of its meaning ("Big Waters") in the native Dakota language. Within two years, the majority of the 100-plus miles of shoreline had been claimed or purchased by European settlers.

Tourism has always been an important part of the Lake community and this has continued on today with countless people traveling to the area each year to enjoy the many beaches, docks, bike paths, fishing, adventure sports and more (Wood 2018). With the growing tourist populations and the travel between lakes, Lake Minnetonka saw an increasing threat for aquatic invasive species (AIS) and a growing need for organizations and government entities to protect the many aquatic and land species native to the lake. However, with the increased tourism and population, there is also a growing demand for residential and commercial development and access to recreation. Lake Minnetonka has many uses; recreation, fishing, tourism, environmental research, residential homes and is a major economic engine in Minnesota.

EOR and Blue Water Science were hired in early 2019 to coordinate with various lake entities to begin development of this Vegetation & AIS Master Plan.

LMCD Background:

The LMCD has a broad scope of authority . It was formed in 1967 by legislation through Minnesota Law (Reference Current Law) to provide a lake wide approach to the issues of the time. The issues specified in the Law are:

"103B.611** Subd. 3. **Powers

the district has the following powers on Lake Minnetonka, excluding the area of public drainage ditches or watercourses connected to the lake:

(1) to regulate the types of boats permitted to use the lake and set service fees;

(2) to regulate, maintain, and police public beaches, public docks, and other public facilities for access to the lake within the territory of the municipalities, provided that a municipality may supersede the district's action under this clause by adopting an ordinance specifically referring to the district's action by one year after the district's action;

(3) to limit by rule the use of the lake at various times and the use of various parts of the lake;

(4) to regulate the speed of boats on the lake and the conduct of other activities on the lake to secure the safety of the public and the most general public use;

(5) to contract with other law enforcement agencies to police the lake and its shore;

(6) to regulate the construction, installation, and maintenance of permanent and temporary docks and moorings consistent with federal and state law;

(7) to regulate the construction and use of mechanical and chemical means of deicing the lake and to regulate mechanical and chemical means of removal of weeds and algae from the lake;

(8) to regulate the construction, configuration, size, location, and maintenance of commercial marinas and their related facilities above the OHW. The regulation shall be consistent with the applicable municipal building codes and zoning ordinances where the marinas are located; (see footnote below)

(9) to contract with other governmental bodies to perform any of the functions of the district;

(10) to undertake research to determine the condition and development of the lake and the water entering it and to transmit their studies to the Pollution Control Agency and other interested authorities, and to develop a comprehensive program to eliminate pollution;

(11) to receive financial assistance from and join in projects or enter into contracts with federal and state agencies for the study and treatment of pollution problems and demonstration programs related to them; and

(12) to petition the board of managers of a watershed district in which the lake conservation district is located for improvements under section 103D.705; a bond is not required of the lake conservation district.

For purposes of this subdivision "watercourses connected to the lake" does not include channels connecting portions of the lake to one another."

This list of powers was authored in 1967 it still holds true today. Subd 3 Powers -- paragraphs 7 and 10 were clearly intended to mean aquatic invasive species using the adjectives of the time to describe the introduction of aquatic invasive species into the lake.

"to regulate mechanical and chemical means of removal of weeds and algae"

"to undertake research to determine the condition and development of the lake and the water entering it and to transmit their studies to the Pollution Control Agency and other interested authorities, and to develop a comprehensive program to eliminate pollution"

The preparation of this Management Plan falls under Subd 3. Powers of the Board.

There are many public, local, and private accesses to the lake with multiple authorities and various designs and amenities. The design and amenities of a public access is important in encouraging AIS prevention actions by lake users. A chart from 2011 indicates the various standards at public launches and potential lake user density based on available parking spaces . Additional assessment of public, local, and private accesses should be conducted to assess the design, amenities, and important factors to promote AIS prevention.

Footnote: In 2019 the Minnesota State Legislature changed the wording of Powers number 8 to "to regulate the construction, configuration, size, location, and maintenance of commercial marinas and their related facilities that affect activity below the ordinary high-water mark. The authority under this clause does not apply to land-based marina activities, including storage facilities, and must be consistent with the applicable state statutes, municipal building codes, and zoning ordinances where the marinas are located.

Table: Lake Access Inventory 2011 showing boater/launch data.

Parking Space Categories	**1993 Total In Use or Available**	**1993 Meet Physical Standards & Certified**	**1993 Total In Use & Planned Certified**	**2011 Total In Use or Available**	**2011 Meet Physical Standards & Certified**
Public Access					
North Arm	80	80	80	59	59
Grays Bay Causeway	37	17	17	0 *(2)*	0
Grays Bay Dam	20	20	20	0 *(3)*	0
Grays Bay	0	0	0	119	119
Spring Park	86	86	86 *(1)*	10	10
Kings Point	32	32	32	0 *(4)*	0
Phelps Bay	4	4	4	4	4
Lake Mtka. Regional Park	0	0	48	59	59
Maxwell Bay	0	0	76	90	90
Cooks Bay	0	0	0	9 *(5)*	0
Subtotal	**259**	**239**	**363**	**350**	**341**
Remote Lots					
Carsons Bay	93	43	70	21 *(6)*	8
Spring Park (Henn. Co. Lot)	NA	NA	NA	80	70
Subtotal	**93**	**43**	**70**	**101**	**78**
On Street					
North Arm/Maxwell Bay	31	31	0	0	0
Williams St.	40	40	40	40	32
Cooks Bay	43	26	43	36	29
Wayzata Bay	101	0	0	28	24
Carsons Bay	0	0	0	14	11
Spring Park	0	0	0	3	2
Subtotal	**215**	**97**	**83**	**121**	**98**
Grand Total	**567**	**379**	**516 *(7)***	**572**	**517**

(1) Car/trailer parking spaces included for remote Hennepin County Transportation Department Lot

(2) 17 car/trailer parking spaces eliminated in coordination with the opening of the Grays Bay Public Access

(3) 20 car/trailer parking spaces eliminated in coordination with the opening of the Grays Bay Public Access

(4) 32 car/trailer parking spaces eliminated in coordination with the opening of the Lake Minnetonka Regional Park

(5) 9 Car/trailer parking spaces not available on holidays or the weekend

(6) 11 Remote lot car/trailer parking spaces -- Requires City of Deephaven parking permit

(7) 32 c/t at Kings Pt. were supposed to be eliminated with the opening of the Lake Minnetonka Regional Park (484 actual number)

1.2. Definition of AIS

AIS include any plants, animals, or pathogens that are not native to the region they have inhabited. They are "aquatic" because they live primarily in water and "invasive" because they thrive in the new, non-native environment and can spread rapidly, often compromising the range and health of native species. The first AIS was reported in Lake Minnetonka in 1910, curly-leaf pondweed. Since then, purple loosestrife, Eurasian watermilfoil, flowering rush, and zebra mussels, have all been introduced to the lake system. Common carp have also been a long-time resident of Lake Minnetonka. Because Lake Minnetonka is such a popular tourist destination, it is increasingly vulnerable to the introduction of new AIS, the spread of existing AIS, and the overall degradation of native habitat and species populations. Additionally, the presence of AIS within Lake Minnetonka is a major threat to other resources in the surrounding area.

The following map illustrates the watercraft inspections conducted for boats launched on Lake Minnetonka that originated from other states in 2018. It is important to note that that data is only a snapshot since watercraft inspections do not occur at the launches at all times watercraft may be launched or at all public accesses.

Figure 1.2- Origin of out of state boats launched in Lake Minnetonka, 2018

1.3. Purpose of the Plan

The LMCD embarked on this Master Plan to develop a holistic and science-based approach for managing lake vegetation and AIS to respond to the rapidly changing landscape of AIS management, identify the activities of other entities, and then assess the effectiveness of the existing LMCD program and its potential roles. (e.g., Minnesota Department of Natural Resources, Hennepin County, Lake Minnetonka Association, etc.).

Table 1 demonstrates the number of waterbodies identified as "infested" by AIS in Minnesota is increasing dramatically. Additionally, the number of new AIS infesting Minnesota's waterbodies is also increasing and expected to increase in the future as changes to our climate make the landscape more habitable to a broader range of species. These trends in AIS management make existing and future management complex for a resource as regionally and nationally significant as Lake Minnetonka.

Table 1. Increase in waterbodies listed as infested by the Minnesota Department of Natural Resources (1995-2019)

Year	Number of waterbodies listed as infested	Number of aquatic invasive species	% increase from waterbodies listed as infested in 1995	Annual % increase
1995	101	5	0%	0%
1996	5	+1	5%	5%
1997	10	--	15%	10%
1998	5	--	20%	5%
1999	16	--	36%	16%
2000	18	--	53%	17%
2001	7	--	60%	7%
2002	6	--	66%	6%
2004	22	--	88%	22%
2005	12	--	95%	8%
2006	37	--	137%	42%
2007	73	+3	209%	72%
2008	13	--	222%	13%
2009	74	+1	295%	73%
2010	62	+1	356%	61%
2011	16	--	372%	16%
2012	118	+2	489%	117%
2013	49	--	538%	49%
2014	113	--	649%	111%
2015	60	+2	709%	60%
2016	70	+1	775%	66%
2017	75	--	852%	77%
2018	87	--	939%	87%
2019	78	--	1,016%	77%
Total	1,128	--	n/a	n/a

Source: https://www.dnr.state.mn.us/invasives/ais/infested.html

A purpose of this plan is to assist in coordination of existing AIS and vegetation management efforts for Lake Minnetonka as well as determine the role to fill any gaps in the system. As a result, this plan identifies who is involved in AIS management on Lake Minnetonka and how they have been involved.

While the ultimate goal of this Plan is to develop a comprehensive AIS management strategy for Lake Minnetonka that considers the efforts of all entities involved in AIS management in an effective manner, this will take additional time and coordination due to the uncertainty of funding and competing demands of the entities. As a result, this first phase of AIS Management Plan takes stock of the LMCD's role in AIS management on Lake Minnetonka. Future phases of this planning effort, described in Section 4.3 *Future of AIS Management on Lake Minnetonka,* will further consider the evolving management activities of others and identify the roles and responsibilities moving forward.

1.4. Plan Development Process

The LMCD initiated the development of the Lake Minnetonka AIS Master Plan in May of 2019. The main components of this first phase of the Lake Minnetonka AIS Strategy/Master Plan include:

- Stakeholder Engagement Plan (see Section 1.3 & Appendix B)
- Review of LMCD's harvesting program (see Section 3.2)
- AIS Emergency Action Plan Modules (see Sections 2.5 & 3.4)
- AIS inventory and mapping (see Appendix A)
- Proactive Starry Stonework Protection Plan (see Appendix C)

Throughout the planning process, LMCD engaged a variety of stakeholders to compile data, discuss what AIS management activities are currently being performed by others, and solicit feedback on the plan development process. This study was guided by a Technical Advisory Group (TAG) and other stakeholders through the course of process. LMCD developed web-based and other outreach materials to solicit input for interested parties, residents, and lake users.

1.4.1. Public and Stakeholder Engagement

Early in the plan development process, the LMCD developed a community engagement plan to engage a broad audience in the plan development process and to create meaningful engagement with stakeholders (see Appendix B). The goals for the community engagement plan were to engage stakeholders in:

- The development of a common vision for AIS and vegetation management on Lake Minnetonka
- The identification and prioritization of needs for AIS management on Lake Minnetonka
- The decision-making process
- The development and review of the Lake Minnetonka Vegetation & AIS Master Plan

Development of the community engagement plan began with the identification of critical stakeholder groups and competing interests. Lake Minnetonka is a 22 square-mile lake that is the tenth largest, and one of the most heavily recreated waterbodies in Minnesota. It is the largest lake in the Twin Cities Metropolitan Area. Recognizing the regional significance of the resource, the LMCD sought to cast a wide net in soliciting input on the development of the AIS Master Plan. In addition to identifying who should be invited to participate in the plan development process, the LMCD identified how the various stakeholder groups should be involved in the plan development process. Participants were given the choice of (1) being informed, (2) being asked, (3) assisting in decision-making and (4) developing solutions.

For the most part, local residents, area-based groups, members of the business community, and visitors to Lake Minnetonka were consulted during the plan development process. These entities were informed about the plan development process and asked for feedback using the following methods:

- **Social Pinpoint** – A digital engagement platform that allows users to post comments and/or photos to specific geographic locations using an interactive map. The LMCD's Social Pinpoint site was made available to users in June of 2019 and remained available for the growing season. All comments received via Social Pinpoint can be found in Appendix B.

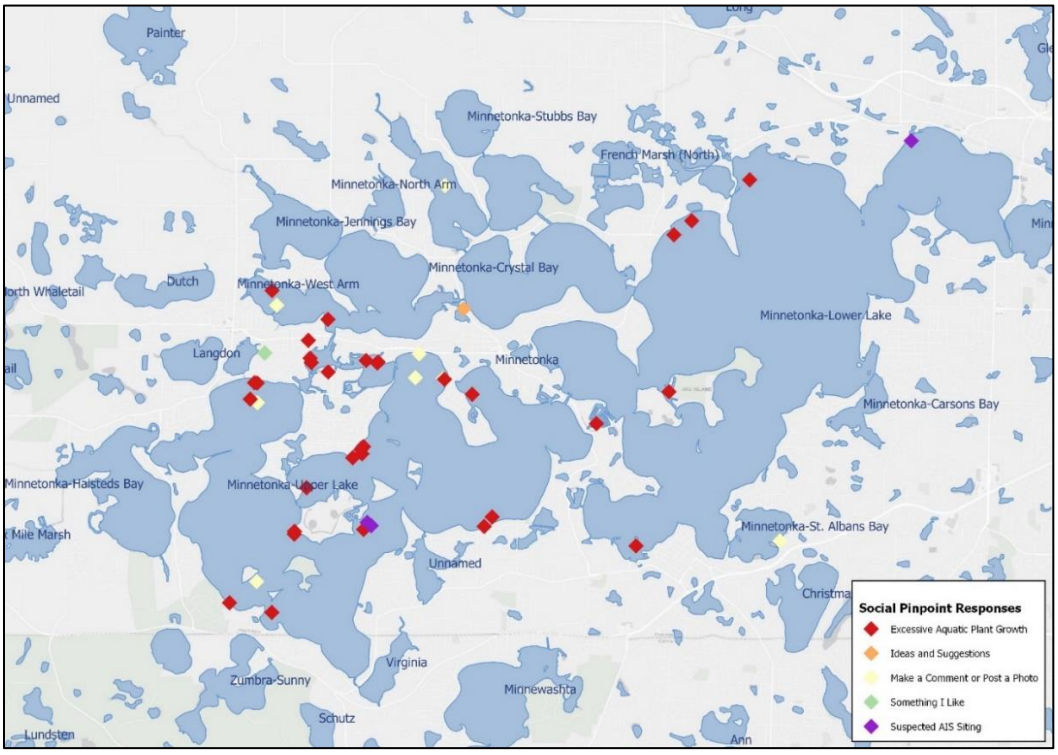


Figure 1-1. Social Pinpoint Feedback Example

- **Survey** – The LMCD created an on-line survey consisting of 17 questions designed to gauge people's experiences and perspective on lake vegetation and AIS management on Lake Minnetonka. Of the 79 respondents, the majority (73%) were male and in the age range of 30 to 69. Most respondents either live on lakeshore property with a dock or lake access (64%) or use public ramps, parks, or lakeshore for access on the lake (26%).

  The main findings of the survey include:

  - The majority of respondents agreed that AIS on Lake Minnetonka increases safety concerns for swimming & water sports, damage to/breakdown of a watercraft, or maintenance costs to watercrafts and docks.
  - The majority of respondents agreed that AIS on Lake Minnetonka decreases property values.
  - The majority of respondents prefer either mechanical (35%) or chemical (41%) treatments for AIS management.

- Eurasian watermilfoil was reported to have the greatest impact on the respondents' enjoyment of the lake, while native vegetation was reported to have the least impact.
- Respondents thought that visiting watercrafts and boats had the greatest overall impact on AIS introduction in Lake Minnetonka, while people, animals, and pets swimming in waters that contain AIS had the least overall impact.
- The majority of respondents agreed that watercraft inspections are important (17%), very important (26%), or extremely important (36%) for preventing or slowing the spread of AIS in Lake Minnetonka.
- The most trusted entity for disseminating information about natural areas, water, and invasive species was the MNDNR (78%).

- **Project Website** – The LMCD hosted and maintained a link to the project on the LMCD's website. This link articulated the intent for the Lake Minnetonka Vegetation and AIS Master Plan, included meeting invitations, identified how people could get involved in the planning process, included project information (e.g., media releases, informational flyers, meeting presentations) and include draft documents for public review and comment.
- **Project Kick-Off Meeting** – The LMCD hosted a project kick-off meeting on June 18, 2019. Everyone was invited to learn about the project and how they could remain involved in the plan development process.
- **TAG Meetings** – Representatives of state agencies, cities, Hennepin County, Minnehaha Creek Watershed District, , U.S.G.S, University of Minnesota, Lake Associations and Bay Groups, and Lake Service Providers were invited to collaborate with the LMCD in the plan development process. These entities were invited to participate in Technical Advisory Group (TAG) meetings and individual meetings to discuss issues related to vegetation and AIS management, review plan content, and evaluate current roles and responsibilities of those entities involved in AIS management on Lake Minnetonka. The notes from these Technical Advisory Group meetings can be found on the LMCD website.
- **Face-to-face Meetings with Cities, Residents and Organizational Leads** –Face-to-face meetings during the course of 2019 were primarily conducted by LMCD staff or Board members. Members of the EOR/BWS consultant team also had individual meetings with key lake partners to solicit feedback and guidance through the process.

1.4.2. Issues Identification

Over the course of the plan development process, valuable information about AIS management issues and local needs was collected from the community and stakeholder groups (see Appexdix B Table 1-2). All of the feedback collected during the plan development process was collected in a database (spreadsheet) for the LMCD to consider during the development of this Plan (see Appendix B). These comments have either been addressed by the individual components of this plan or identified as future activities as described in Section 4.3 *Future AIS Management on Lake Minnetonka.* Table 1-2 identifies which of the issues (identified at this point in time) are addressed in this version of the Plan. A complete compilation of comments received as of November 2019 are found in Appendix B.

1.4.3. Establishment of Goals and Objectives

The goals and objectives of this effort were established through a process that included:

1. Board discussion and authorization to publish an RFP and to hire an RFP respondent.
2. Interactions with the TAG group
3. Public Information meetings and communications
4. Follow-up discussions with the Board
5. Meetings with State and Local Agencies with interest in Lake Minnetonka
6. Draft publication of this Plan and commentary received
7. Ultimately, in the approval of the Board of this Plan

As a result of this process, the goals have been established as:

1. Assess current threats to Lake Minnetonka
    a. On-going Identification of existing AIS Communities
    b. On-going identification of threats, their risk and LMCD's role in the response
2. Assess current Prevention, Control and Management techniques in use in Lake Minnetonka
    a. Determine effectiveness of the LMCD Harvesting Program
    b. Identify a Proactive Prevention Plan for Starry Stonewort
    c. Watercraft Inspections and Cleaning Stations
    d. Assist in the development of new (new AIS, new technologies and new best management practices) Control and Management techniques
3. Determine LMCD's Role in Vegetation and AIS Control and Management in Lake Minnetonka

Through the process concern was expressed by agency members of the TAG that LMCD was attempting to insert itself into a larger AIS role on Lake Minnetonka and assign roles to other entities. The project team and TAG had considerable discussions around these issues. The process was beneficial in identifying opportunities for more coordination and management of existing AIS and nuisance aquatic vegetation, and more effective approaches to minimizing risk of introducing new AIS into the lake. This document provides the baseline of information the LMCD Board needs to further discuss AIS prevention, management and how best to coordinate with other groups conducting AIS-related activities on the lake. It is also important to note that entities later expressed concern about the sustainability of their funding for AIS programs.

1.5. Utilization of this Plan

This Plan summarizes the state-of-the-science in AIS management, evaluates the LMCD's role in AIS management and aquatic vegetation harvesting and identifies next steps in the coordination of a cost-effective lake vegetation and AIS management strategy for Lake Minnetonka.

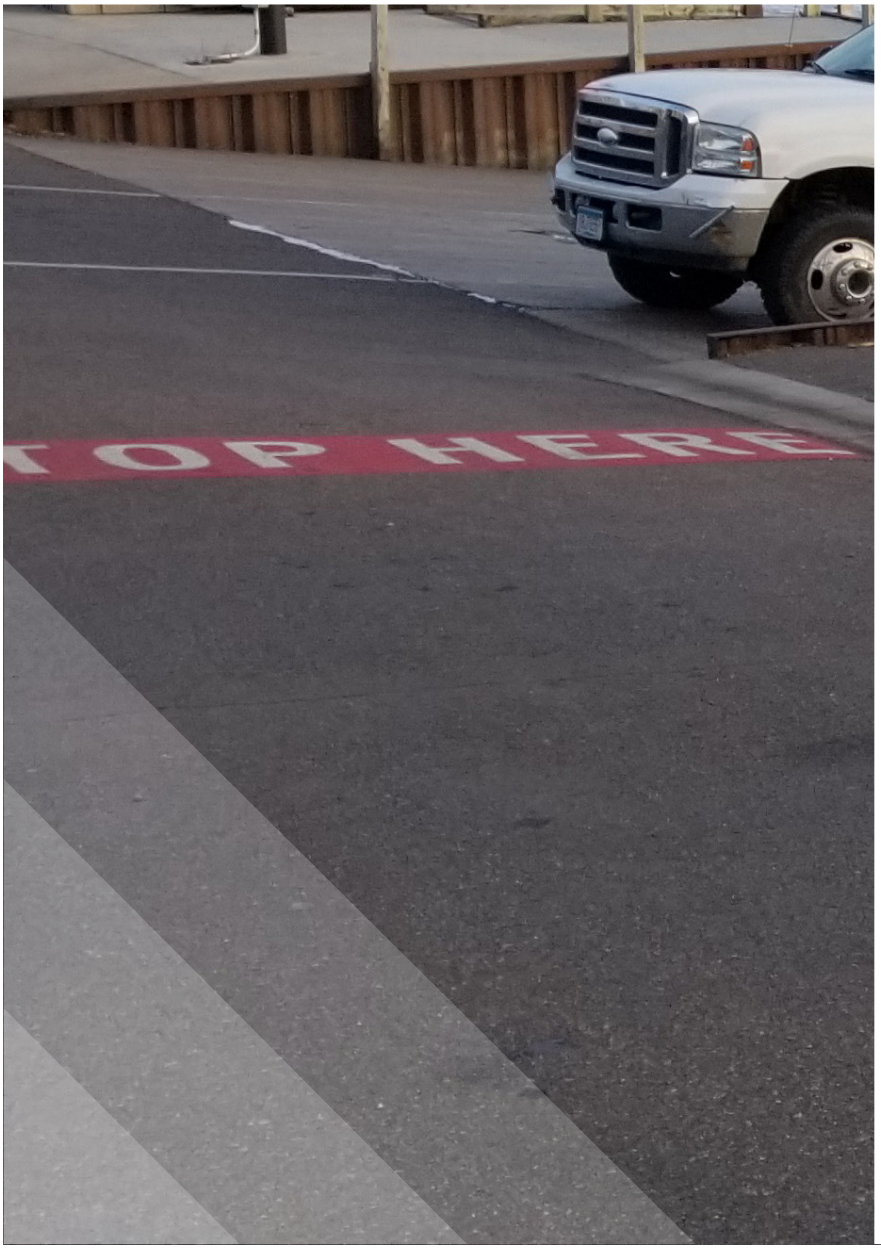
While using this plan, it is important to acknowledge that the science surrounding the prevention, early detection, rapid response, management, and control of AIS is constantly evolving to encompass the many complicating factors at play, including weather and climate conditions, transportation, land use changes, and technological advances. Additionally, there are many entities involved in AIS management on Lake Minnetonka and the roles and responsibilities of those entities may expand or reduce over time.

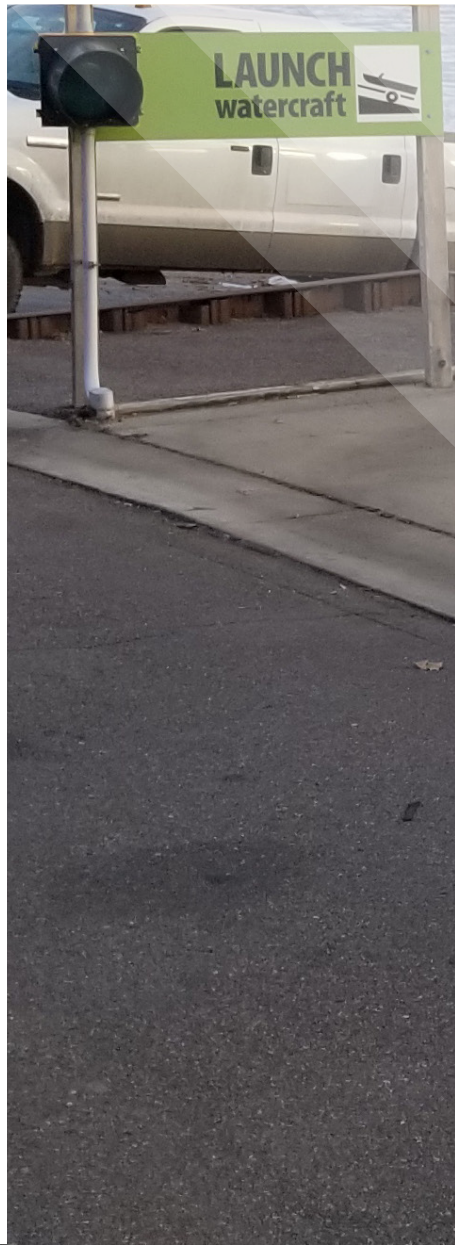
The framework of this plan facilitates adaptations and revisions as new information is revealed and as the roles of entities expand, decrease, or otherwise change over time. It follows a modular format so that any changes to one chapter will not affect the integrity of another chapter. Portions of this plan, particularly Chapters 4 and 5, should be workshopped with partners at a later date to accurately reflect the priorities and commitments from all players in AIS management. Additionally, as new information is revealed about the presence of AIS, the spread of AIS, or the best management options for AIS, this information should be reflected in the plan. The AIS modules in Chapters 2 and 3 of this plan serve as a guide to slow or prevent AIS spread and introduction. They include two categories of approaches: *Prevention and Early Detection*, and *Management & Control*. The approach that should be taken depends on whether the AIS has not been introduced or was very recently introduced or if the AIS has established itself in the lake. These AIS modules should be changed accordingly with changes to the scope and scale of the AIS within Lake Minnetonka.

Chapter 6 of this document contains many AIS modules. The modules were developed to be easily updated as new information or research becomes available and if for example a new AIS is introduced into the lake. The modules are differentiated between "Management" for AIS species already in the lake and "Prevention" for AIS species that pose an imminent threat to Lake Minnetonka. Each of the modules discuss the threat to the lake, its unique biologic/habitat needs, the likely transport mechanisms for new AIS and an impact risk assessment. It is anticipated that the modules may be updated to reflect new information.

Chapter 2:
Prevention and Early Detection/Rapid Response

- Review of Past Efforts
- Scientific Review of Prevention andEmergency Action/Rapid Response Options
- Recommended Approach
- AIS Modules





2. PREVENTION AND EARLY DETECTION/RAPID RESPONSE

This section is focused on prevention, early detection, and emergency action (rapid response) recommendations for AIS. At the discretion of the LMCD, this section of the document can be modified to include changing climatic conditions or other factors that affect risk of new infestations as well as prevention recommendations for additional species (e.g., spiny waterflea) not currently in Lake Minnetonka. However, the development of prevention strategies for other species is better managed on a statewide basis by the MNDNR.

2.1. Review of Past Efforts

The LMCD maintains a summary list of current AIS activities conducted by other entities and individuals in the lake's region. The most current list was updated as of June 2019, and identifies the following activities being conducted for prevention & early detection/rapid response:

Watercraft Inspections: Inspections involve a visual assessment of watercrafts (e.g., motor boats, canoes, kayaks) at public water access points. These inspections may result in the removal, drainage, decontamination of the watercraft if AIS are detected. Sometimes watercraft are required to be decontaminated. The purpose of the inspections is to help prevent the spread of AIS from recreational activity. Various agencies have been involved with Watercraft Inspection Programs over the years. MNDNR includes two levels of watercraft inspectors: level 1 being those who can inspect the watercraft, and level 2 being those who can decontaminate the watercraft (MNDNR 2018b) and LMCD directly in the past and recently through contracted services. The majority of respondents from the AIS survey agreed that watercraft inspections are important (17%), very important (26%), or extremely important (36%) for preventing or slowing the spread of AIS in Lake Minnetonka.

CD3 Cleaning Stations: These are waterless cleaning systems that can be installed at public accesses. They include a wet-dry vacuum, an air blower, and hand tool options for cleaning AIS from watercrafts before entering the public access point.

AIS Early Detection: This effort involves training volunteers to conduct lake surveys and to look for AIS while recreating on the lake. The focus is on the early detection of AIS so they can be contained and removed before spreading throughout the system (Brough 2018). The LMCD has participated in education, detection programs such as Starry Trek and through the harvesting program, as well as responding to public concerns regarding potential AIS and nuisance vegetation.

2.2. Scientific Review of SSW Prevention Options

Numerous proactive solutions are available to prevent a starry stonewort introduction into Lake Minnetonka, but few are practical and implementable. The team preparing this Master Plan have researched the literature and talked to the country's leading SSW experts. A chart listing several prevention methods and the probability of a successful SSW prevention program for Lake Minnetonka is shown in Table 2-1.

Table 2-1. Evaluated methods for prevention and early detection of SSW in Lake Minnetonka. Methods 1, 2, and 3 would be the most practical and effective for implementing.

Method	Politically Acceptable	Technically Achievable	Economically Feasible	Probability of Preventing a SSW Introduction (points)	Probability of Implementation (points)	Total Score (points)
1. Bi-weekly surveys at priority boat accesses.	Yes	Yes	Yes	**High (4)**	**High (4)**	**8**
2. Extra boat inspections at priority public accesses	Yes	Yes	Yes	**Moderate (3)**	**High (4)**	**7**
3. Conduct exit inspections on 100% of the boats on all Minnesota lakes that currently have SSW. Also apply copper sulfate at public accesses at the 14 SSW lakes to reduce SSW biomass and prevent SSW transport by a boat trailer.	Unlikely – Who is responsible?	Yes	Yes	**High (4)**	**Moderate (3)**	**7**
4. Don't allow any boats to visit Minnetonka, use a boat club approach.	No	Unlikely	Unlikely	**High (4)**	**Very Low (0)**	**4**
5. I-LIDS: Motion detected video surveillance cameras at boat access are a potential option but rate as low priority.	Yes	Yes	Yes	**Very Low (0)**	**High (3)**	**3**
6. Inspect 100% of incoming boats.	No	No	No	**Moderate (3)**	**Very Low (0)**	**3**
7. Put all boats and trailers through a chemical bath before entering Lake Minnetonka.	Unknown	No	No	**Moderate (3)**	**Very Low (0)**	**3**
8. Develop a Preemptive Pilot Study* which incorporates the use of pre-emptive copper sulfate dosing at prioritized Lake Minnetonka public accesses every 2 to 4 weeks during the growing season. Treatments are prioritized on a launch-by-launch basis, but focus will be on higher risk launches.	Unknown	Yes	Yes	**Low (2)**	**Very Low (0)**	**2**
9. Using e-DNA monitoring for detecting SSW (not available at this time): Currently (as of 2019) there are no kits for sampling and identifying the presence of SSW in a lake using e-DNA.	Yes	No	No	**Very Low (0)**	**Low (1)**	**1**

*note this is not an introduction prevention strategy. It assumes that SSW has already been introduced into Lake Minnetonka, but has not yet become fully established Initially, EOR and the LMCD recommended working with the MNDNR and MAISRC to develop a pilot program to attempt preemptive copper sulfate applications at priority public access points in Lake Minnetonka. Since meeting with the LMCD, EOR and BWS have determined that preemptive copper sulfate treatment at public accesses are not a viable solution:

Even if the recommended combination of prevention methods is employed, there is no guarantee there would be 100% prevention of a SSW introduction over the next 5 to 10 years. After reviewing SSW treatment results in Michigan, Wisconsin, and Minnesota, the most cost effective treatment has been the use of copper sulfate. Hand pulling can be considered for very limited infestations, but then a follow-up copper sulfate application should be considered. Other methods that have been attempted, but have been less effective include dredging, DASH (diver assisted suction harvesting), and lake drawdowns. After a treatment, a post-treatment evaluation is necessary to determine the effectiveness of a containment treatment. This protocol is available from the MNDNR. Components will likely include a thorough search of the treatment area, and a post treatment survey of the treatment area and surrounding area. A flow chart showing a sequence of rapid response steps following the detection of SSW in Lake Minnetonka is shown in Figure 2-1.

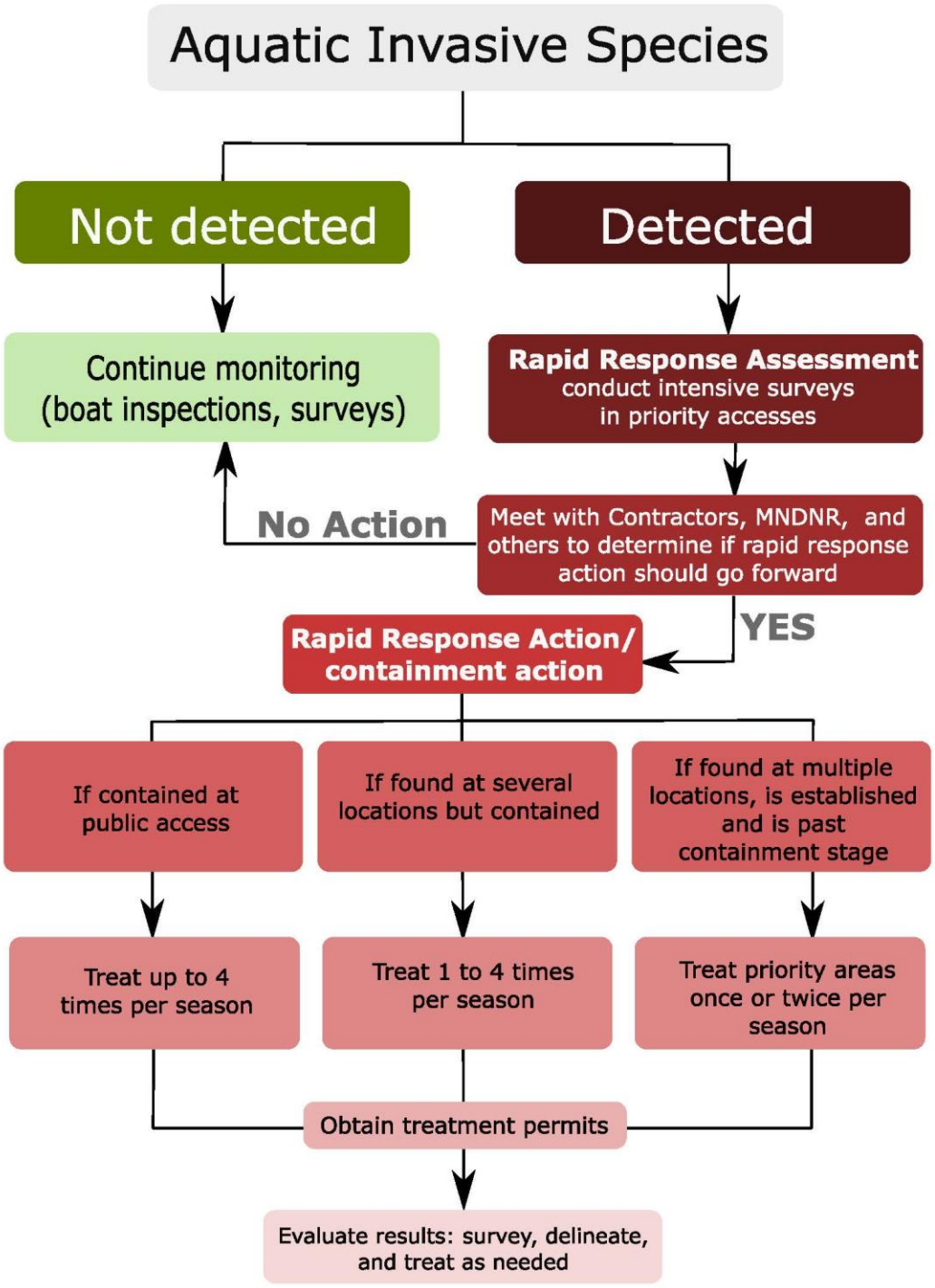


Figure 2-1. AIS Rapid Response Plan Flow Chart.

2.3. Recommended SSW Approach

A combination of the first three methods identified in Table 2-1 has the best potential for preventing a SSW introduction based on politics, technical aspects, and costs. Hand pulling can be considered for very limited infestations, but then a follow-up copper sulfate application should be considered. Other methods that have been attempted, but have been less effective include dredging, DASH (diver assisted suction harvesting), and whole-lake drawdowns. Biological options for controlling SSW are not currently available.

Risk Assessment

The following potentially negative impacts are associated with the recommended management approach:

1. Copper sulphate is a broad spectrum herbicide, meaning they can potentially impact non-target native species. The absence of native species could subsequently result in an open niche for SSW to invade. The overall risk to native species is low as the use of copper sulfate typically has minimal impacts on vascular plants and is applied around the lake by residents, agencies, and researchers.
2. Copper does not biodegrade, the potential for a significant accumulation of copper in sediments, even after repeated applications is unlikely, but should be monitored.

The overall risk for ecological damage of the recommended management approach is low.

2.4. AIS Modules

If an **AIS has not yet been introduced or was very recently introduced** into the system, key personnel should be trained to take the necessary measures to prevent the introduction of the AIS and (if introduced) to respond quickly and appropriately to contain the AIS upon early detection. The "Prevention & Early Detection Modules" outline those steps for key AIS that have not yet been introduced to Lake Minnetonka.

The modules include a brief summary of the AIS characteristics, the history of its spread, its life cycle, its impacts on the system, regulations associated with the AIS, and recommended control measures. They then go into its context in Minnesota, its suitability in Lake Minnetonka, and the recommended measures for prevention, early detection, and rapid response. Lastly, the roles and responsibilities for each task are outlined in a table.

The prevention and early detection modules include:

- Starry Stonewort
- Spiny Waterflea
- Hydrilla

As new AIS are introduced or as new threats become apparent the AIS modules can be updated such as from a prevention to management module in the AIS Module Section.

Chapter 3:
Management and Control

- Review of Past Efforts
- Scientific Review of Management and Control Options
- Recommended Approach

3. MANAGEMENT AND CONTROL

There are many variables that affect the types and severity of nuisance aquatic vegetation and AIS infestations. Weather is an important factor, for example. Climatic conditions such as temperature and snow cover during frozen lake conditions can have a dramatic effect on growth density of some AIS species. Because of this, variability in AIS infestations can be observed from year to year.

3.1. Review of Past Management & Control Efforts

The following activities are being conducted by the LMCD and/or partner entities for the management and control of AIS in Lake Minnetonka:

Mechanical AIS Control: Strategies for controlling AIS mechanically may include harvesting, hand pulling, or raking. These methods may be more or less feasible depending on the acres that need to be managed and the purpose for the management. For example, the management strategy would be different for recreation than it would be for protecting a certain native habitat. As part of the effort to develop this plan, in 2019 EOR/BWS evaluated the aquatic vegetation harvesting program conducted by the LMCD. This program has been in operation since 1989, shortly after Eurasian watermilfoil (EWM) was introduced into the lakes system, to ultimately reduce the biomass of AIS in the lake. LMCD's harvesting efforts have targeted both EWM and more recently curly-leaf pondweed (CLP). More information about mechanical AIS control strategies can be found in the Aquatic Vegetation Harvesting Program Evaluation (Emmons & Olivier Resources, Inc. and Blue Water Science 2019).

Chemical AIS Control: There are many different pesticides that can be used to control AIS. Some herbicides include 2-4D, sonar, diquat, and ProcellaCOR. Chemicals may be used systemically or from contact. Systemic pesticides are absorbed into the species tissue that may spread during reproduction. Contact pesticides stay on the surface of the tissue.

Enforcement: Minnesota has several state laws intended to minimize the introduction and spread of invasive species of wild animal and aquatic plants in the state. Using a four-tiered system, invasive species are classified as prohibited, regulated, unregulated nonnative species, or are unclassified and remain as unlisted nonnative species. This classification system establishes the level of regulation and allowable uses for each species (MNDNR 2019).

AIS Permits: The MNDNR releases Invasive Aquatic Plant Management (IAMP) permits for any forms of AIS control involving mechanical or chemical removal of plants. These permits are issued to property owners, lake organizations, and local governments. The permits are in place to ensure that AIS control is being conducted in a manner that minimizes potential negative impacts to aquatic habitat (MNDNR 2018d).

3.2. Scientific Review of Aquatic Vegetation Management Options

The LMCD has numerous tools at its disposal for managing nuisance aquatic vegetation including mechanical, chemical, and biological control options. The use of all three of these tools in the appropriate space and time is the basis for an effective integrated pest management (IPM) program

that delivers desirable environmental outcomes. Simultaneously, each control tool has limitations and associated shortcomings.

One of the most common shortcomings of aquatic plant management is that the desired outcome from the implementation of a given tool is not always clearly defined and/or understood by stakeholders. To address this concern, the LMCD will incorporate stakeholders in the planning process and keep the public informed of the desired end state.

The specific tasks and considerations for determining the appropriate management tool should begin each year with a lake-wide pre-treatment, point-intercept survey conducted between May 15th and June 1st annually. The point–intercept survey should incorporate biomass-sampling techniques via the use of sonar units capable of recording aquatic plant biomass. Annual pre-treatment surveys and plant biomass estimates are required because aquatic plant growth can change from year to year. As aquatic plant growth changes, the role of each management tool will also need to change accordingly.

Results from the pre-treatment survey should be made publicly available via the LMCD website, social media, and/or Social Pinpoint. Meetings should be held with bay captains, MNDNR, and other vested stakeholders to determine where aquatic plant management is proposed, determine site priorities, and determine the appropriate control tool. This exercise will begin with a review of previously managed areas such as provided in example Figure 3-1. Ultimately, all areas within the lake should be mapped and prioritized for management actions. The end goal of this exercise will be a bay-by-bay map showing all areas of the lake to be treated and the proposed method of control. A post-treatment survey will also be completed as a means of documenting treatment effectiveness from which recommendations for future treatments will be derived. All data collected will be maintained on the LMCD website in an effort to ensure transparency and document progress towards stated goals. These pre-planning steps will also provide data to compare in subsequent years to determine changes in vegetation and if any adjustments in management methods should be considered.

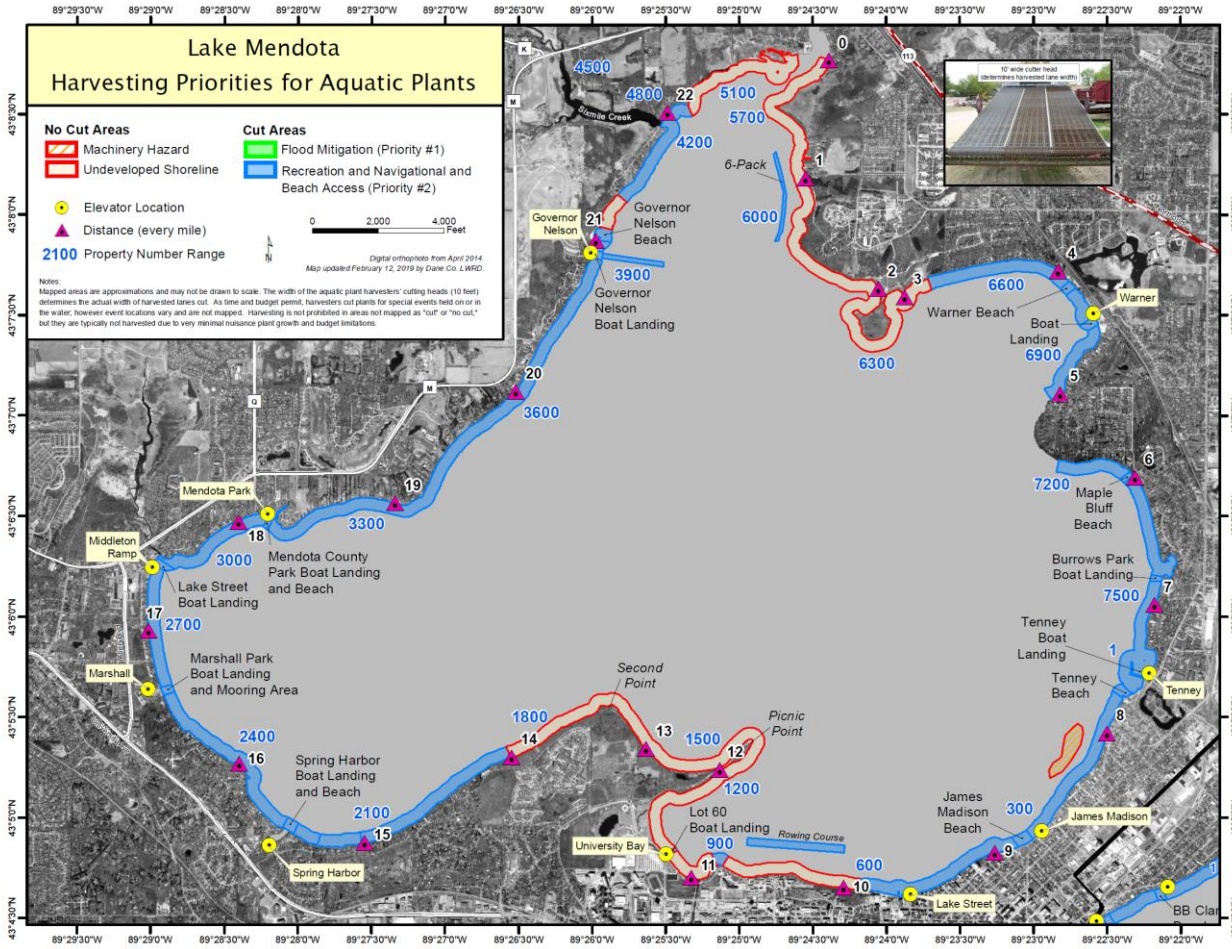


Figure 3-1. Example- Lake Mendota (Dane County) Harvesting Priorities for Aquatic Plants (source: Dane County Aquatic Plant Management Harvesting Program).

3.3. Recommended Approach for Aquatic Vegetation

A review of available mechanical, chemical, and biological treatments specific to the LMCD's role in aquatic vegetation management in Lake Minnetonka is presented in the AIS modules. The following section provides a scientific review of the three control tools (Physical, Chemical, and Biological) and provides a recommended management approach for where, when, and why these tools should be implemented in accordance with the following LMCD goals:

1. Enhance navigability for recreational and commercial use in public areas of Lake Minnetonka affected by EWM and CLP, or other nuisance vegetation
2. Management activities will maintain or increase native aquatic plants and water quality as appropriate.
3. Management activities will leverage the broadest sources of available funds.

The following section also includes a risk assessment for the recommended management approach.

3.3.1. Chemical Treatments

Herbicides: The use of aquatic herbicides is the most-often used technique to control aquatic plants in Minnesota and should be the primary mechanism for control of Lake Minnetonka's excessive aquatic vegetation for the following reasons:

1. Most cost-effective solution available, significantly less expensive than mechanical harvesting for controlling plants in large areas
2. The advent of new herbicides and continued research of existing herbicides has reduced risk to non-target species, new herbicides also require shorter contact times.
3. Studies on Lake Minnetonka have provided quantifiable reductions in EWM frequency.

Aquatic herbicides can be divided into two groups, including 1) systemic herbicides and 2) contact herbicides as approved by the Environmental Protection Agency (EPA) and Minnesota Department of Agriculture (MDA). Contact herbicides kill only the part of the plant which comes in direct contact with the herbicide. The root system is not killed and the plant may grow back from the roots. Systemic herbicides are absorbed by the plants and taken into the root system, so the whole plant can be killed. Systemic herbicides are specifically designed to minimize damage to non-target species whereas contact herbicides will damage all species in which they come into contact with, including native species. Sometimes a herbicide application is effective for several years but more frequently, it is an annual control. Rarely does an application result in the complete eradication of the target plant.

Historical Context: Lake Minnetonka has a history of using a variety of different types of herbicides for controlling EWM. In 2018, a whole-bay fluridone treatment on North Arm Bay reduced bay-wide EWM frequency from 61% of points to 0.6% of points sampled.

Also in 2018, a 27-acre portion of Grays Bay was treated with ProcellaCOR, a new herbicide first approved for use by the EPA in 2018. Initial results from the Grays Bay ProcellaCOR application demonstrated a 46% reduction in EWM frequency within the treated area (Heilman and Getsinger 2018); however, the overall abundance of EWM in Grays Bay increased because the 27 acre treated area represented less than 15% of the surface area of Grays Bay. Developing an understanding of the

scope of the herbicide treatment (bay-wide versus spot treatment) is therefore critically important when defining if the treatment was a success.

Recommendation: Results from 2019 aquatic plant focused meander survey efforts conducted on Lake Minnetonka found EWM and native plant growth is mostly light to moderate over much of the nearshore areas that are not involved with bay-wide management areas. In most cases, EWM was intermixed with native species. It is important to note aquatic vegetation density may vary significantly from year to year based on weather and other factors.

With the advent of herbicides like ProcellaCOR that are selective for EWM, the impact to non-target species can be minimized by using herbicides as the primary control technique rather than mechanical harvesting which is a non-selective control technique, thereby meeting the LMCD goal of increasing native aquatic plants. Furthermore, wide, expansive areas, like the EWM beds in Crystal Bay, are most cost effectively managed with herbicides, thereby meeting the LMCD goal of leveraging available funds.

It is recommended the LMCD work with the LMA, Lake Improvement Districts (e.g., North Arm Bay and Libbs Lake Association), and the MNDNR to identify the areas of the lake in which herbicide treatments are most likely to be effective and the type of herbicide that is best suited for the targeted area. The areas subject to control via herbicides are subject to change annually due to inter-annual changes in aquatic plant growth. Blue Water Science has prepared Table 1, which summarizes the corresponding characteristics for commonly used herbicides. The LMCD will also work with the MNDNR and the LMA and other stakeholders to evaluate which herbicide to use and when bay-wide techniques should be incorporated versus spot treatments on a bay-by-bay basis. In several cases, the University of Minnesota and MNDNR has found lake-wide increases in EWM frequency despite localized reductions in the portions of the lake in which a spot treatment occurred. These types of observations are difficult for stakeholders to understand and can be a very serious point of contention. To avoid confusion, the LMCD will work with all vested stakeholders to clearly identify the scope of the proposed treatment and clearly define the intended outcome. Post-treatment surveys will be conducted to evaluate progress towards goals from which future recommendations will be derived.

Risk Assessment

The following potentially negative impacts are associated with the recommended management approach:

1. Decomposing vegetation can lead to fluxes in dissolved oxygen and the release of nutrients, which can lead to reduced water clarity and algae blooms.
2. Aquatic herbicides can dissipate away from the targeted treatment area due to wind, waves.
3. Repeated use of herbicides with the same mode of action can lead to herbicide-resistance. Certain hybrid Eurasian watermilfoil genotypes have been documented as resistant. Lake Minnetonka has seven hybrids currently documented.
4. Research indicates that the use of 2, 4-D herbicides at current recommended concentrations (<2ppm whole lake; <4ppm spot treatment) could present risks to fathead minnow larval survival (Dehnert et. al., 2018).

Table 3-1. Summary of common aquatic herbicides and corresponding characteristics

Herbicide	Trade Name	Formulation and Contact or Systematic	Mode of Action	Advantages	Disadvantages	Systems Where Used Effectively	Plant Species Response	Use Rate (active ingredient)	Half-life
Copper Complexes (algaecide)	Cutrine-plus Cleatigate Captain Komeen K-tea	Various complexing agents **Contact**	Plant cell toxicant	Inexpensive rapid action, approved for drinking water	Doesn't biodegrade, but bio inactivates in sediments	Lakes higher exchange rates	Broad spectrum, acts in 7-10 days, up to 4-6 weeks	1 mg/l	2-8 Days
2-4, D	Navigate Aqua-Kleen	BEE salt DMA, liquid **Systemic**	Selective- plant growth regulator	Inexpensive, systemic	Non-target may be affected	Lakes and slow flow areas	Selective to broadleaf, acts in 5-7 days or up to 4-6 weeks	to 1.0mg/L	2-6 days
Diquat	Reward Weedtrine-D	Liquid **Contact**	Disrupts plant cell membrane integrity	Rapid action, limited drift	Does not affect underground portions	Shoreline, localized treatments, higher exchange rate areas	Broad spectrum, acts in 7 days	0.1-0.5 mg/L	< 48 hours
Endothall	Aquathol K Aquathol Super K Hydrothol 191	Liquid or granular **Contact**	Inactivates plant protein synthesis	Rapid action, limited drift	Does not affect underground portions	Shoreline, localized treatments, higher exchange rate areas	Broad spectrum, acts in 7 days	2-4mg/L	1-7 days
Flumioxazin	Clipper	**Contact**	Inhibits chlorophyll synthesis	Controls duckweed		Ponds and lakes	Broad spectrum	0.1-0.4 mg/l	
Fluridone	Sonar AS, SRP, PR, Q Avast!	Liquid or granular **Contact**	Disrupts carotenoid synthesis	Very low dosage required, systemic	Very long contact period	Small lakes, slow flow systems	Broad spectrum acts in 30-90 days	0.005-0.020 mg/l	20-80 Days
Florpyrauxifen-benzyl	ProcellaCOR	Liquid **Systemic**	Selective- plant growth regulator	Short contact time, systemic		Lakes higher exchange rates	Initial symptoms within a few days, plant death 2-3 weeks.	1-5 PDU	1-6 days
Glyphosate	Rodeo, AquaPro Aquamaster Aqua Neat Touchdown	Liquid **Systemic**	Disrupts synthesis of amino acids	Widely used, systemic	Very slow action, no submersed control	Emergent and floating leaf plants only	Broad spectrum, acts in 7-10 days up to 4 weeks	0.5-0.5 mg/L	
Imazamox	Clearcast	Liquid **Systemic**	Disrupts synthesis of amino acids	Systemic	Growth regulation of submersed plants, not death	Quiescent bodies of water	Growth regulation of submersed plants, acts in 1-2 weeks or more for foliar applications	Up to 0.5 mg/l	7-14 days
Imazapyr	Habitat	**Systemic**	Disrupts synthesis of amino acids	Systemic	Not recommended for submerged species	Emergent and floatingleaf plants only	Acts in several weeks	1.5 lbs ai/acre	
Penoxsulam	Galleon SC	Liquid **Systemic**	Disrupts synthesis of amino acids	Selective, few label restrictions, systemic	Very long contact period	Quiescent bodies of water	broad spectrum, acts in 60- 120 days	0.15 mg/l	
Triclopyr	Garlon 3A Renovate 3 Renovate OTF	Liquid **Systemic**	Selective plant growth regulator	Selective, inexpensive	Can injure other nearby broadleaf species	Lakes and slow flow areas	Selective to broadleaves acts in 5-7 days up to 2 weeks	1.0mg/L	12-72 hours

3.3.2. Mechanical Treatments

Mechanical Harvesting: Mechanical harvesting equipment comes in a wide variety of designs, however, most harvesters operate with the common goal of cutting, collecting, and subsequently removing aquatic plant material from a given portion of a waterbody. In most waterbodies, Mechanical harvesting is often viewed as a maintenance technique, although in some cases it is used as a long-term management strategy. In Lake Minnetonka, mechanical harvesting has most often been used to meet the LMCD's goal of enhancing navigability for recreational and commercial use in public areas of Lake Minnetonka affected by EWM and CLP. Additionally, a 2004 study conducted by Three Rivers Park District on Lake Minnetonka found that the mechanical harvesting program removed approximately 510 pounds of phosphorus per year at an estimated cost of $204 per pound, significantly lower than the estimated phosphorus removal costs for most watershed BMPs. The removal of phosphorus is in line with the LMCDs goal of increasing water quality.

Historical Context: The LMCD Harvesting Program has been in operation since 1989. Traditionally, the LMCD harvesting program has been used to provide immediate relief in areas of the lake where herbicides or other management approaches would not be as effective, are not permitted, or where an immediate solution was required such as in areas where vegetation hindered boater safety and/or usability. Previous harvesting efforts by the LMCD have not used GPS technology to map the path of harvesters. This has resulted in a lack of data showing acreage harvested in comparison with expended effort and a perceived lack of transparency amongst certain stakeholders.

Recommendation: The LMCD should continue to manage a harvesting program; however, the scope of the harvesting program will be significantly refined from previous years such that the total area harvested will be less than 100 acres/year. Mechanical harvesting will only be used in areas not suitable for herbicide use which will be the primary control mechanism for managing aquatic plant growth on Lake Minnetonka. Furthermore, harvesting will only focus on spatially defined areas that are 150 feet or further from shore with the exception of connecting channels and public boat landings. The LMCD will evaluate each potential harvesting site to determine if the LMCD should conduct the harvest or if it would be more cost efficient to hire a private contractor to conduct the harvesting. The LMCD will set up a contractor's short list and assign aquatic plant harvesting where it is needed. The most likely areas in which mechanical harvesting will be applied include:

- Areas that are not being targeted through herbicide treatments.
- Areas where dense native plant growth is impeding navigation and an immediate solution is required to provide recreational access to open water from riparian areas.
- Navigational channels from one bay to another.
- Areas where genetic composition of EWM/Hybrid EWM suggests resiliency to herbicides.
- Skimming of rafts of floating plant fragments in open water based on feedback received from Social Pinpoint, social media, or other communications.
- Primary contact recreation (swimming) areas where herbicide use may be undesirable.

As part of the mechanical harvesting program, the LMCD will consider scheduled aquatic plant pickups at docks on a bi-weekly basis to manage floating vegetation.

Risk Assessment

The following potentially negative impacts are associated with the recommended management approach:

1. Mechanical harvesters are not selective and remove native plants along with target weeds. However, most native plants will likely return by the next growing season or before.
2. Floating plant fragments produced during mechanical harvesting can be a concern because aquatic plants, including EWM, can regrow from even small pieces of fragmented vegetation. Homeowners downwind of the harvesting site may not appreciate having to regularly rake weeds and floating fragments off their docks and beaches.
3. Regrowth of cut vegetation can occur quickly. For example if EWM can grow 1 to 2 inches per day as reported, a harvest that cuts 5 feet deep could result in plants reaching the water surface again only one to two months after harvesting. Speed of regrowth depends of the target plant, time of year harvested, water clarity, water temperature and other factors.

3.3.3. Biological Treatments

Milfoil Weevil: The milfoil weevil (*Euhrychiopsis lecontei*) is a native insect found in many Midwestern lakes with native watermilfoil. The milfoil weevil has since adopted EWM as its preferred host following the introduction of EWM to North America. Research conducted by the University of Minnesota has found that the weevil performs best on EWM and poorest on the native northern watermilfoil. Interestingly, weevil performance on hybrid watermilfoil is better than on the native watermilfoil and may be better (Borrowman et al. 2015) or worse than on EWM (Roley and Newman 2006).

Historical Context: Research studies on the use of milfoil weevils to control EWM were first performed on Lake Minnetonka in the early 1990's by the MNDNR and Dr. Ray Newman at the University of Minnesota. Results from previous studies on Lake Minnetonka have shown that the milfoil weevil can control EWM when sufficient densities of the weevil are attained and maintained throughout the summer (Creed and Sheldon 1995, Newman 2004). However, milfoil weevil populations are typically not maintained at sufficient (<0.25/stem or <25/m2) enough density to fully control the plant (Newman 2004). In Lake Minnetonka, the presence of an abundant sunfish (*Lepomis spp.*) population, developed shorelines, and implementation of mechanical and chemical treatments all negatively impact weevil populations. Milfoil weevils are not currently commercially available for stocking; however, Dr. Sallie Sheldon, a professor at Middlebury College in Vermont has developed simple propagation methods. Using Dr. Sheldon's methodology, a student led effort on Christmas Lake; (Hennepin County) apparently reduced EWM abundance on Christmas Lake in 2019.

Recommendation: The LMCD will work with lake entities, Dr. Sallie Sheldon, University of Minnesota, and the Christmas Lake Association to identify several pilot study sites to replicate the weevil rearing and stocking methods used on Christmas Lake. Study sites will include areas that are not being targeted by herbicide treatments or mechanical treatments. Post-treatment surveys will be conducted to evaluate progress towards goals from which future recommendations will be derived. Blue Water Science participated in a weevil rearing effort near Big Island, Lake Minnetonka a decade

ago with limited results. Current research should be monitored to determine the potential for future reintroduction efforts.

Risk Assessment

The following potentially negative impacts are associated with the recommended management approach:

1. Milfoil weevils are not supplied/stocked in a sufficient density to provide adequate control of EWM resulting in an expansion of EWM in Lake Minnetonka.

3.4. AIS Modules

If an **AIS has been introduced** into the system, key personnel should be trained on the appropriate management strategies needed to control and slow the spread of the AIS. The "Management & Control Modules" outline those steps for key AIS that have already been introduced to Lake Minnetonka.

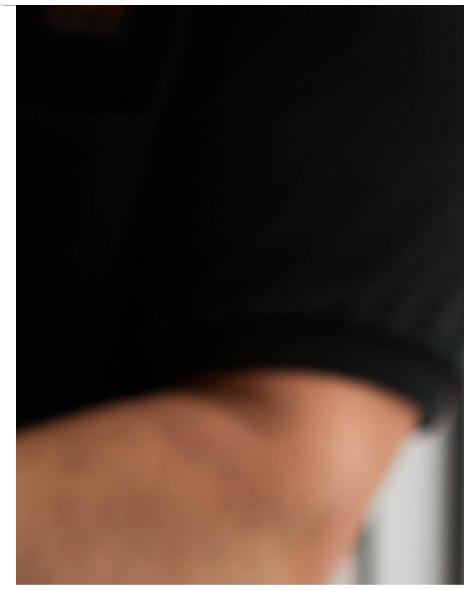
The modules include a brief summary of the AIS characteristics, the history of its spread, its life cycle, its impacts on the system, regulations associated with the AIS, and recommended control measures. They then go into its distribution in Lake Minnetonka, a description of the measures needed for its management, and a table of the roles and responsibilities for each task. As new information about management is learned, the modules will be updated in the AIS Module Section.

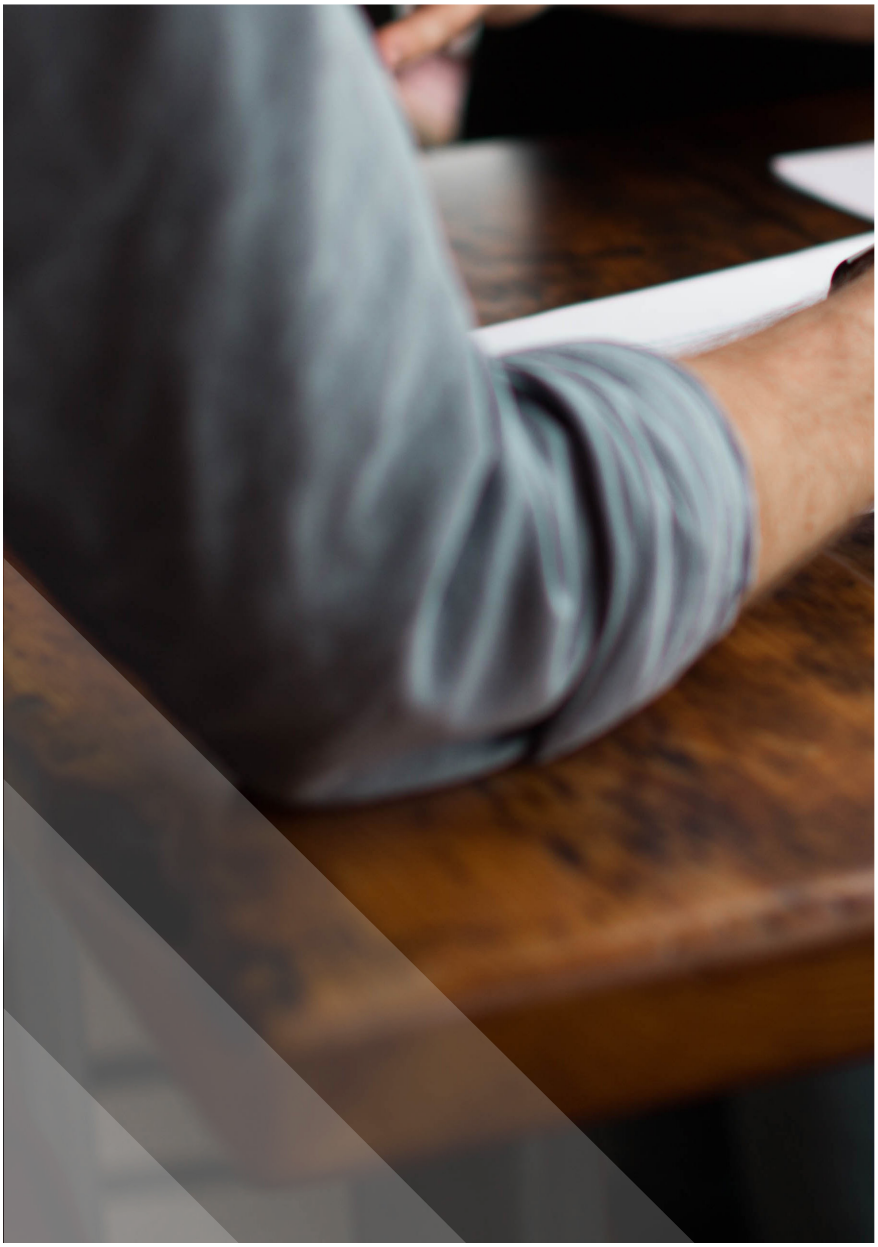
The management modules include:

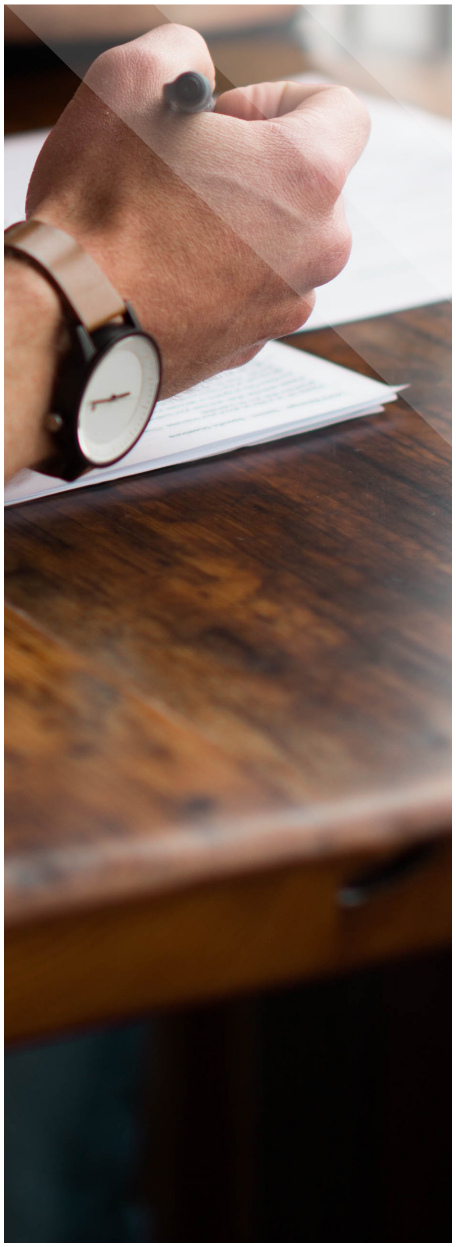
- Zebra mussels
- Eurasian watermilfoil
- Curly-leaf pondweed
- Flowering rush
- Purple loosestrife

Chapter 4:
Leadership and Coordination

- Entities involved in AIS Management
- Review of Past Leadership & Coordination
- Future of AIS Management on Lake Minnetonka







4. LEADERSHIP AND COORDINATION

4.1. Entities Involved in AIS Management

AIS is a complex problem that requires participation and involvement from an equally complex mix of entities and stakeholders. The US Forest Service, US Fish and Wildlife Service, US Army Corps of Engineers, National Park Service, MNDNR, county and tribal resource managers, local watershed districts, soil and water conservation districts, lake improvement districts, lake associations, local outdoor recreation organizations, chambers of commerce, non-profits, lake businesses and engaged citizens all play a role in AIS management. In the case of Lake Minnetonka the mix of partners and stakeholders includes local entities throughout the state who are working to prevent the spread of AIS from one waterbody to another. In order to efficiently manage AIS in Lake Minnetonka, these entities must collaborate and determine the most effective means for achieving the objectives laid out in this plan. During the development of the plan, it is important to point out the fluctuation in funding for AIS activities expressed by agencies and entities, and the change in strategic focus due to policy changes or agency needs.

4.1.1. Lake Organizations

Lake organizations are established by interested parties, included lake residents and users of the lake for the purpose of managing the improvement and preservation of lake quality. The focus of these organizations can vary, but they are typically centered on lake improvement efforts. The powers of these organizations, however, can vary significantly. Such organizations can include lake conservation districts, lake improvement districts, lake associations, recreation associations and nonprofit conservation organizations.

Lake Conservation Districts

Within the State of Minnesota, there are only two Lake Conservation Districts, The Lake Minnetonka Conservation District (LMCD) and the White Bear Lake Conservation District. The LMCD has evolved over time as new problems have been introduced, including the management of AIS and the prevention of new AIS. The LMCD has its own statute and set of powers, distinguished from those granted to Lake Improvement Districts. LMCD currently conducts watercraft inspections, harvests AIS in the lake, responds to suspect AIS reports, provides public education, and has contracted with EOR and Blue Water Science to develop this Lake Vegetation & AIS Master plan.

Lake Improvement Districts

In 1990, Minnesota Law established lake improvement districts (LIDs) with a purpose "to preserve and protect the lakes of the state." LIDs are established for three key reasons: 1) to manage water quality, 2) to manage water levels, and 3) to manage aquatic vegetation. As of 2009, there were thirty-two active LIDs in Minnesota. Lake Minnetonka has a few LIDs such as Carmen Bay and St. Albans Bay.

Lake Associations and Representatives

A Lake Association is an organization formed with no statutory requirement under the Law of Minnesota. Therefore, these associations do not have powers established to them by the government of Minnesota. Lake Associations contribute significant value to the management of lakes in Minnesota. In 2017, the Concordia Lake Association study found that more than $6.3 million and 1.2 million volunteer hours were being brought to lakes around the state through these lake association (Ibrahim et al. 2017). For most of these associations, the primary goal is to control AIS. The Lake Minnetonka Association (LMA) currently conducts chemical treatments of certain bays and recently started starry stonewort monitoring in Lake Minnetonka. The Libbs Lake Association provides an integrated approach to AIS management, which includes a public beach and channels. Other more informal activities are taken by bay representatives to coordinate with AIS management in their bays.

4.1.2. Local Governments

Local government is a key player in supporting the projects and programs in Lake Minnetonka. They provide financial, technical, and educational assistance along with many other public services that ultimately protect the quality and public access to the lake.

Hennepin County

Hennepin County pursues a variety of strategies to slow the spread of aquatic invasive species through AIS Prevention Grants from the State of Minnesota. Some past funded activities have included:

- Installing permanent boat-washing stations
- Redesigning public accesses
- Developing interactive educational displays
- Training volunteers to be early detectors
- Providing grants to cities, watersheds, park districts and lake associations (Hennepin County Environmental Services 2019)

Carver County

Carver County has an agreement with Hennepin County to provide certain resources for Lake Minnetonka.

Cities

There are 14 cities, in two counties, on and along Lake Minnetonka who are members of the LMCD and contribute an allocated amount of funds to the LMCD budget each year. These cities include Deephaven, Excelsior, Greenwood, Minnetonka, Minnetonka Beach, Minnetrista, Mound, Orono, Shorewood, Spring Park, Tonka Bay, Victoria, Wayzata, and Woodland.

Minnehaha Creek Watershed District

This watershed district (MCWD) was established in 1967 and is responsible for managing and protecting one of the largest and most heavily used urban watersheds in Minnesota. The MCWD governs 178 square miles, including 8 major creeks, 129 lakes, and thousands of wetlands. It is located in Hennepin and Carver counties, where they collaborate with local governments, agencies, and residents to put projects and programs in place that support the water resources and, in turn, recreational spaces, fish and wildlife habitat, and the environment within the watershed. The MCWD has completed many AIS projects or provided funding in the Lake Minnetonka region. It is currently conducting a carp management program in Halsteads Bay and will focus efforts to improve water quality in Lake Minnetonka through activities associated with Six Mile Creek.

4.1.3. Regional, State and Federal Agencies

There are many entities, outside of lake organizations that provide services for water protection and water quality in Minnesota. Agencies may provide services such as conducting research and enforcing regulations surrounding water management. Some agencies that provide Lake Minnetonka valuable services include the Minnesota Department of Natural Resources (MNDNR), Three Rivers Park District (TRPD), Hennepin County Environmental Services (HCES), the United State Geological Survey (USGS), University of Minnesota Fisheries and Wildlife, and University of Minnesota Aquatic Invasive Species Research Center (MAISRC).

4.1.4. Others

Other important supporters of Lake Minnetonka are marinas and other lake service providers, local residents, recreationalists (fishing, watersports, clubs, visitors, etc.), volunteers, local businesses, and environmental associations. Residents of the lake and those recreating on the lake provide a range of benefits to Lake Minnetonka, including volunteering time and equipment, providing financial contributions, and making general observations regarding AIS and water quality.

4.2. Review of Past Leadership & Coordination Efforts

The following activities are being conducted by the LMCD and/or other entities for the leadership and coordination of AIS management in Lake Minnetonka:

Plan Development: Plan development involves the generation of a long-term strategy for addressing AIS within a system (large or small). The plan usually includes a set of goals for the resource(s) and some actions for achieving those goals. Plan development requires leadership and coordination between many public and private entities.

Funding Resources: AIS management cannot be performed without financial resources. These resources are generally allocated through public entities governing the jurisdiction. Funding can come from public or private grants, taxes to local residents, and partnerships. Financial assistance is necessary to fund any of the actions outlined in this plan.

Training: Individuals who are conducting watercraft inspections and implementing management strategies for AIS are most effective with appropriate training. Training is typically conducted by government agencies and entities. The training may include early detection strategies, AIS inspection protocols, and other important skills and information.

Monitoring/Surveys/Research: AIS monitoring, surveys, and research are essential for efficiently and effectively addressing the AIS problems within a resource. The results from these activities are used to target areas for AIS management and to coordinate activities among various groups. Many surveys have been conducted in Lake Minnetonka and ongoing research and monitoring are being used to inform the recommendations in this plan. For example, Hennepin county funds research and pathway analysis for AIS including a U of M study on zebra mussel management in Lake Minnetonka and a survey of 13 lakes and ponds for the presence of AIS throughout Hennepin County. (Brough 2018).

4.3. Future of AIS Management on Lake Minnetonka

As stated in Section 1.2 *Purpose of the Plan,* the purpose of this plan is to consider existing AIS management efforts for Lake Minnetonka. The ultimate goal of this Plan is to develop a comprehensive vegetation and AIS management strategy for Lake Minnetonka that coordinates the efforts of all entities involved in AIS management in an effective and cost-effective manner. This first generation of the Lake Minnetonka Vegetation & AIS Master Plan takes stock of the LMCD's role in AIS management on Lake Minnetonka. This section identifies the next steps the LMCD intends to take in coordinating the development of a complete AIS Strategy/Master Plan for Lake Minnetonka.

- Adopt policy to establish the LMCDs role in vegetation and AIS management
- Clarify the roles and any future roles of each entity involved in AIS management for Lake Minnetonka
- Conduct 2020 Harvesting Pilot Study
- Hire or contract with a Professional Lake Manager
- Define the Goal for Invasive Plant Management
- Conduct On-going Lake Vegetation Delineation Surveys as Appropriate
- Maintain an Online Database for AIS Detection and Mapping
- Obtain and Consider the Input of All Stakeholders
- Complete the Lake Minnetonka Vegetation & AIS Master Plan

Each of these tasks are described in more detail below.

4.3.1. Policy Establishing LMCDs Role in AIS Management

Get a resolution from the LMCD Board stating that they are coordinating an AIS management planning effort.

4.3.2. Clarifying Roles of Others in AIS Management

Initial agency meetings were held in 2019. Continue to hold regular meetings with everyone working in AIS prevention on Lake Minnetonka. Meet with all entities to discuss what is being done and whether or not organizational goals are being achieved. Identify where each entity's resources are being allocated and what changes are planned for the future. This will minimize duplicity and identify ongoing and potential critical gaps in AIS management.

4.3.3. Conduct 2020 Harvesting Pilot Study

A 3-year pilot study will be managed by LMCD that utilizes contractors to harvest nuisance weeds rather than running an in-house aquatic vegetation harvesting program. Efficacy and costs of the program will be tracked during the course of the pilot.

4.3.4. Hire a Professional Lake Manager

LMCD will hire or contract with a qualified professional lake manager who will have the role of coordinating the LMCD aquatic vegetation management program and work collaboratively with

other lake entities on AIS activities. The Lake Manager shall possess the necessary limnological and administrative experience for this type of work.

4.3.5. Define the Goal for Invasive Plant Management

Establish lake-wide goal for invasive and plant management that is developed through collaboration with the lake entities and is science based.

4.3.6. Conduct On-going Vegetation Surveys

LMCD shall complete annual lake vegetation surveys in areas where data is not being collected. This data will be used to track trends, presence of new AIS, efficacy of control programs and be used to establish future management work on the lake.

4.3.7. Maintain Online Database

The lake data website will be maintained moving forward to keep a quality inventory of vegetation data and management activities on Lake Minnetonka. This database in built in a geographic interface viewable by the lake partners and the public.

4.3.8. Obtain and Consider the Input of All Stakeholders

Continue to engage stakeholders through avenues such as TAG meetings, the AIS Task Force as well as continue to support opportunities for the public to provide input through information meetings, public events, and online social media tools.

4.3.9. Complete Lake Minnetonka Vegetation and AIS Master Plan

Assume that the Plan will identify who is performing and/or responsible for the implementation of various activities related to AIS management and how these activities will be funded.

- Build on other plans completed to date.
- Hold an Annual Conference for Lake Minnetonka
- Acknowledge & utilize past work of other agencies.
- Define role or projected conclusions of the TAG/agencies moving forward so each entity understands the final product and process and any requested commitment moving forward.

The following table provides a template for visualizing the activities and tasks associated with managing AIS on Lake Minnetonka and some important activities in AIS prevention and management. This table will assist further development in AIS Master Plan process by providing a rough framework for identifying which entities are implementing what activities or have the capacity to contribute, with the understanding that it is dependent on fluctuating budgets and changing entity priorities. Information has been provided in the previous sections regarding specific activities based on meetings with the agencies.

Table 4-1. Framework Table for Illustrating Types of AIS Management Activities and Current Agency Activities.

This table indicates current types of agency activities on Lake Minnetonka. See the Leadership and Coordination Section for details. Agency activities are subject to change due to budget constraints, therefore, future activities are not reflected in this table.

	LMCD	Henn. Co.	Cities	MCWD	LMA	LIDs/Associations/ Bay Captains	MNDNR	MAISRC	USGS	U of M	TRPD	Contractors	Volunteers	Lake User s
Prevention Detection, Rapid Response														
Conduct monthly targeted searches (Jul-Oct)					X									
Press release if AIS are found	X						X							
Watercraft Inspections	X						X				X			
CD3 Cleaning Stations		X												
Conduct an initial exploratory search after the first report of an AIS observation	X						X							
Organize and train lake searchers for a full search effort & conduct expanded targeted search	X						X							
Meet to determine treatment options	X				X	X	X							
Close public access, if necessary														
Set-up containment area & treat	X						X							
Evaluate treatment & Report findings							X							
Management/Control														
Mechanical AIS control (Harvesting/hand pulling)	X			X		x								
Chemical AIS control (pesticides)					X	x								
Biological AIS control														
AIS Permits	X				X	x								
Leadership/Coord.														
Plan Development	X													
Training (e.g. Early Detection)	X						X							
AIS Monitoring/surveys/Research	X							X	X	X				
Enforcement	X													
Funding Resource		X	X											

Chapter 5: Funding Opportunities and Resources

5. FUNDING OPPORTUNITIES AND RESOURCES

A Vegetation & AIS management program cannot be successful without a clear plan for maintaining a sustainable source of both financial and technical assistance. Therefore, this plan must outline the resources needed to undertake AIS management on Lake Minnetonka and the strategies by which those resources can be acquired.

The LMCD's primary source of funding comes from two levies (admin and AIS) on the fourteen member municipalities. Additional funding comes from grants and rebates, interest, licenses and permits, court fines, and donations. The LMCD's budget for 2020 is $573,500, with approximately $80,000 allocated to AIS management.

Hennepin County has solicited applications for the Aquatic Invasive Species Prevention Grant for 2020. Hennepin County works to protect and preserve natural resources to enhance the quality of life for current and future generations. Through the Aquatic Invasive Species (AIS) Prevention Program, the county has about $200,000 of grant funds made available to help local units of government and organizations implement projects that prevent the spread of aquatic invasive species. The proposal deadline was January 23, 2020. LMCD and lake entities discussed application ideas and submitted to this grant program. Funds were not allotted to the LMCD for the requested watercraft inspections or lake shore owner education.

In 2019, an evaluation for the LMCD's harvesting plan was conducted which reviewed and assessed the comprehensive costs of its AIS harvesting program. A similar review should be completed in the next year to assess the financial commitments needed to conduct other AIS management projects and activities being funded by other entities. This information should then be used to develop a cost-effective plan for AIS management on Lake Minnetonka that outlines each of the entity's roles and the sources of funding that will be used to execute those responsibilities. Multiple funding options should be explored and pursued in this process, especially given the assumption that the LMCD and other entities do not have additional funds or diminishing funds beyond what is currently being contributed to AIS management.

Current funding relies on local property taxes and local sources. Existing funding sources do not consider this a state, county, or national problem. It is seen as a local problem. The thinking of officials needs to change. Dialogue with lakeshore owners/communities regarding possible funding resources, such as user fees, should begin. Understanding the costs, existing resources, and inequality is important.

6. AIS MODULES

Module 6-1. Zebra mussels

Module 6-2. Eurasian watermilfoil

Module 6-3. Curly-leaf pondweed

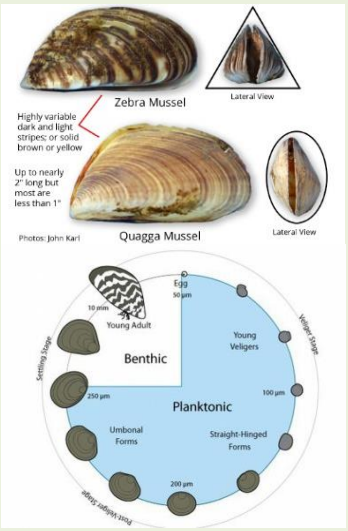
Module 6-4. Flowering rush

Module 6-5. Purple loosestrife

Module 6-6. Starry stonewort

Module 6-7. Spiny waterflea

Module 6-8. Hydrilla



Characteristics:

- ¼ - 1 ½ inch long 2 shelled (bivalve) molluscs.
- Shell is wedge-shaped, similar to the letter "D".
- Shell consists of alternating yellow/brown stripes in zigzag pattern
- Shells form straight line when closed

Can be mistaken for

Quagga Mussels (Invasive), Asian clam (Invasive), Native snails

History:

Zebra mussels (ZM) were first reported in Lake Minnetonka on July 27, 2010. Results from a Minnehaha Creek Watershed District (MCWD) study conducted from 2011-2016 found extremely high populations of ZM in bays like Wayzata Bay which has moderate algae growth whereas populations of ZM were significantly lower in Halsteds Bay which has significantly higher algae growth. In 2016, the MCWD worked with the University of Minnesota to initiate field tests using low doses of a copper-based product (EarthTec QZ) to kill off ZM. Attempts to eradicate ZM in Minnesota have been largely unsuccessful to date, however, researchers have been able to exterminate more than 90 percent of the invasive populations in trial experiments. Research is currently being conducted on Lake Minnetonka to identify the correct application dosage which will kill ZM without harming native species.

Life Cycle:

A single female ZM can produce up to 500,000 eggs per year. Upon fertilization, the eggs develop into free-floating microscopic larvae referred to as veligers. The veliger stage lasts for approximately three weeks during which ZM begin to form shells. After two to three weeks, the veligers fall out of the water column and attach to any firm surface using tiny fibers also known as byssal threads. ZM grow to reproductive size within 12 to 18 months (University of Minnesota - Extension 2019).

Impacts:

The filtration of algae by zebra mussels can starve native fish and wildlife by removing microscopic plants and animals from the base of the food web.

Regulations:

ZM is classified as a "prohibited invasive species" in the state of Minnesota. It is unlawful to possess, import, purchase, transport, or introduce except under a permit for disposal, control, research, or education.

Control:

The following molluscicides have been used for pilot projects to control ZM in Minnesota:

1) EarthTec QZ® (Recommended)
2) Zequanox®
3) Cutrine Ultra® (chelated copper)
4) Potassium chloride

Bay Suitability and Distribution:

In 2010, Blue Water Science developed a table outlining ZM growth potential for all Bays in Lake Minnetonka based on Table 3.7 in Mackie & Claudi's 2010 book titled: "Monitoring and Control of Macrofouling Mollusks in Fresh Water Systems". Table 1 outlines specific criteria which can be used to determine the susceptibility of a given waterbody to infestation by zebra mussels. Table 2 shows the suitability for ZM growth based on water quality data collected in 2009 and 2010 (prior to ZM infestation) (McComas, Singh, and Dooley 2010).

Table 1. Water column zebra mussel suitability criteria. Source – Mackie and Claudi, 2010

Parameter	Low Potential for Adult Survival	Low Potential for Larval Development	Moderate (survivable, but will not flourish)	High (favorable for optimal growth)
Calcium (mg/l)	<8	8 - 15	15 - 30	>30
Dissolved oxygen (mg/l)	<3	3 - 7	7 - 8	>8
Temperature (C)	<10 or >32	26 - 32	10 - 20	20 - 26
pH	<7.0 or >9.5	7.0 - 7.8 or 9.0 - 9.5	7.8 - 8.2 or 8.8 - 9.0	8.2 - 8.8
Potassium (mg/l)	>100	>50 (prevents settlement)	40 - 50	<40
Hardness (mg/l)	<30	30 - 35	55 - 100	100 - 280
Alkalinity (as mg CaCO3/l)	<30	30 - 55	55 - 100	100 - 280
Conductivity (umhos)	<30	30 - 60	60 - 110	>110
Secchi depth (m)	<1 or >8	1 - 2 or 6 - 8	4 - 6	2 - 4
Chlorophyll a (ug/l)(food source)	<2.5 or >25	2.0 - 2.5 or 20 - 25	8 - 20	2.5 - 8
Total phosphorus (ppb)	<5 or >50	5 - 10 or 35 - 50	10 - 25	25 - 35

Table 2. Lake Minnetonka bays water quality (2009 and 2010) and suitability for zebra mussel growth. Key: green = light growth; yellow = moderate growth; and red = heavy growth. Source – Steve McComas, 2010.

Water Column Suitability Rating for Individual Bays	Dissolved Oxygen			Calcium (mg/l)	pH	Alkalinity (mg/l)	Cond. (umhos)	Secchi Disc (m)	TP (ug/l)	Chl. a (mg/l)
	Depth where DO is less than 3 mg/l (ft)	Depth range where DO is 3-6 mg/l (ft)	Depth range where DO is greater than 6 mg/l (ft)							
Black Lake	20	13 – 20	0 – 13	33 - 34	7.9 - 8.3	130	405	1.3 - 2.5	30 - 35	12 - 20
Carman Bay	36	26 – 36	0 – 26	35	7.5 - 8.1	138	415	3.2 - 3.3	15 - 27	3 - 8
Carsons Bay	20	13 – 20	0 – 13	32 - 36	7.8 - 8.4	123	420	3.0 - 3.6	18 - 20	1 - 5
Cooks Bay	30	20 – 30	0 – 20	35 - 36	7.8 - 8.1	128	400	1.6 - 2.3	25 - 30	10 - 14
Crystal Bay	30	23 – 30	0 – 23	37 - 38	7.4 - 7.7	138	460	2.6 - 3.1	19 - 24	5 - 6
Forest Lake	20	13 – 20	0 – 13	32 - 39	7.5 - 8.0	138	470	0.4 - 1.1	56 - 62	33 - 101
Grays Bay	23	16 – 23	0 – 16	35 - 36	8.0 - 8.4	135	420	1.7 - 3.0	22 - 28	5 - 8
Halsted Bay	23	13 – 23	0 – 13	40 - 42	7.7 - 8.1	145	380	0.4 - 0.8	96 - 116	60 - 122
Harrisons Bay	23	16 – 23	0 – 16	37 - 40	7.8 - 8.4	141	430	0.5 - 1.3	51 - 59	25 - 76
Jennings Bay	20	13 – 20	0 – 13	43 - 44	7.9 - 8.5	152	440	0.4 - 1.2	79 - 123	35 - 91
Lafayette Bay	33	20 – 33	0 – 20	35	7.7 - 8.5	--	425	3.2 - 3.4	16 - 21	2 - 6
Lower Lake N.	41	30 – 41	0 – 30	35 - 36	7.6 - 8.2	135	435	3.2 - 3.7	13 - 18	3 - 4
Lower Lake S.	39	26 – 39	0 – 26	36	7.4 - 8.0	--	435	3.2 - 3.8	15 - 20	3 - 5
Maxwell Bay	26	20 – 26	0 – 20	38	7.4 - 7.8	--	450	1.6 - 2.1	26 - 30	8 - 14
North Arm	23	20 – 23	0 – 20	35 - 37	7.3 - 7.7	134	437	1.5 - 2.3	27 - 29	8 - 14
Peavey Lake	13	7 – 13	0 – 7	72 - 80	6.6 - 6.7	215	1,640	1.3 - 2.7	49 - 90	21 - 59
Phelps Bay	23	20 – 23	0 – 20	34 - 34	7.4 - 8.4	--	400	2.1 - 2.6	20 - 25	4 - 7
Priests Bay	23	16 - 26	0 – 16	35 - 37	7.8 - 8.3	134	400	0.9 - 2.2	28 - 45	14 - 36
Smithtown Bay	30	20 - 30	0 – 20	34 - 35	7.2 - 8.0	--	405	2.3 - 2.7	19 - 28	7 - 8
Spring Park Bay	23	16 - 23	0 – 16	34 - 35	7.8 - 8.4	137	410	2.8 - 3.3	17 - 24	4 - 8
St. Albans	30	23 - 30	0 – 23	28 - 33	7.9 - 8.5	114	405	3.0 - 4.3	15 - 18	2 - 4
Stubbs Bay	20	16 - 20	0 – 16	41 - 42	7.7 - 8.1	--	460	0.8 - 1.5	36 - 42	14 - 42
Tanager Lake	16	13 – 16	0 – 13	44 - 46	7.8 - 8.4	152	430	0.4 - 1.1	71 - 104	38 - 97
Wayzata Bay	36	26 – 36	0 – 26	34 - 36	8.0 - 8.3	135	430	3.6 - 3.9	13 - 17	2 - 6
West Arm	26	13 – 26	0 – 13	38 - 41	7.8 - 8.3	146	440	0.5 - 1.4	58 - 79	26 - 82
West Upper Lake	30	23 - 30	0 – 23	34 - 35	7.2 - 7.8	--	415	2.4 - 2.8	21 - 23	7 - 9

Since 2010, the MCWD have closely monitored the way ZM spread throughout Lake Minnetonka and subsequently their effect on water quality. Based on data collected to date, ZM appear to proliferate in bays with moderate amounts of algae such as Wayzata Bay while struggling to take hold in bays with too low or too high levels of algae. Halsteds Bay is an example where high concentrations of blue-green algae limit ZM growth (Figure 1) (Minnehaha Creek Watershed District 2016).

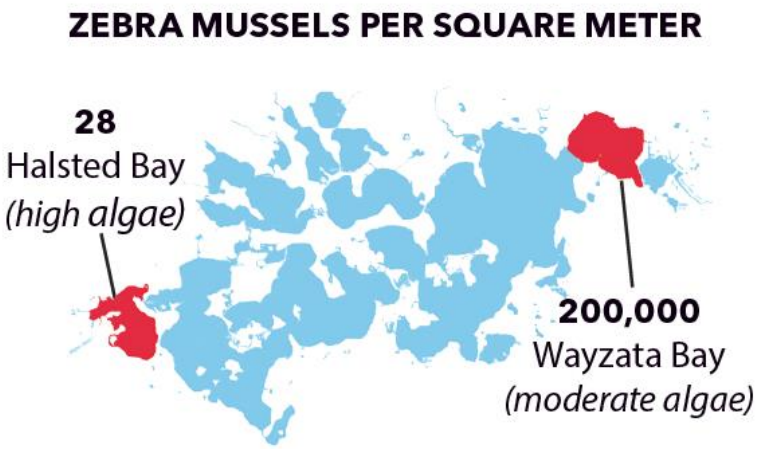


Figure 1. Zebra Mussels per Square Meter

In 2016, the MCWD divided Lake Minnetonka into three groups based on predicted ZM growth (Figure 2). Because water quality tends to improve as it flows towards Grays Bay Dam, the eastern portion of Lake Minnetonka appears to have the right composition of algae for optimal ZM growth. In these basins, ZM research is indicating improved water clarity and reductions in chlorophyll-a concentrations (Dooley 2017).

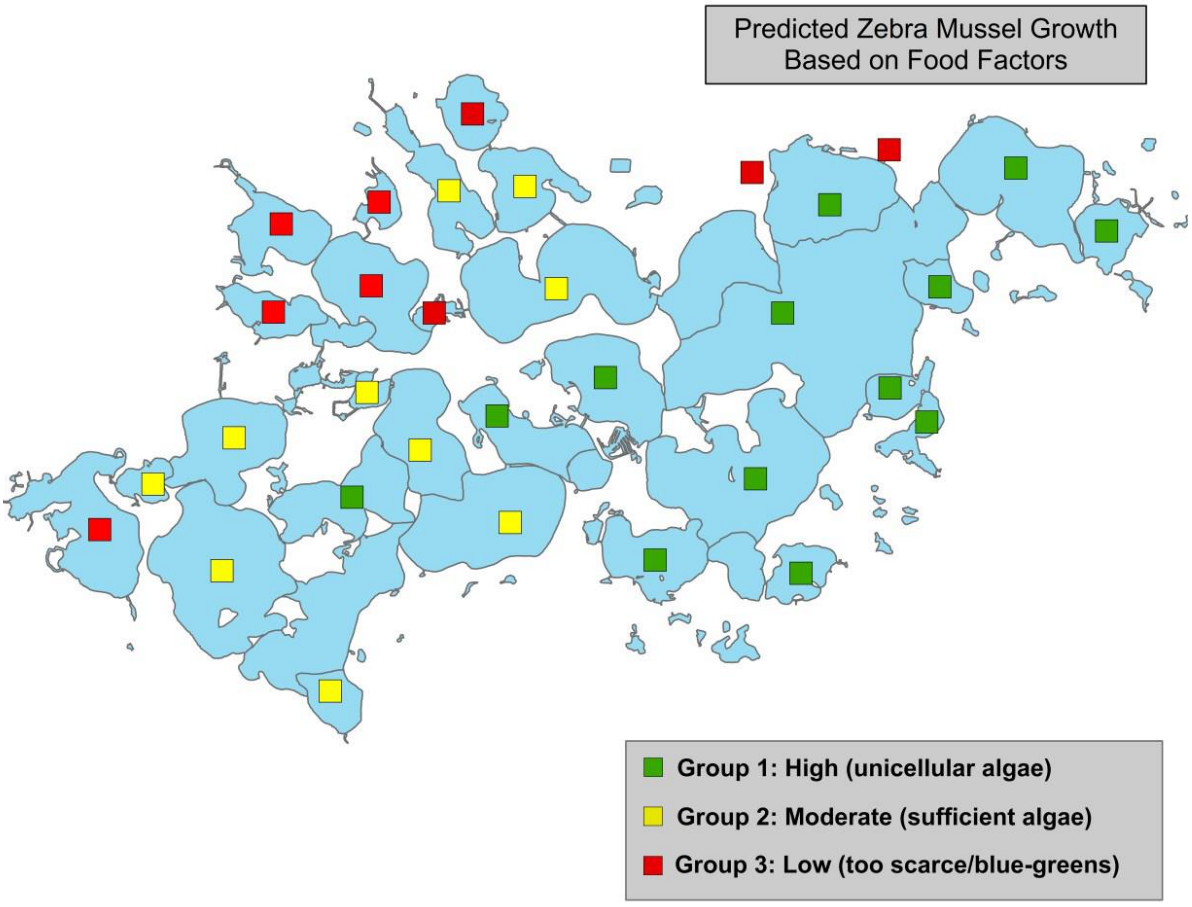


Figure 2. Predicted ZM growth based on food factors. Source – MCWD 2016 Research and Monitoring Report

Management Tools:

The United States Geological Survey (USGS), MCWD, and Minnesota Aquatic Invasive Species Research Center (MAISRC) are exploring innovative and efficient ways to control ZM. Key findings and accomplishments most relevant to Lake Minnetonka include:

1) Completed sequencing of a draft genome of the ZM in order to isolate markers to study spread and explore possible genetic weaknesses that can be targeted for control.
2) Established best practices for using EarthTec QZ, a commercially available molluscicide, to control population by suppressing veligers.
3) Evaluated the influences of temperature and exposure duration on the toxicity of two U.S. EPA-registered (EarthTec QZ and Zequanox) and two nonregistered (niclosamide and potassium chloride) molluscicides to zebra mussels at water temperatures of 7, 12, 17, and 22 °C (MAISRC 2018).

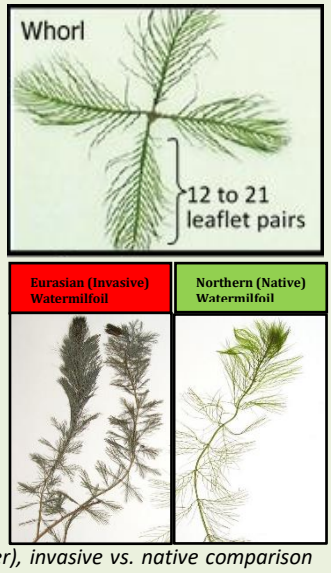
In 2019, researchers from the USGS and MAISRC embarked on a ZM control research project on St. Albans Bay, which will evaluate the use of low-dose EarthTec QZ (copper) treatments to manage ZM populations by suppressing their early life stages. In another treatment using EarthTec QZ in 2018 in a 29 acre quarry in Bainbridge, Pennsylvania, quagga mussels apparently were eradicated from the entire quarry (EarthTec QZ 2018). A 2016 EarthTec QZ treatment of a 29-acre bay of Lake Minnewashta resulted in a 100 percent kill of mussels over a 10 day application period (Fieldseth and Sweet 2016).

Table 3 provides a list of the specific actions and the active roles the LMCD and partnering organizations will take to minimize the harmful impacts of ZM on Lake Minnetonka.

Table 3. Specific Actions for controlling existing populations of ZM to minimize harmful impacts. Source – Adopted from WDNR AIS Management Plan.

Strategy	Specific Actions	Lead Organizations	LMCD Role
Program Maintenance	Provide funding for AIS control actions	DNR, Hennepin County, 14 Cities on Lake Minnetonka	Secure funding as it becomes available to fund AIS control actions
	Invest in other parts of AIS management (outreach, monitoring) to limit the need for expensive control actions	DNR, LMCD	Continue to maintain transparency with the public in regards to efforts to control ZM on Lake Minnetonka through the use of social media, the LMCD website and/or Social Pinpoint
Research	Invest in new control technologies	DNR, LMA,LMCD, University of MN	Continue to work with the University of Minnesota and USGS to evaluate the use of new technologies to control ZM in Lake Minnetonka.
	Better understand and refine existing control technologies. Continue to implement pre/post treatment monitoring for research purposes	DNR, LMA,LMCD, University of MN	Maintain pre and post treatment results in comparison with goals on ArcGIS Online or through LMCD website to maintain transparency with the public.
Collaboration	Share research outputs with local, state and regional partners. Work across organizations to better communicate control options and their benefits and consequences	DNR, LMA,LMCD, University of MN	Continue to communicate with industry professionals to ensure AIS management efforts on Lake Minnetonka continue to incorporate the latest science and best management practices.

Eurasian Watermilfoil (EWM) (*Myriophyllum spicatum) MANAGEMENT*



Photos. *Mechanical removal (left), whorls with leaflets (upper), invasive vs. native comparison (lower)*

Characteristics:

- 3-5 feathery leaves arranged in whorls
- Each leaf has 12-21 leaflets.
- Stems are long, stringy, and limp when out of water
- Flowers: small, reddish, above water surface by mid-summer

Can be mistaken for

Northern watermilfoil, coontail

History:

Eurasian watermilfoil (EWM) was first discovered in 1987 in Excelsior Bay, the first reported case of EWM in Minnesota. A 1988 inspection found that EWM was widespread throughout Lake Minnetonka. In response, the LMCD coordinated a series of public meetings and forums to evaluate the best means of managing EWM from which a EWM Task Force was established to provide professional guidance to the LMCD. Since 1987, the LMCD has worked collaboratively with the University of M and others on pioneering efforts to manage EWM using physical, biological, and chemical treatments.

Life Cycle:

Eurasian watermilfoil is capable of reproducing from both fragments and seeds. EWM is also capable of hybridizing with native northern watermilfoil. Although reproduction from seeds was thought to be uncommon, the presence of hybrids suggests that sexual reproduction does occur. EWM naturally auto-fragments in mid to late summer, allowing small branches of the plant to break off and form roots at new locations. Any fragment of the plant stem that includes a whorl of leaves is capable of producing a new viable plant.

Impacts:

- Establishes dense mats at surface of water
- Outcompetes natives & can lower diversity in the lake in the short term. Long-term impacts are variable.
- Interferes with recreation, inhibits water flow, impedes navigation (MAISRC, 2018)

Regulations:

EWM is classified as a "prohibited invasive species" in the state of Minnesota. It is unlawful to possess, import, purchase, transport, or introduce except under a permit for disposal, control, research, or education.

Control:

There are three methods of control:

1) Mechanical Control
   –Mechanical harvesting, hand pulling, suction dredging, DASH
2) Herbicide control
   – Systemic: Examples include 2,4-D, ProcellaCOR, Sonar
   – Contact: Diquat, Endothall
3) Biological Control
   –Milfoil Weevil (*Euhrychiopsis lecontei*)

Eurasian Watermilfoil (EWM) (*Myriophyllum spicatum) MANAGEMENT*

Distribution:

In 2019, the LMCD published the first, comprehensive inventory of EWM for all of Lake Minnetonka in the form of an interactive ArcGIS Online Map, which can be accessed via the LMCD website. Data within the online map represents the collective mapping efforts from surveys conducted by Minnehaha Creek Watershed District, University of Minnesota, Minnesota Department of Natural Resources, Lake Minnetonka Association, Blue Water Science, and Emmons and Olivier Resources. Where possible, the distribution and density for each sampling point containing EWM was ranked on a scale from 0-3, where a density ranking of 1 indicates only a few individual plants at a sample site while a ranking of 3 indicates an abundance of plants. Results from survey efforts conducted in 2019 found that the EWM growth was mostly light to moderate and often found to be intermixed with native species. A comparison of EWM growth conditions is shown in Table 1. The portions of the lake in which EWM was found at a ranking of 2 or 3 represent the priority for future management efforts.

Table 1. Eurasian Watermilfoil Growth Characteristics: Source – Steve McComas Blue Water Science

EWM Presence (Growth Condition)	Description	Rake Density Equivalent	Stem Density/ Biomass	Example Image
Rare (Light)	Plants rarely reach the surface. Navigation and recreational activities generally are not hindered.	1, 2	**Stem density:** 0 - 40 stems/m2 **Biomass:** 0-51g-dry wt/m2	
Common (Moderate)	Broken surface canopy conditions. However, stems are usually unbranched. Navigation and recreational activities may be hindered. **Lake users may opt for control.**	2, 3	**Stem density:** 35 - 100 stems/m2 **Biomass:** 30-90g-dry wt/m2	
Abundant (Heavy)	Solid or near solid surface canopy conditions. Stems typically are branched near the surface. **Control is necessary for navigation and/or recreation.**	3	**Stem density:** 250 + stems/m2 **Biomass:** >285g-dry wt/m2	

Eurasian Watermilfoil (EWM) (*Myriophyllum spicatum) MANAGEMENT*

Management Goals:

The LMCD has established the following management goals with regards to managing EWM in Lake Minnetonka:

1. Enhance navigability for recreational and commercial use in public areas of Lake Minnetonka affected by EWM and CLP.
2. Management activities will maintain or increase native aquatic plants and water quality.
3. Management activities will leverage the broadest sources of available funds.

Management Areas:

The LMCD focuses control activities to public areas of the lake where there will be an identified public benefit. These public areas are defined as the following:

1. All areas 150 feet offshore and outside of the authorized dock use areas as established by LMCD Code; or
2. All areas adjacent to publically owned land or other public access points and destinations.

Private Areas - Plant control in areas outside of the defined public use areas would be the responsibility of the private property owners. Generally, these are areas within 100 feet of the lake shoreline (LMCD AIS Sub-committee 2012).

Management Tools:

The following EWM management tools have been evaluated and implemented for controlling EWM on Lake Minnetonka:

- Mechanical harvesting
- Systemic herbicides
- Contact herbicides
- Hand pulling
- Biological control

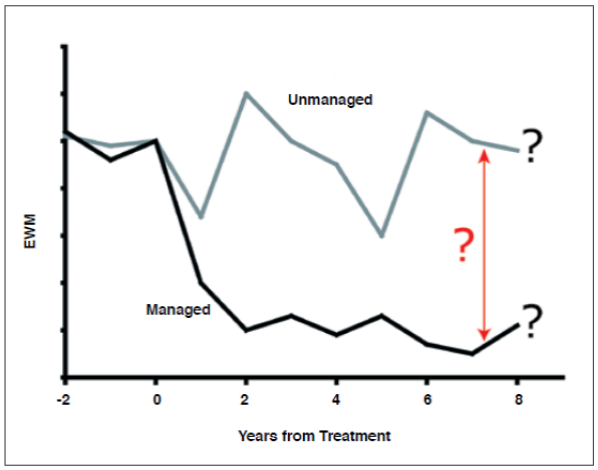


Figure 1. Conceptual figure showing the relationship between the abundance of EWM over time, subject to management or not. Source WDNR

While all aquatic plant management techniques have positive and negative attributes, both mechanical harvesting and systemic herbicides should be used as part of an integrated EWM management approach for Lake Minnetonka. The combined use of these two techniques have the greatest chance of achieving management goals when applied in the appropriate space and time. Ultimately, EWM will reach a certain equilibrium in Lake Minnetonka with or without management (Figure 1). This equilibrium is likely to change due to impacts from zebra mussels, climate change, and changing weather patterns from year to year. The amount of EWM that is deemed acceptable is ultimately based on the opinions of those who value Lake Minnetonka as a resource (Nault et al. 2012).

Eurasian Watermilfoil (EWM) (*Myriophyllum spicatum) MANAGEMENT*

Table 2 provides a list of the specific actions and the active roles the LMCD and partnering organizations will take to minimize the harmful impacts of EWM on Lake Minnetonka.

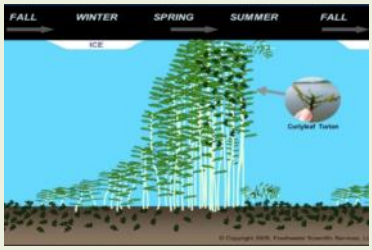
Table 2. Specific Actions for controlling existing populations of AIS to minimize harmful impacts. Source – Adopted from WDNR AIS Management Plan.

Strategy	Specific Actions	Lead Organizations	LMCD Role
Program Maintenance	Provide funding for AIS control actions	DNR, Hennepin County, 14 Cities on Lake Minnetonka	Secure funding as it becomes available to fund AIS control actions
	Implement integrated EWM management approach for control activities	DNR, LMCD, LMA	LMCD to work collaboratively with the DNR and the LMA to implement both mechanical and herbicide controls at clearly defined spaces in time
	Invest in other parts of AIS management (outreach, monitoring) to limit the need for expensive control actions	DNR, LMCD	Continue to maintain transparency with the public in regards to efforts to control EWM on Lake Minnetonka through the use of social media, the LMCD website and/or Social Pinpoint
Research	Invest in new control technologies	DNR, LMA,LMCD, University of MN	Continue to work with the University of MN to evaluate the use of new technologies to control EWM in Lake Minnetonka.
	Better understand and refine existing control technologies. Continue to implement pre/post treatment monitoring for research purposes	DNR, LMA,LMCD, University of MN	Incorporate GPS technology into pre and post treatment surveys. Evaluate return on investment from implemented management actions in terms of progress towards established, quantifiable goals. Maintain pre and post treatment results in comparison with goals on ArcGIS Online or through LMCD website to maintain transparency with the public.
Collaboration	Share research outputs with local, state and regional partners. Work across organizations to better communicate control options and their benefits and consequences	DNR, LMA,LMCD, University of MN	Continue to communicate with industry professionals to ensure AIS management efforts on Lake Minnetonka continue to incorporate the latest science and best management practices.

New Management Efforts

Lake Minnetonka has a history of being used as a testing ground for trying novel approaches for controlling EWM. For example, in 2018, a 27 acre portion of Grays Bay was treated with ProcellaCOR. ProcellaCOR is unique in that it uses 40-100x less active ingredient in comparison with other herbicides used to treat EWM. Initial results from the Grays Bay ProcellaCOR application demonstrated impressive control of EWM (Heilman and Getsinger 2018). DNR staff reported similar results for Lake Jane, in Washington County, MN where the frequency of EWM fell from 72% to 1% 45 days after the treatment of a 12 acre area (MNDNR 2018). An additional benefit of ProcellaCOR is a shorter contact time allows for effective spot treatments.

Curly-leaf Pondweed (CLP) (*Potamogeton crispus)* *MANAGEMENT*



Photos. *Mechanical removal (left), wavy leaves (upper), annual life cycle with turions (lower) (Source: North Lakeland Discovery Center)*

Characteristics:

- Undulating leaves are 0.5 inches wide and 2-3 inches long.
- Leaves are wavy with finely serrated edges.
- Stems can be white, green, brown or red
- Flowers: Typically in June, appears reddish/brown but actually green.

Can be mistaken for

Clasping-leaf pondweed, White-stem pondweed, Flatstem pondweed.

History:

Curly-leaf pondweed (CLP) was first reported in Minnesota in 1910 and has likely been in Lake Minnetonka since this time. CLP has not been the principal target of vegetation control in Lake Minnetonka. However, the LMCD has worked collaboratively with the University of Minnesota and others on pioneering efforts to manage CLP using physical, biological, and chemical treatments in years where climatic conditions have led to excessive CLP growth. In 2017, an early spring arrival triggered excessive curly-leaf pondweed growth on Lake Minnetonka which required the LMCD to more aggressively manage CLP.

Life Cycle:

Curly-leaf pondweed has a unique life cycle in that it begins growing during the winter via a turion. A turion is an overwintering bud that produces new CLP growth. The ability to start growing during the winter gives CLP a competitive advantage over native species as it is usually the first plant to reach the water surface in spring. CLP is more likely to form dense mats that interfere with recreation and displace native species during mild winters with less snow cover (Valley and Heiskary 2012). By early July, curly-leaf pondweed begins to rapidly die back, which can result in floating plant material as well as a release of nutrients which may be used by algae. Changing climate patterns resulting in reduced snow and ice cover will result in an increase in the abundance and distribution of CLP in Lake Minnetonka in the future.

Impacts:

- Mid-summer die back leads to floating vegetation; decomposition can deplete dissolved oxygen and promote phosphorus release from the sediments.

Regulations:

CLP is classified as a "prohibited invasive species" in the state of Minnesota. It is unlawful to possess, import, purchase, transport, or introduce except under a permit for disposal, control, research, or education.

Control:

There are two methods of control:

1) Mechanical Control
   –Mechanical harvesting, hand pulling, suction dredging, DASH
2) Herbicide control
   –Endothall (Aquathol®K) or diquat

Distribution:

In 2019, the LMCD published an interactive ArcGIS Online map that contains all available aquatic plant data collected to date on Lake Minnetonka including information depicting CLP abundance and/or presence/absence. The data is based on surveys conducted by Minnehaha Creek Watershed District, University of Minnesota, Minnesota Department of Natural Resources, and the Lake Minnetonka Association. A comprehensive, lake-wide survey of CLP abundance in Lake Minnetonka has **not** yet been completed. Figure 1 shows an example of available results for North Arm Bay and Crystal Bay. While some bays have recent data available from 2019, other bays have little or no information available with regards to CLP presence/absence and/or abundance.

Where possible, the distribution and density for each sampling point containing CLP was ranked on a scale from 0-3, a density ranking of 1 indicates only a few individual plants were observed at the sample site while a ranking of 3 indicates an abundance of plants. Results from survey efforts conducted in 2019 found that the CLP growth was mostly light to moderate. A comparison of CLP growth conditions is shown in Table 1. The portions of the lake in which CLP was found at a ranking of 2 or 3 represent the priority for future management efforts.

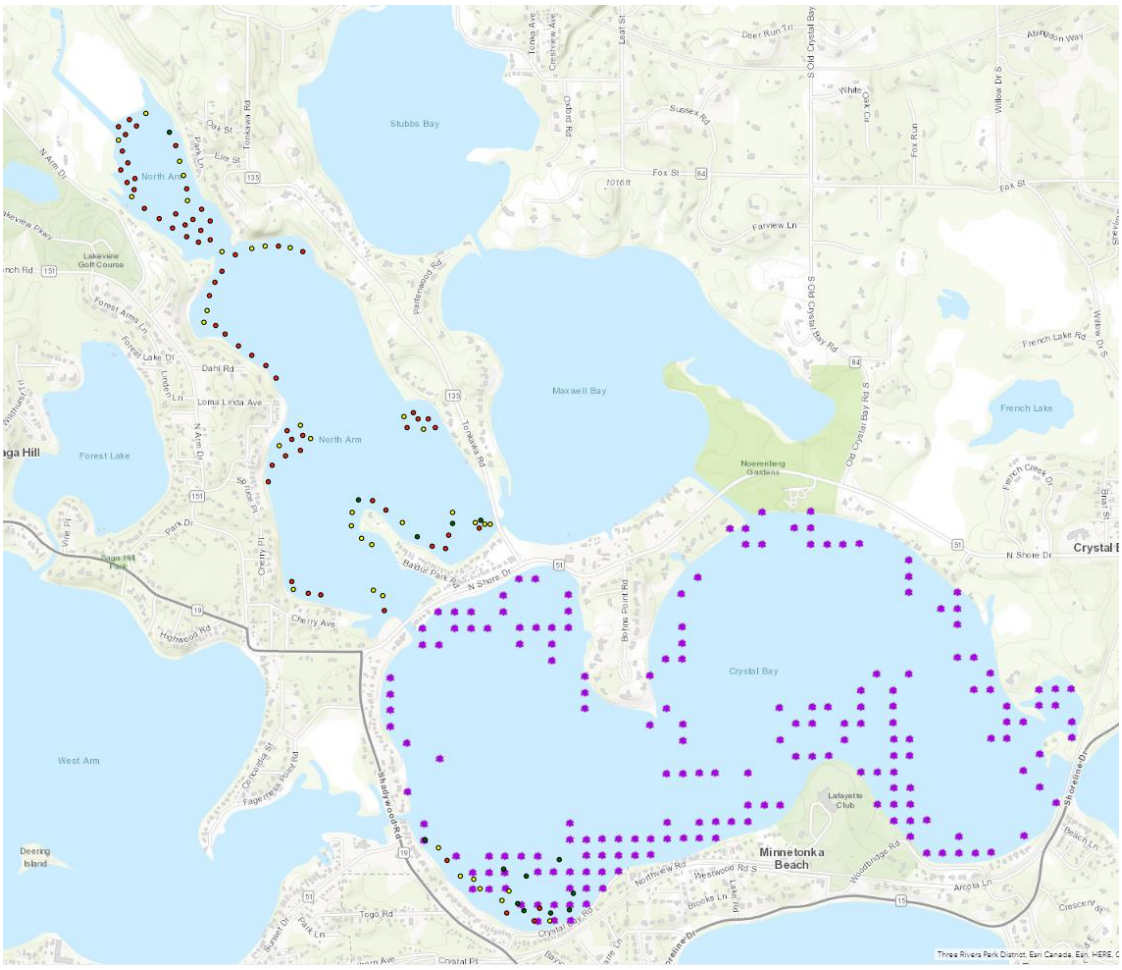


Figure 1. Lake Minnetonka LMCD Vegetation and AIS Master Plan ArcGIS Online map. Purple dots = CLP presence, red dots= abundant CLP growth, yellow dots = moderate CLP growth, green dots = light CLP growth.

Table 1. Curly-leaf Pondweed Growth Characteristics: Source – Steve McComas Blue Water Science

EWM Presence (Growth Condition)	Description	Rake Density Equivalent	Stem Density/ Biomass	Example Image
Rare (Light)	Plants rarely reach the surface. Navigation and recreational activities generally are not hindered.	1, 2	**Stem density:** 0 – 160 stems/m2 **Biomass:** 0-50g-dry wt/m2 **Estimated TP Loading:** <1.7 lbs/acre	
Common (Moderate)	Broken surface canopy conditions. However, stems are usually unbranched. Navigation and recreational activities may be hindered. **Lake users may opt for control.**	2, 3	**Stem density:** 100-280 stems/m2 **Biomass:** 50-85g-dry wt/m2 **Estimated TP Loading:** 2.2-3.8 lbs/acre	
Abundant (Heavy)	Solid or near solid surface canopy conditions. Stems typically are branched near the surface. **Control is necessary for navigation and/or recreation.**	3	**Stem density:** 400 + stems/m2 **Biomass:** >300g-dry wt/m2 **Estimated TP Loading:** >6.7 lbs/acre	

Management Goals:

The LMCD has established the following management goals with regards to managing CLP in Lake Minnetonka:

1. Enhance navigability for recreational and commercial use in public areas of Lake Minnetonka affected by EWM and CLP.
2. Management activities will maintain or increase native aquatic plants and water quality.
3. Management activities will leverage the broadest sources of available funds.

Management Areas:

The LMCD focuses control activities to public areas of the lake where there will be an identified public benefit. These public areas are defined as the following:

1. All areas 150 feet offshore and outside of the authorized dock use areas as established by LMCD Code; or
2. All areas adjacent to publically owned land or other public access points and destinations.

Private Areas - Plant control in areas outside of the defined public use areas would be the responsibility of the private property owners. Generally, these are areas within 100 feet of the lake shoreline.

Management Tools:

The following CLP management tools have been evaluated and implemented for controlling CLP on Lake Minnetonka:

- Mechanical harvesting
- Contact herbicides
- Hand pulling

While all aquatic plant management techniques have positive and negative attributes, both mechanical harvesting and herbicides should be used as part of an integrated CLP management approach for Lake Minnetonka. The combined use of these two techniques have the greatest chance of achieving management goals when applied in the appropriate space and time (LMCD AIS Sub-committee 2012).

Changing Climate: Future Management Implications

Research conducted by the DNR and MPCA in 2012 documented short-term declines in CLP on multiple Minnesota lakes following the snowy winters of 2009-2011 (Figure 2), indicating that the severity of winters, is potentially one of the factors that limits CLP growth. This research is supported by the finding that CLP often forms nuisance conditions in southern Minnesota lakes while in northern Minnesota lakes, CLP very rarely forms nuisance conditions. If changing climatic conditions result in shorter ice cover and/or more winter precipitation falling as rain, CLP is more likely to reach nuisance growth conditions in Lake Minnetonka as it did in 2017 where mechanical harvesting of CLP represented a significant management focus for the LMCD. Efforts to manipulate snow cover to locally manage CLP over targeted areas has been suggested as a potential management tool (Valley and Heiskary, 2012). The LMCD will continue to map CLP abundance and distribution in comparison with winter snowfall totals as a means of predicting the amount of resources which may be required to fully manage CLP.

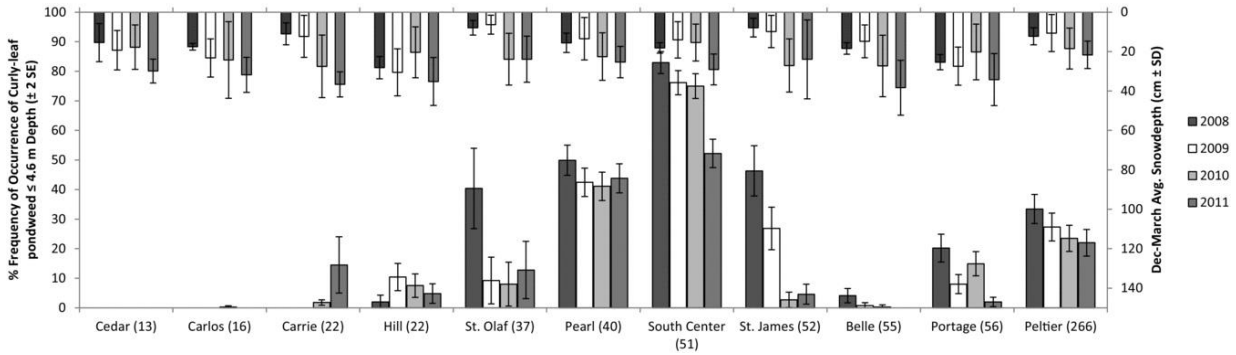


Figure 2. Curly-leaf pondweed frequency of occurrence in depths less than or equal to 4.6 m ± 2 Standard Errors and average monthly snow depth in centimeters ± 1 Standard Deviation (SD; top and right axes). Source – Valley and Heiskary, 2012.

Table 2 provides a list of the specific actions and the active roles the LMCD and partnering organizations will take to minimize the harmful impacts of CLP on Lake Minnetonka.

Table 2. Specific Actions for controlling existing populations of AIS to minimize harmful impacts. Source – Adopted from WDNR AIS Management Plan.

Strategy	Specific Actions	Lead Organizations	LMCD Role
Program Maintenance	Provide funding for AIS control actions	DNR, Hennepin County, 14 Cities on Lake Minnetonka	Secure funding as it becomes available to fund AIS control actions
	Implement integrated CLP management approach for control activities	DNR, LMCD, LMA	LMCD to work collaboratively with the DNR and the LMA to implement both mechanical and herbicide controls at clearly defined spaces in time
	Invest in other parts of AIS management (outreach, monitoring) to limit the need for expensive control actions	DNR, LMCD	Continue to maintain transparency with the public in regards to efforts to control EWM on Lake Minnetonka through the use of social media, the LMCD website and/or Social Pinpoint
Research	Invest in new control technologies	DNR, LMA,LMCD, University of MN	Continue to work with the University of MN to evaluate the use of new technologies to control CLP in Lake Minnetonka.
	Evaluate the impacts of ice and snow cover on curly-leaf pondweed abundance	DNR, University of MN	Work with the DNR and University of Minnesota to develop a predictive model which will help to predict the severity of curly-leaf pondweed infestation based on snow totals and duration of ice cover. Extrapolate findings to evaluate potential impacts of climate change on CLP abundance.
	Better understand and refine existing control technologies. Continue to implement pre/post treatment monitoring for research purposes	DNR, LMA,LMCD, University of MN	Incorporate GPS technology into pre and post treatment surveys. Evaluate return on investment from implemented management actions in terms of progress towards established, quantifiable goals. Maintain pre and post treatment results in comparison with goals on ArcGIS Online or through LMCD website to maintain transparency with the public.
Collaboration	Share research outputs with local, state and regional partners. Work across organizations to better communicate control options and their benefits and consequences	DNR, LMA,LMCD, University of MN	Continue to communicate with industry professionals to ensure AIS management efforts on Lake Minnetonka continue to incorporate the latest science and best management practices.

Flowering Rush (FR) (*Butomus umbellatus)* *MANAGEMENT*

Photos. *2015 Hand removal on Lake Minnetonka (left), flower (Upper), Detroit Lakes shoreline with flowering rush (lower)*

Characteristics:

- Flowers from June-August, 3 white/pink petals.
- Emergent leaves are thin, stiff, triangular in cross-section
- Grows submerged with floating leaves
- Roots are bulb-like and appear to "hug" or cup one another

Can be mistaken for

- Hardstem bulrush
- Giant bur-reed
- Sweet flag

History:

According to the Great Lakes Aquatic Nonindigenous Species Information Systems (GLANSIS) Flowering Rush (FR) was intentionally brought to North America from Europe as an ornamental plant. FR was first found in Lake Minnetonka in Maxwell Bay in 1976. In 2009, additional surveys conducted on Lake Minnetonka found flowering rush in nine bays. In 2009, the MCWD hired Waterfront Restoration, LLC to hand remove flowering rush at two test sites on Lake Minnetonka. A follow up survey conducted in 2012 by Blue Water Science found that hand removal was successful in removing flowering rush from areas with soft substrates but was not as effective in areas with hard substrates (gravel, rock). The MCWD has continued to support hand removal efforts for control of small areas as well as herbicide (Diquat) efforts to control FR. These efforts have been successful in preventing the spread of FR to other areas of the lake.

Life Cycle:

FR is a perennial that is capable of reproducing using four different methods (seed, vegetative bulbils on the rhizomes, vegetative bulbils on the flowers, and by fragmentation of the rhizomes). Most of the seed produced by FR in Minnesota is not viable, therefore the primary means of spread in MN is via rhizomes. FR rhizomes contain bulbils which can easily be broken off with minor disturbances such as waterfowl, passing boats, or normal wind and wave action.

Impacts:

- Interferes with recreational uses of the lake and may restrict boater access
- Outcompetes and displaces native species

Regulations:

Flowering rush is classified as a "prohibited invasive species" in the state of Minnesota. It is unlawful to possess, import, purchase, transport, or introduce except under a permit for disposal, control, research, or education.

Control:

There are three methods of control:

1) Hand digging (Recommended)
2) Herbicide control (Recommended)
   - Diquat
3) Cutting (Maintenance only)

Distribution:

In 2019, the LMCD published an interactive ArcGIS Online map that contains all available aquatic plant data collected to date on Lake Minnetonka including information depicting FR presence/absence. The FR data is largely based on surveys conducted by Minnehaha Creek Watershed District (MCWD) and BWS from 2012-2016. Figure 1 shows an example of available results for Brown's Bay, Crystal Bay, Lafayette Bay, Maxwell Bay, Smith's Bay, and areas adjacent to Big Island. These areas encompass documented areas in which FR has been found since 2011.

Results from a 2016 survey conducted by Blue Water Science found no FR in the hand pulling sites in Smith Bay except for some light growth in the NE end of the bay. An herbicide treatment conducted on the Maxwell Bay channel in 2014 and 2015 was highly successful as no FR was observed in Maxwell channel in 2016 except for some light growth at the north end of the channel. Overall, results of the 2016 survey indicate that FR is most common on the north side of Crystal Bay, FR does not appear to be expanding in these areas. Most importantly, results from the 2016 FR survey suggest that FR does not appear to be expanding very rapidly in Lake Minnetonka.

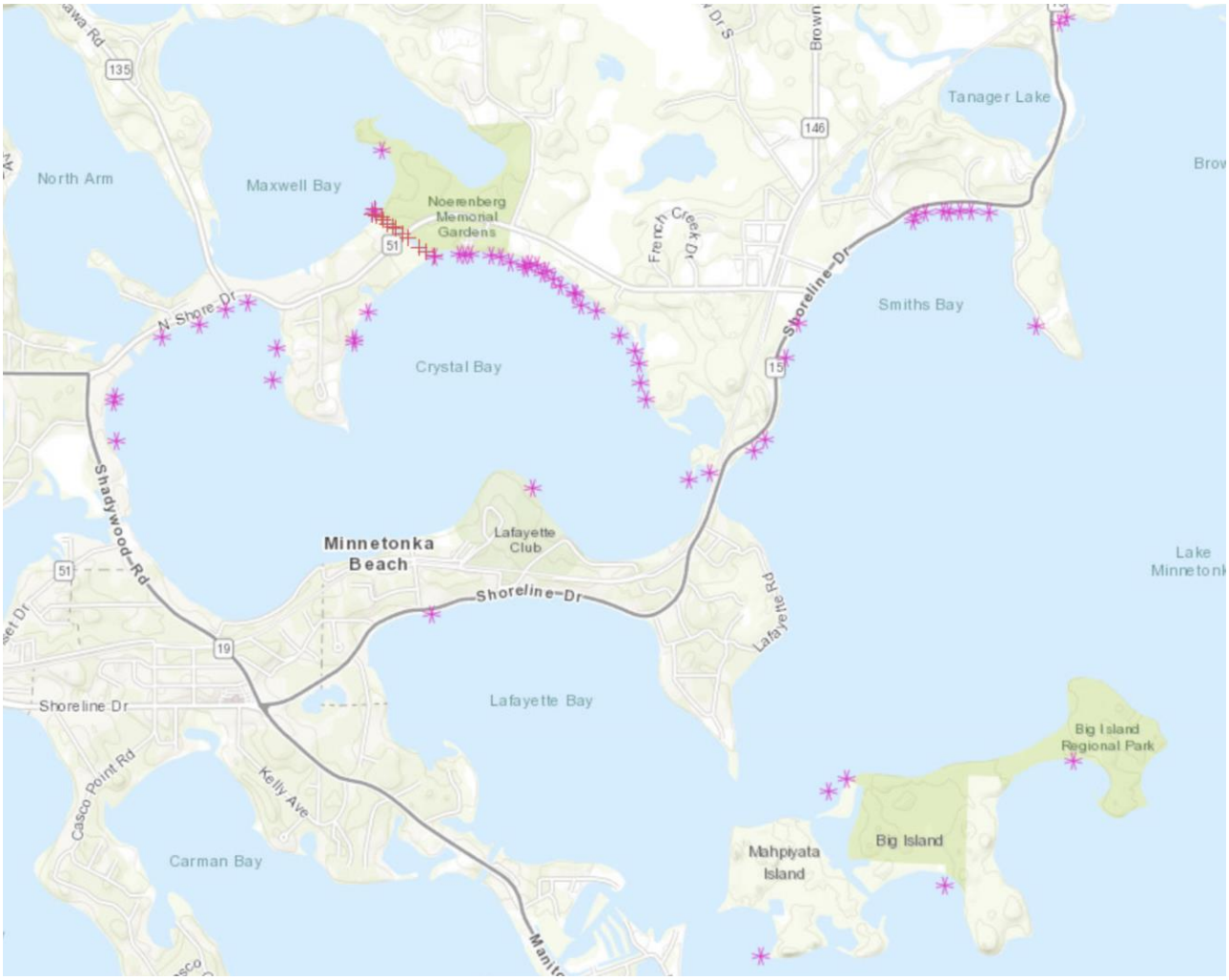


Figure 1. LMCD ArcGIS Online map depicting Flowering Rush presence as indicated by purple stars.

Proposed Management Goals:

1. Continue hand pulling or diquat spot treatments for flowering rush control in small areas (4,000 square feet or 0.1 acre) or less.
2. Continue to monitor FR abundance to ensure that the existing population is not spreading
3. Continue diquat treatments in the Maxwell Bay Channel.
4. Monitor FR treatments on Forest Lake and Detroit Lakes, incorporate lessons learned into FR management on Lake Minnetonka.

Management Tools:

The following FR management tools have been evaluated and implemented for controlling FR on Lake Minnetonka:

- Hand pulling
- Contact herbicides (Diquat)

While all aquatic plant management techniques have positive and negative attributes, hand pulling and contact herbicides should be used as part of an integrated FR management approach. The combined use of these two techniques have the greatest chance of achieving management goals when applied in the appropriate space and time.

Hand pulling

Hand pulling efforts conducted in small areas (4,000 square feet or 0.1 acres) on Lake Minnetonka at 10 sites from 2011-2015 proved to be an effective method at reducing the density of FR but has not eliminated it (Figure 2). Hand pulling appears to be most effective in areas with soft substrates as the entire rhizome and bulbil must be remove to prevent regrowth.

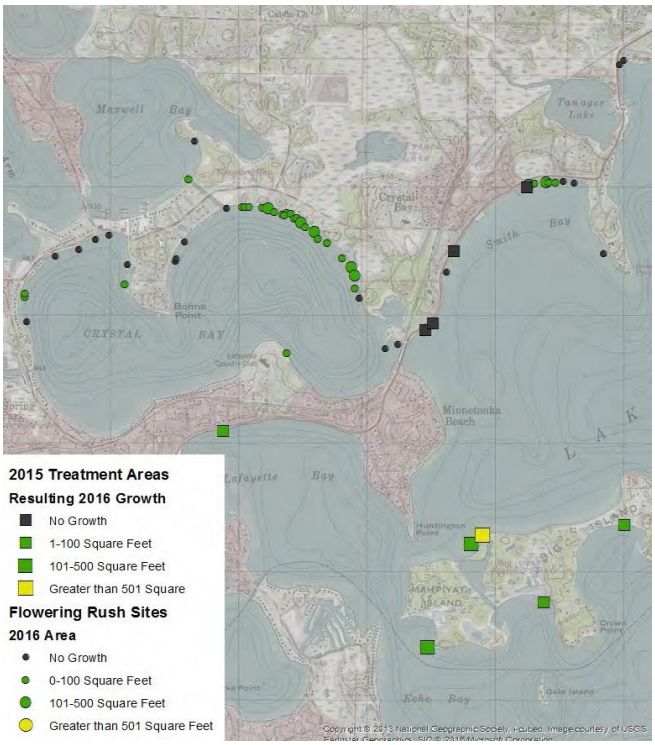


Figure 2. 2016 Minnetonka flowering rush locations and treatment sites. Source – Steve McComas

Contact Herbicides (Diquat)

A 2014 and 2015 Diquat treatment aimed at controlling FR in the Maxwell Bay channel proved effective in reducing the density of FR. The Pelican River Watershed District has conducted similar Diquat treatments aimed at controlling FR on lakes in the Detroit Lakes area since 2013. Results from this effort have reduced about 100 acres of FR across multiple lakes including Big and Little Detroit Lakes, Curfman Lake, Sallie Lake, and Melissa Lake (Figure 3, Figure 4). The treatment plan now in place in Detroit Lakes calls for once- or twice-yearly applications of the aquatic herbicide diquat, at specific times of the summer and with the chemical injected into the water so it contacts the whole plant (Johnson 2019). Based on lessons learned in Detroit Lakes, the direct injection of Diquat into the water column has been identified as a critical step in targeting the roots of the plant where FR stores a majority of its energy.

Figure 3. A southward view of Lake Sallie, where the Pelican River flows in, shows a flowering rush infestation, pre-treatment in August 2017. Source - Pelican River Watershed District

Figure 4. View of Lake Sallie, post-treatment in July 2018, shows a drastic reduction in the sprawl and density of the flowering rush. Source - Pelican River Watershed District

Table 2 provides a list of the specific actions and the active roles the LMCD and partnering organizations will take to minimize the harmful impacts of FR on Lake Minnetonka.

Table 1. Specific Actions for controlling existing populations of AIS to minimize harmful impacts. Source – Adopted from WDNR AIS Management Plan.

Strategy	Specific Actions	Lead Organizations	LMCD Role
Program Maintenance	Provide funding for AIS control actions	DNR, Hennepin County, 14 Cities on Lake Minnetonka	Secure funding as it becomes available to fund AIS control actions
	Implement integrated FR management approach for control activities	DNR, MCWD	LMCD to work collaboratively with the DNR and the MCWD to implement both mechanical and herbicide controls at clearly defined spaces in time
	Invest in other parts of AIS management (outreach, monitoring) to limit the need for expensive control actions	DNR, LMCD	Continue to maintain transparency with the public in regards to efforts to control FR on Lake Minnetonka through the use of social media, the LMCD website and/or Social Pinpoint
Research	Invest in new control technologies	DNR, MCWD, Pelican River Watershed District	Continue to review FR management efforts conducted on Detroit Lake to evaluate the use of new technologies to control FR in Lake Minnetonka.
	Better understand and refine existing control technologies. Continue to implement pre/post treatment monitoring for research purposes	DNR, LMA,LMCD, University of MN	Evaluate return on investment from implemented management actions in terms of progress towards established, quantifiable goals. Maintain pre and post treatment results in comparison with goals on ArcGIS Online or through LMCD website to maintain transparency with the public.
Collaboration	Share research outputs with local, state and regional partners. Work across organizations to better communicate control options and their benefits and consequences	DNR, LMA,LMCD, Pelican River Watershed District	Continue to communicate with industry professionals to ensure AIS management efforts on Lake Minnetonka continue to incorporate the latest science and best management practices.

Purple Loosestrife (PLS) (*Lythrum salicaria*) MANAGEMENT

Photos. *Reduction in PLS infestation in Winona, MN from 1987-2003 following introduction of PLS beetles (Left), PLS in Bloom (Upper Right) PLS Beetle in Action – EOR/ CLFLWD Project Sylvan Lake (Lower Right)*

Characteristics:

- Leaves are lance shaped with smooth edges, can grow up to 4" long.
- Square shaped stem with either 4 or 6 sides
- Individual flowers have five or six pink-purple petals surrounding small, yellow centers
- Thick, woody roots potentially with 30 to 50 shoots.
- Mature plants can produce more than 2 million seeds.

Can be mistaken for

- Fireweed
- Blue Vervain

History:

Purple loosestrife (PLS) is a wetland plant native to Europe and Asia. PLS was first introduced into North America in the 1800s. The first discovery of PLS in the United States was in Lake Ontario in 1869. The first collection of naturalized PLS in Minnesota was made in 1924 in Ramsey County. PLS was intentionally introduced to Minnesota as an ornamental plant for flower gardens. A 1984 edition of the Minnesota Horticulturist magazine described PLS as "a graceful perennial commonly found in Minnesota flower gardens and adding a beautiful lavender cast to many Minnesota wetlands" (Ray, 1984). Based on available data from the Early Detection and Distribution Mapping System (EDDMapS), the earliest verified record of PLS on Lake Minnetonka was made in 1938 by the DNR.

Life Cycle:

PLS is a perennial that is capable of reproducing by sexual or vegetative means. The seeds produced by PLS are extremely small, about the size of ground pepper. Flowers and seeds are typically produced from mid-July through September. Amazingly, a single PLS plant can produce more than 2 million seeds, the vast majority (88-100%) of which are viable. The primary means for PLS to spread is via seeds, however, vegetative reproduction via rhizomes is also important in disturbed areas.

Impacts:

- Interferes with recreational uses and may restrict boater access
- Overtakes habitat and outcompetes native aquatic plants, lowering diversity
- Dense, woody stems and root systems can alter the hydrology of infected waterbodies

Regulations:

Purple loosestrife is classified as a "prohibited invasive species" in the state of Minnesota. It is unlawful to possess, import, purchase, transport, or introduce except under a permit for disposal, control, research, or education.

Control:

There are three methods of control:

1) Biological(Main Method)
2) Herbicide control (Secondary Method)
   - Roundup, Renovate
3) Mechanical (Small Sites Only)
   - Digging, hand pulling, cutting

Distribution:

In 2019, the LMCD published an interactive ArcGIS Online Map which contains all available aquatic plant data collected to date on Lake Minnetonka including information depicting PL presence/absence. Figure 1 shows an example of available results. Data represented in the ArcGIS online map was generated from data collected in the EDDMaps Midwest. All data within EDDMaps Midwest is verified by state verifiers to ensure all data is accurate

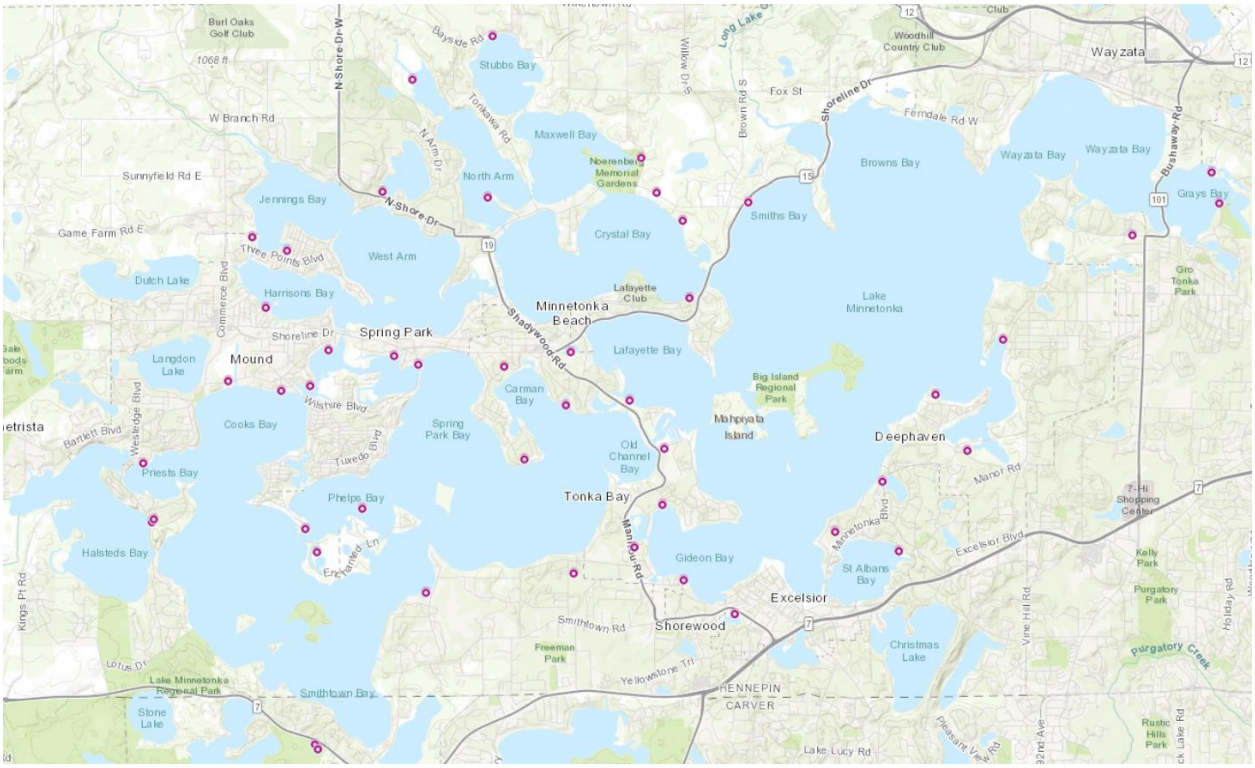


Figure 1. LMCD ArcGIS Online map depicting Purple Loosestrife presence as indicated by purple stars.

Management Goals:

The Best time to control

1. Continue hand pulling in small areas (4,000 square feet or 0.1 acre) or less.
2. Continue to monitor PL abundance to ensure that the existing population is not spreading
3. Implement PLS biological control efforts and monitor the effectiveness of these insects on existing populations of PLS around Lake Minnetonka.

Management Tools:

The following PL management tools have been evaluated and implemented for controlling PL on Lake Minnetonka:

- Biological control
- Hand pulling
- Contact herbicides (Diquat)

While all aquatic plant management techniques have positive and negative attributes, biological control is the main method used to manage PLS in Minnesota. Herbicide treatments should only be used as a secondary method if biological controls do not provide sufficient treatment. Mechanical controls can also be implemented on small sites, but is not recommended for large stands.

Biological Control

The following paragraphs paraphrase the history of PLS biological control efforts in Minnesota based on information provided by the DNR and Minnesota Department of Agriculture.

History: Finding and selecting biological controls

In the mid-1980s, biologists began to conduct a search for biological control agents of purple loosestrife. Of the more than 100 insects that feed on purple loosestrife in Europe, several species were thought to have had excellent potential. Testing began in Europe and was completed in North America between 1987 and 1991 prior to the insects being approved for release. Included in the tests were "feeding trials" which exposed the insects to approximately 50 species of plants including wetland species native to North America, and important commercial and agricultural species.w Following the rigorous testing process and evaluation of the test results, four species of beetles were introduced into Minnesota after receiving approval for release from the United States government. This includes two leaf-feeding beetles, one root-boring weevil and one flower-feeding weevil.

Galerucella pusilla and *G. calmariensis* are leaf-eating beetles which seriously affect growth and seed production by feeding on the leaves and new shoot growth of purple loosestrife plants. The two species share similar ecology and life history. Adults feed on young plant tissue causing a characteristic “shothole” defoliation pattern. Larva feed on the foliage and strip the photosynthetic tissue off individual leaves creating a “window-pane” effect. At high densities (greater than 2-3 larvae per centimeter of shoot), entire purple loosestrife populations can be defoliated. Several

defoliations are needed to kill the plant. Adult beetles are mobile and possess good host finding abilities.

Implementation of PLS Control in Minnesota

Biological control insects released between 1992 and 2009 have established reproducing populations at more than 75% of the sites visited. The leaf-feeding beetles disperse from release sites and find new purple loosestrife sites on their own. A recent study by the University of Minnesota and the DNR found the leaf-feeding beetles more than 12 miles away from where they were released on unmanaged purple loosestrife infestations. With success of insect establishment in the field, rearing efforts are coming to an end. Resource managers are now able to collect insects from established release sites and move them to new infestations.

The long-term objective of biological control is to reduce the abundance of PLS in wetland habitats throughout Minnesota. Biological control, if effective, will reduce the impact of PLS on wetland flora and fauna. PLS will not be eradicated from most wetlands where it presently occurs, but its abundance can be significantly reduced so that is only a small component of the plant community, not a dominant one. Recent assessments demonstrate that the leaf-feeding beetle introductions have caused severe defoliation of PLS populations on over 20% of sites visited.

Table 2 provides a list of the specific actions and the active roles the LMCD and partnering organizations will take to minimize the harmful impacts of FR on Lake Minnetonka.

Table 1. Specific Actions for controlling existing populations of AIS to minimize harmful impacts. Source – Adopted from WDNR AIS Management Plan.

Strategy	Specific Actions	Lead Organizations	LMCD Role
Program Maintenance	Provide funding for AIS control actions	DNR, Hennepin County, 14 Cities on Lake Minnetonka	Secure funding as it becomes available to fund AIS control actions
	Implement biological control as the primary management activity for control activities	DNR, LMCD, Volunteers	LMCD to work collaboratively with the DNR and lake shore owners to establish a volunteer led, biological control aimed at reducing existing stands of PLS
	Invest in other parts of AIS management (outreach, monitoring) to limit the need for expensive control actions	DNR, LMCD	Continue to maintain transparency with the public in regards to efforts to control PLS on Lake Minnetonka through the use of social media, the LMCD website and/or Social Pinpoint
	Better understand and refine existing control technologies. Continue to implement pre/post treatment monitoring for research purposes	DNR, LMA,LMCD, University of MN	Evaluate return on investment from implemented management actions in terms of progress towards established, quantifiable goals. Maintain pre and post treatment results in comparison with goals on ArcGIS Online or through LMCD website to maintain transparency with the public.
Collaboration	Share research outputs with local, state and regional partners. Work across organizations to better communicate control options and their benefits and consequences	DNR, LMA,LMCD	Continue to communicate with industry professionals to ensure AIS management efforts on Lake Minnetonka continue to incorporate the latest science and best management practices.

Starry Stonewort (SSW) (*Nitellopsis obtusa*) PREVENTION

Photos. *Starry stonewort: removal (left), green, branch-like structure (upper), white bulbils (lower)*

Characteristics:

- Macro-algae
- Leaves and stem: thin, green branch-like structures
- Flowers: white and star-shaped bulbils, size of a pinhead

Can be mistaken for

Muskgrasses, Stoneworts, Sago pondweed, or Narrow-leaf pondeweeds – all native aquatic plants.

History:

Minnesota's Starry stonewort was first found in Lake Koronis in 2015. Currently, SSW is known to occur in in 14 lakes in Minnesota (2019).

Life Cycle:

SSW is a dioecious algae, meaning that individuals are either male or female. All recorded populations in the United States are male. This means that the spread of SSW is most likely through human movement of fragments from lake to lake. This can occur by various means, including boating or swimming.

Impacts:

- Establishes dense mats sometimes reaching the water surface
- Outcompetes natives & can lower plant diversity in the lake
- Can harm habitat of native animals – including shelter, food, and nesting habitat

Regulations:

SSW is classified as a "prohibited invasive species" in the state of Minnesota. It is unlawful to possess, import, purchase, transport, or introduce except under a permit for disposal, control, research, or education.

Control:

There are two methods of control:

1) Mechanical Control
   –includes hand pulling, suction dredging, or diver assisted suction harvesting (DASH)
2) Algaecide control
   –includes endothall, copper, and diquat, which only kill algal cells that get direct contact with the algaecide .

Context:

This is an early stage of lake infestation in Minnesota and theoretically if SSW was not transported out of these 14 infested lakes, infestations into new lakes including Lake Minnetonka would be minimal. Of the lakes with current SSW populations, Medicine Lake has the most boats exiting the lake and then visiting Lake Minnetonka.

Extra hours of inspection for boats leaving Medicine Lake are recommended.
Exit inspections at the other 13 lakes are recommended as well.

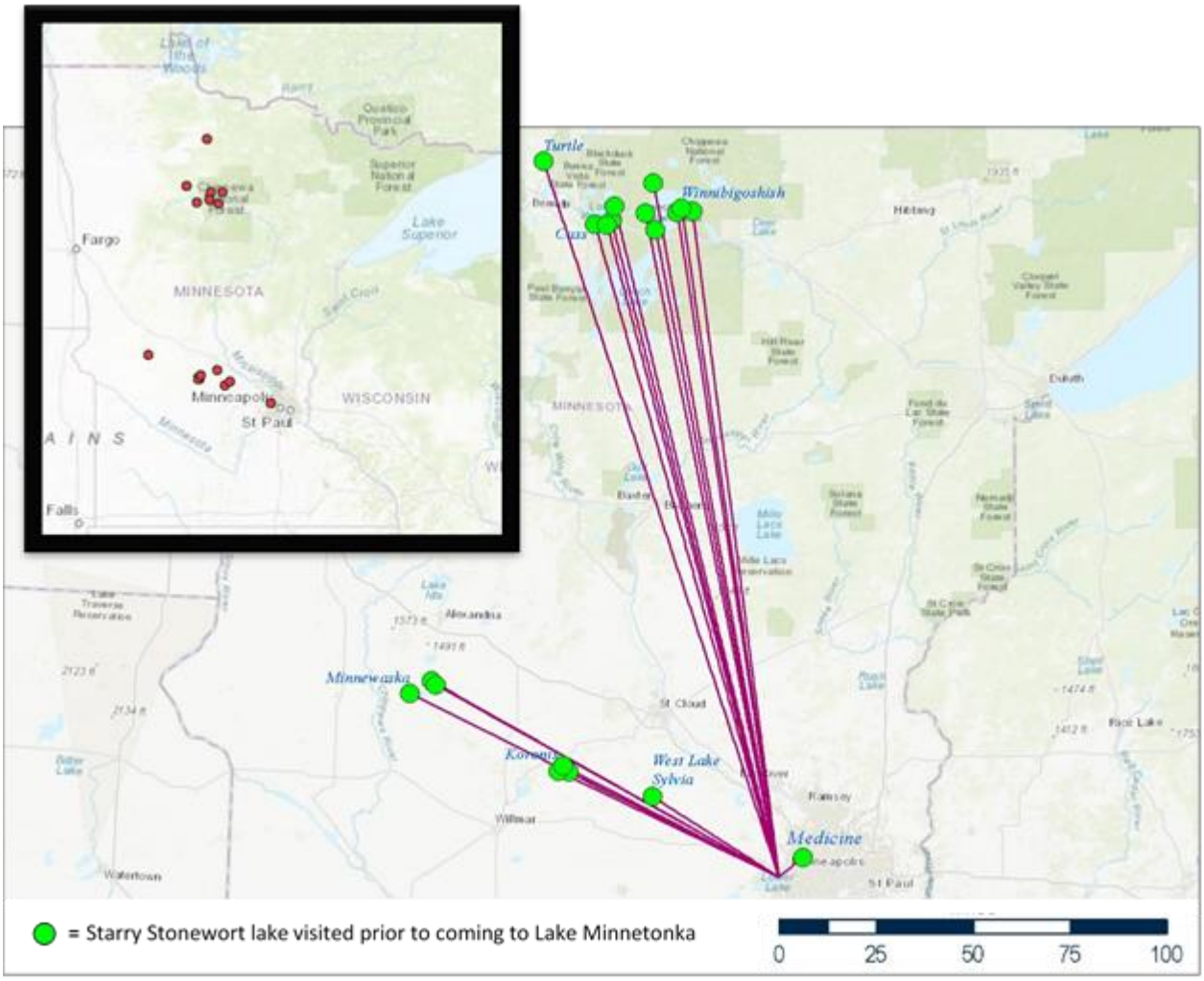


Figure 1 Lake Minnetonka Watercraft Inspections for 2018 – starry stonewort

More information on the suitability of SSW growth in lakes is increasing, but at the present time definitive critical growth factors are speculative. Based on available information, oligotrophic and mesotrophic lakes are suitable whereas eutrophic lakes may support more limited growth. Based on these criteria, it appears several of the eutrophic Lake Minnetonka bays would not be suitable for SSW growth. **Priority accesses** where there is high boat landing traffic and water quality that is likely suitable for SSW growth are shown in (Figure 2) below.

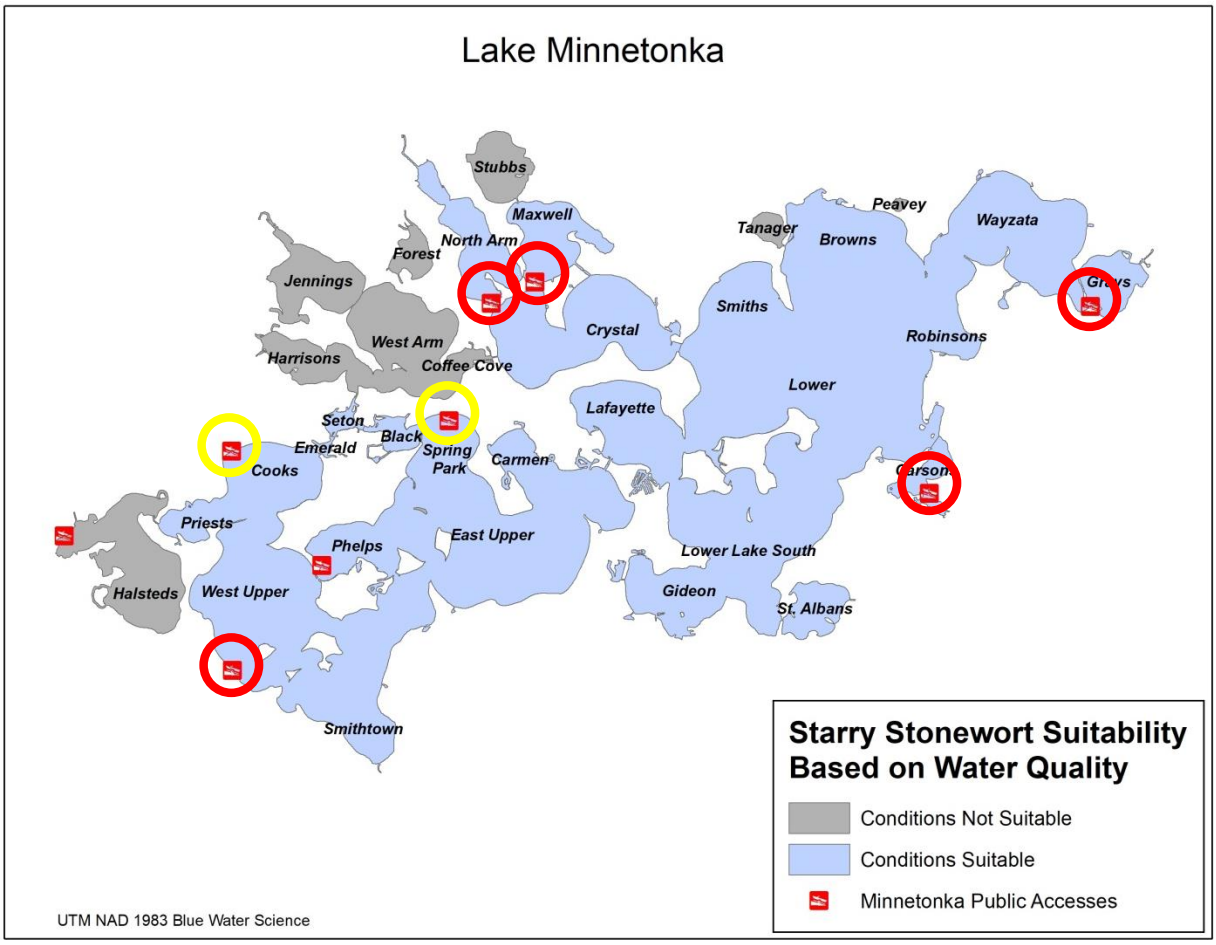


Figure 2. Suitability of starry stonewort survivability in Lake Minnetonka along with 9 public accesses. Public access inspection priorities are shown with red circles (high priority) and yellow circles (moderate priority). Four public accesses without a circle

Prevention and Early Detection:

High Priority Activities	1. Bi-weekly surveys at priority boat accesses. (Figure 2). 2. Extra boat inspections at priority Lake Minnetonka public accesses 3. Conduct exit inspections on 100% of the boats on all Minnesota lakes that currently have SSW. Also apply copper sulfate at public accesses at the 13 SSW lakes to reduce SSW biomass and prevent SSW transport by a boat trailer. 4. Initiate program to identify boats from infested lakes that need thorough cleaning including careful drain plug and live well inspection prior to entry.
Lower Priority Activities	1. Don't allow any boats to visit Minnetonka, use a boat club approach. 2. I-LIDS: Motion detected video surveillance cameras at boat access are a potential option but rate as low priority. 3. Inspect 100% of incoming boats. 4. Put all boats and trailers through a chemical bath before entering Lake Minnetonka. 5. Develop a Preemptive Pilot Study* which incorporates the use of pre-emptive copper sulfate dosing at prioritized Lake Minnetonka public accesses every 2 to 4 weeks during the growing season. Treatments are prioritized on a launch-by-launch basis, but focus will be on higher risk launches. 6. Using e-DNA monitoring for detecting SSW (not available at this time): Currently (as of 2019) there are no kits for sampling and identifying the presence of SSW in a lake using e-DNA. However, future research efforts may result in a method for detecting a low infestation.

The following sections outline critical measures that must be taken to enhance the existing inspection and prevention program. These critical measures include:

1) **Lake Minnetonka Conservation District website information and citizen reporting.**
The Lake Minnetonka Conservation District (LMCD) should maintain AIS information on its website and provide links to AIS identification pages to help lake residents identify AIS. Set-up a network for citizen reporting of any AIS observation. LMCD staff will develop and maintain additional tools (ArcGIS Online Maps, Social Pinpoint) to allow vested citizens to review spatial information, including mapped areas of infestation, identify areas where management actions may be needed, and inform citizens about critical AIS issues such as the potential discovery of SSW.

2) **Development of a fundamental understanding of the suitability of SSW.**

A preliminary evaluation of critical growth parameters was performed on a bay-by-bay basis to determine where SSW is most likely to result in the largest ecological/economic impact based on data collected to date. New data regarding SSW suitability and population abundance trends is currently being collected in the Upper Midwest. New information should be evaluated in an effort to better determine the suitability of SSW growth and subsequent potential for ecological and economic impacts on a bay-by-bay basis.

3) Optimizing boat inspections.

Two-types of boat inspections are recommended. One type of inspection involves exit inspections at all 14 Minnesota lakes with SSW present. The other type of inspection is for incoming boats to Lake Minnetonka with enhanced inspection for boats that have recently been in any of the 14 SSW lakes. There are five priority public accesses on Lake Minnetonka that should have extra inspection hours.

4) Enhanced starry stonewort early detection search programs:

Contract for bi-weekly searches using scuba diving, snorkeling, wading, and rake sampling from July-October. In addition, boat inspectors at the public access should spend a minimum of 1 hour a week using rake sampling to search for SSW. If starry stonewort is found, verify with DNR, produce a press release, notify lake residents, and implement a control plan.

5) Licensed Multiple Dock Facility Inspections:

The first infestation of SSW in Lake Geneva, Wisconsin came in an area immediately adjacent to a private marina licensed to provide storage for multiple boats. In addition to boat inspections conducted at public accesses, the LMCD should spend a minimum of 1 hour a week using rake sampling to search for SSW at private marinas and licensed boat storage facilities.

Photos: *AIS Inspections at boat launch area*

Rapid response assessment:
After the first verified observation of starry stonewort in a Lake Minnetonka bay, conduct an assessment effort. Contractors, DNR, and others should conduct an initial search in the most probable locations to determine the distribution of starry stonewort. From 10 - 20 hours of surveying should be conducted for a thorough assessment. All SSW locations should be sited with GPS.

Rapid response action:
If SSW is found only within a public access area (or area less than 20 acres) then the rapid response action could be a containment attempt. LMCD staff and managers would coordinate in decisions as to what type of a rapid response action should go forward. DNR permits are necessary for treatments and meetings should be conducted prior to any eradication treatments.

Starry stonewort containment:
When the management objective is to contain SSW in a small area, aggressive treatments should be considered. Apply a copper sulfate product to a delineated area, wait 2 weeks and resurvey. If SSW is found, treat with copper sulfate again. Repeat up to 4 times during the SSW growing season from June- October. A step by step description of recommended rapid response actions is provided below.

Summary of steps for a rapid response action

1. Before the detection of an introduced species, a treatment action should be planned because the timing of rapid response to an initial observation is critical. Typically after the first detection for small areas (<20 acres), treatments can occur in 2-3 weeks.
2. After an early detection observation, meet with DNR AIS staff to discuss a protocol for actions and treatment.
3. Conduct the Rapid Response Assessment, beginning with priority accesses. If SSW is detected, move to a full search of the surrounding areas. If the extents of the infestation indicate a small, isolated location, the LMCD will consider placing physical barriers to prevent boat access through the infested areas. The LMCD has the jurisdiction to place physical barriers around any portion of Lake Minnetonka. The highest priority locations for barriers to be placed include public accesses and high traffic locations such as connecting channels where boaters are most likely to move SSW to new areas of the lake.
4. Evaluate the results of a rapid response assessment. Do results indicate conditions are suitable to contain the SSW in a small area? If a small area of SSW is identified within close proximity to a public landing, the LMCD will place physical barriers within the water which will effectively close the public access in which SSW was found. Boaters will be re-directed to other public accesses to minimize the ability for SSW to spread.
5. If treatment is to occur at a public access, determine if it needs to be closed. Discuss with DNR, LMCD, Angler Groups, and lake associations. Conduct an open meeting to discuss options.
6. Delineate a treatment polygon based on the full search survey results. For new infestations, the treatment area has ranged from 0.6 acres up to around 20 acres.
7. Containment of SSW should be measured based on results of a rapid response assessment. With early detection, the objective is to contain SSW in a small area of infestation. Previous projects (Sylvia, Rice, Pleasant) have found aggressive multiple treatments have successfully contained SSW at the public access. Once the initial infestation has spread and is widespread (> 50 acres) treatments are reduced to just the areas with the heaviest growth. Multiple treatments over large areas are not warranted due to excessive costs and ecological damage.
8. Estimated costs associated with the application and monitoring are up $20,000 for a containment treatment, dependent on the treatment dimensions and frequency of treatments.

Management Options

After reviewing SSW treatment results in Michigan, Wisconsin, and Minnesota, the most cost effective treatment has been the use of **copper sulfate.** Hand pulling can be considered for very limited infestations, but then a follow-up copper sulfate application should be considered. Other methods that have been attempted, but have been less effective include dredging, DASH (diver assisted suction harvesting), and drawdown. After a treatment, a post-treatment evaluation is necessary to determine the effectiveness of a containment treatment. This protocol is available from the DNR. Components will likely include a thorough search of the treatment area, and a post treatment survey of the treatment area and surrounding area. A flow chart showing a sequence of steps is shown in Figure 3.

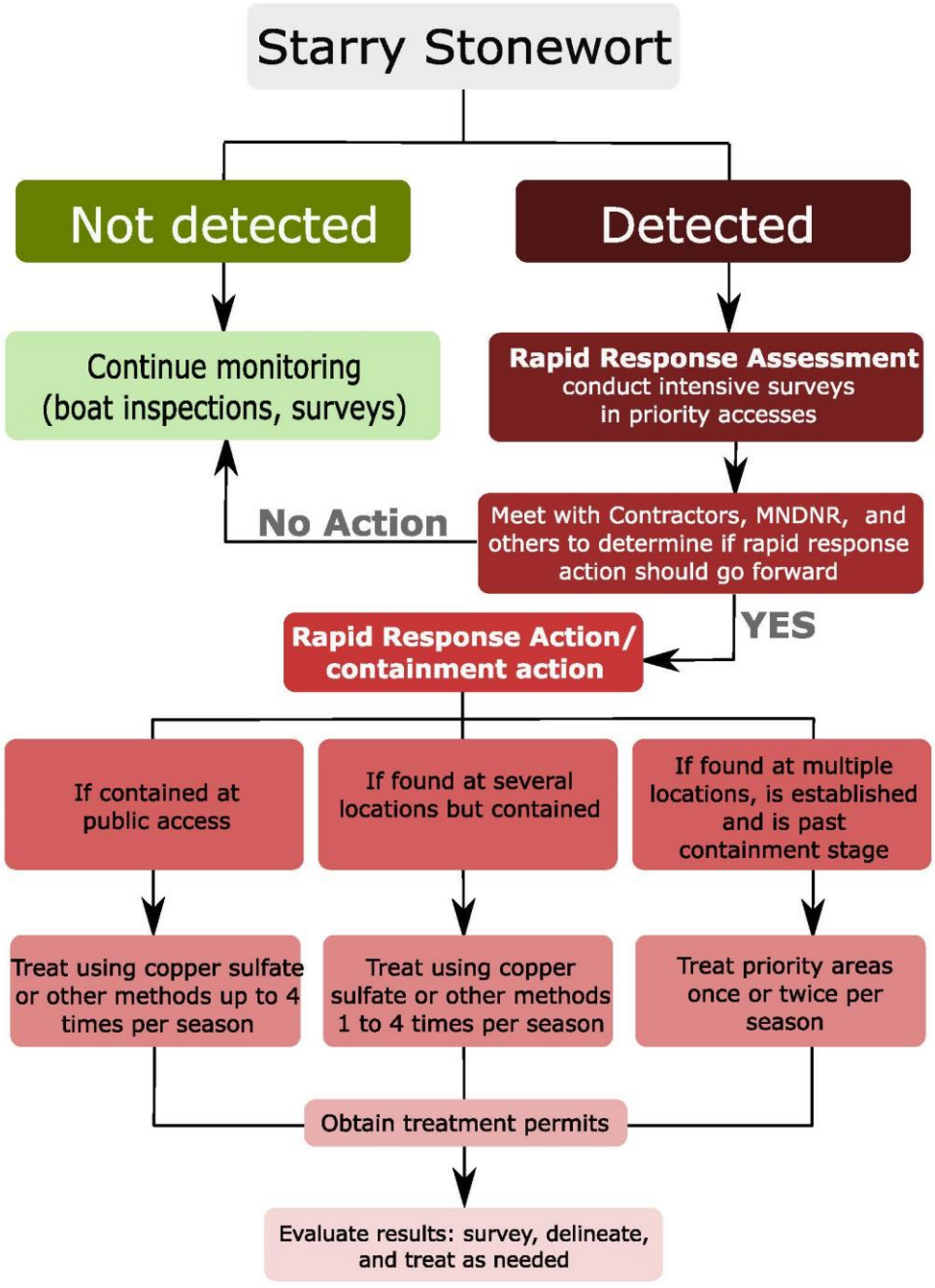


Figure 3. Starry Stonewort Rapid Response Plan Flow Chart.

Table 1. Specific actions for preventing new invasions of AIS including Starry Stonewort via recreational activities and service providers. Source – Adopted from WDNR AIS Management Plan.

Strategy	Specific Actions	Lead Organizations	LMCD Role
Education/ Outreach	Continue to conduct more than 600,000 watercraft inspections/year statewide (619,000 in 2019).	DNR, Counties, Lake Associations, TRPD	Help the DNR and others to coordinate inspection efforts to ensure coverage at priority accesses during peak periods.
	Move towards a mobile data collection and entry system by 2025	DNR, Counties, Lake Associations, TRPD, U of M-Extension	Secure funding to purchase tablets required for data collection/entry for all Watercraft Inspectors on Lake Minnetonka.
	Develop new outreach materials to address boating pathways that may require additional actions to reduce risk (e.g., wakeboard boats, personal watercraft)	DNR, Counties, Lake Associations, TRPD, U of M-Extension	N/A
	Better target transient boaters and boaters from out of state.	DNR, Counties, Lake Associations, TRPD	N/A
	Communicate with all stakeholders about completed outreach work targeting fishing tournaments, and better implement existing programs	B.A.S.S., P.M.T.T., Local Fishing Clubs	N/A
Research	Create a database of lake service providers. Expand the Lake Service Provider Pilot Study Program Statewide if found to be effective	DNR, Lake Service Providers	Actively promote Lake Service Providers who are certified and are following best management practices for decontamination.
	Determine risk and appropriate actions to reduce AIS transport risk of specialty recreational watercraft (e.g., wakeboard boats, personal watercraft)	DNR	N/A
Regs/ Enforcement	Support warden education to reduce barriers to enforcement action	DNR	N/A
	Wardens and AIS staff proactively engage with tournament organizers and participants by attending pre-meetings to ensure all are aware of new AIS regulations and regulations are followed	DNR	N/A
	Increase the number of law enforcement AIS group checks	DNR	N/A
Agency Collaboration	Explore partnerships across state borders and throughout boating industry to include Stop Aquatic Hitchhikers! prevention message on all marine equipment.	DNR, U of M-Extension	N/A

If starry stonewort is detected, please contact Vickie Schleuning with the LMCD (*P: 952-745-0789, E: vschleuning@lmcd.or)* or Keegan Lund with the MN DNR (*P: 651-259-5828*) *E: Keegan.Lund@state.mn.us*)

If Starry Stonewort is found, the location of the siting will be updated here: https://arcg.is/r9OD00

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Spiny Waterflea (SWF) (*Bythotrephes longimanus*) PREVENTION

Photos. Individual Spiny Waterflea, and collection of mass Spiny Waterfleas on fishing lines photo courtesy Minnesota Sea Grant website

Characteristics:

- Invertebrate, Cladorcerans, planktonic animals
- Very small, between ¼ and 5/8 inch in length.
- Long spine like tail, with one to four pairs barbs, distinctive black eyespots. Females may have large bulbous egg sac extending from backs.
- **Can be mistaken for:** Other zooplankton such as invasive Fishhook waterflea, and native Leptadora and Chaoborus.

History:

Spiny waterflea are native to northern Europe and Asia. They were first introduced in the Great Lakes in the 1980s. While mostly in northern Minnesota border waterbodies, it has infested Lake Mille Lacs, Lake Vermilion and approximately 40 Minnesota water bodies. Much of the spiny waterflea ecology as well as its suitability requirements are under investigation.

Life Cycle:

SWF is a cladoceran, a member of a family of tiny planktonic animals known as waterfleas and considered crustaceans. They reproduce both sexually and asexually, increasing potential to reproduce quickly. Females produce resting eggs that are dropped into lake sediments and can establish new population with sediment moved to another waterbody. SWF can also be transported in bait buckets or even attached to fishing or boating gear. This means that the spread of SWF is most likely through human movement.

Impacts:

- These are predatory zooplankton that will prey on other zooplankton such as Daphnia. This can result in reducing food availability to planktivoruous larval fish, which may reduce fish populations and increase algal blooms.
- SWF can negatively impact fishing experience by clogging rod eyelets, damaging reel drag systems, and prevent landing fish.
- SWF are not an optimal food source to fish due to long tail and spines making them difficult to eat.

Regulations:

SWF is classified as a "regulated invasive species" in the state of Minnesota. It is legal to possess, sell, buy, and transport, but it may not be introduced into a free-living state, such as being released or planted in public waters.

Control:

There is no known effective method for population control once established in natural waterbodies. Therefore prevention is the primary management objective. More research is needed regarding the specific pathways of dispersal. The following prevention activities are recommended:

1) **CD3 -** Clean all watercraft, drain all water and remove plugs during transport, dispose of unwanted bait in trash, and dry all water equipment for at least 21 days before transporting to another water body.

2) **Air Dry –** Air dry watercraft and items for more than six hours or 5 days to kill any spiny waterflea eggs (MN DNR, MN Seagrant).

Context:

This is an early stage of lake infestation in Minnesota and theoretically if SWF was not transported out of these infested lakes, infestations into new lakes, including Lake Minnetonka, new infestations would be minimal. Recent research by the University of Minnesota (2019/2020) suggests that Lake Minnetonka may not have conditions suitable for SWF infestation.

More information about the suitability of SWF growth in lakes is increasing, but at the present time definitive critical growth factors are speculative. Based on available information, Spiny waterfleas prefer cooler deeper lakes, but can establish in shallow waterbodies and rivers. It is important to continue to practice appropriate prevention steps while more research is conducted regarding suitability conditions for colonization of Spiny waterflea.

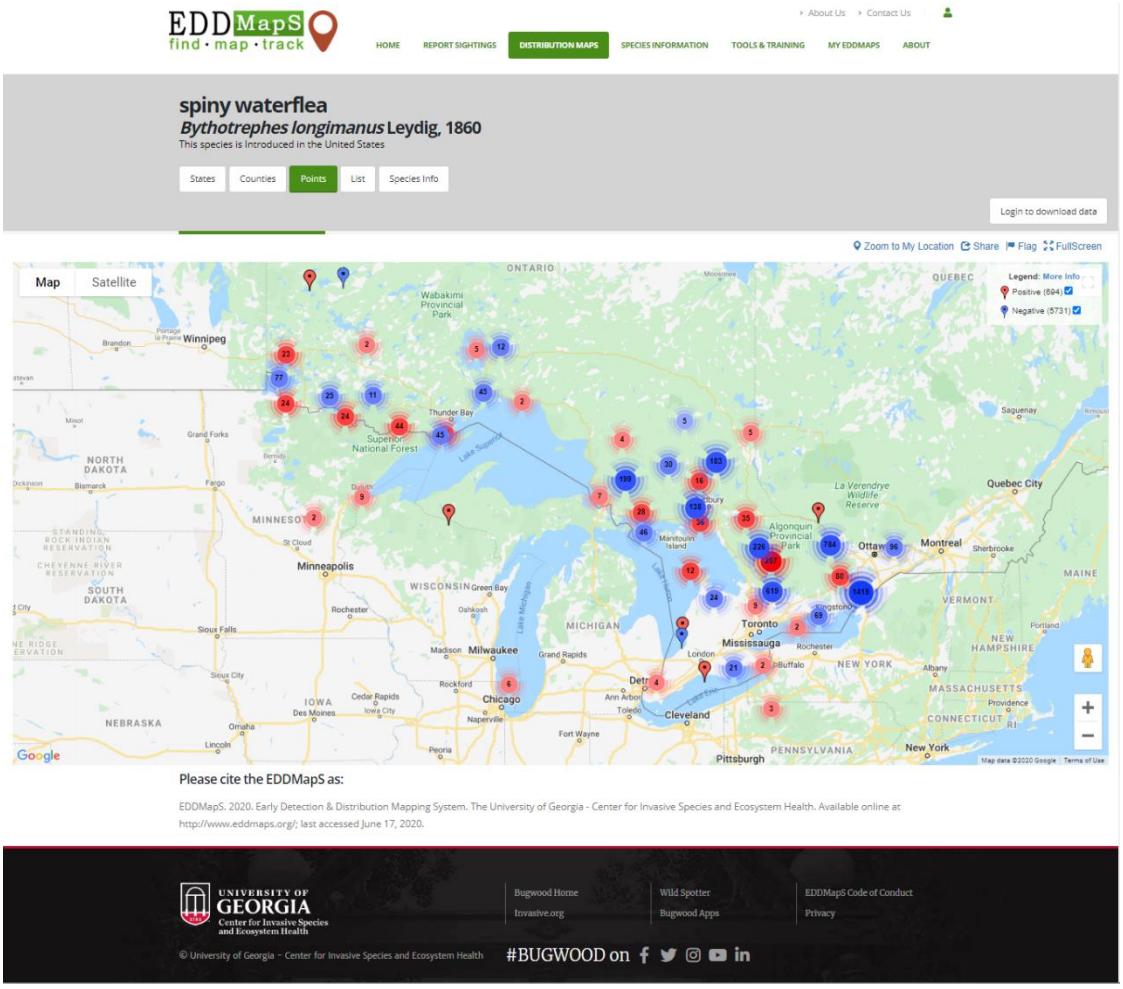

Figure 1. Spiny waterflea distribution map. Source – Early Detection & Distribution Mapping System (EDDMapS).

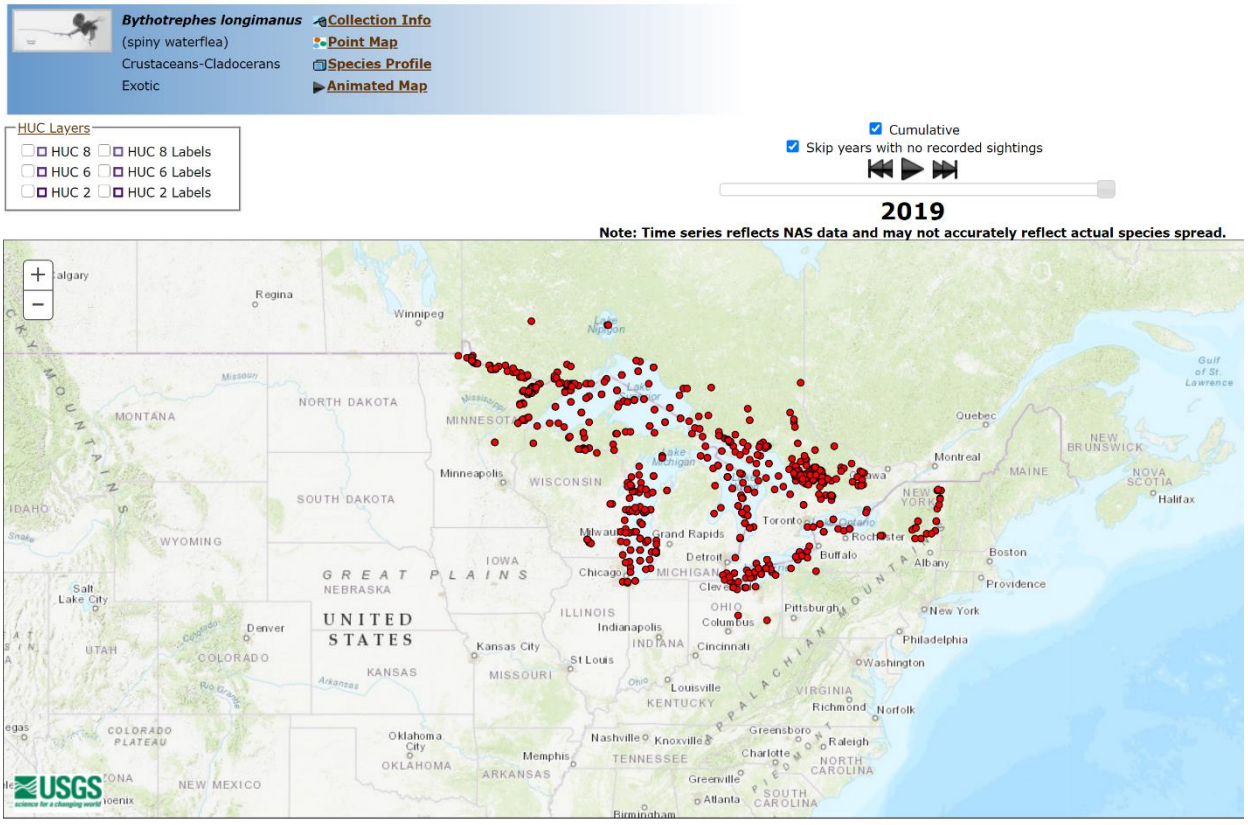

Figure 2. Spiny waterflea infestations distribution, 2019. Source – USGS

Prevention and Early Detection:

High Priority Activities

1. Boat inspections at priority Lake Minnetonka public accesses.
2. Conduct exit inspections on 100% of the boats on all Minnesota lakes that currently have SWF.
3. Dry all water equipment for at least 5 days before transporting to another water body.
4. Air dry watercraft and items for more than six hours or five days to kill any spiny waterflea eggs.
5. Initiate program to identify boats from infested lakes that need thorough cleaning including careful drain plug and live well inspection prior to entry.

The following sections outline critical measures that should be taken to enhance the existing inspection and prevention program. These critical measures include:

1) Lake Minnetonka Conservation District website information and citizen reporting.
The Lake Minnetonka Conservation District (LMCD) should maintain AIS information on its website and provide links to AIS identification pages to help lake residents identify AIS. Set-up a network for citizen reporting of any AIS observation. LMCD staff will develop and maintain additional tools (ArcGIS Online Maps, Social Pinpoint) to allow vested citizens to review spatial

information, including mapped areas of infestation, identify areas where management actions may be needed, and inform citizens about critical AIS issues such as the potential discovery of SWF.

2) Development of a fundamental understanding of the suitability of SWF.

When reliable information regarding the growth pattern and environment for SWF is available, a preliminary evaluation of critical growth parameters on a bay-by-bay basis should be performed to determine the largest potential ecological/economic impact based on data collected to date.

3) Optimizing boat inspections.

Two-types of boat inspections are recommended. One type of inspection involves exit inspections at Minnesota lakes with SWF present. The other type of inspection is for incoming boats to Lake Minnetonka with enhanced inspection for boats that have recently been in any of the SWF lakes.

4) Enhanced spiny waterflea early detection reporting programs:

Encourage lake users, especially anglers, to contact LMCD to report suspicious spiny waterflea encounters. If spiny waterfleas are found, verify with the MN DNR, produce a press release, notify lake residents, and implement a public education and control plan.

Photos: *AIS Inspections at boat launch area*

Public Notification Response:

After the first verified observation of spiny waterflea in a Lake Minnetonka bay, additional monitoring and assessment to determine is SWF is present in any other bays should be performed. Approximately 10 - 20 hours of surveying should be conducted for a thorough assessment. All SWF locations should be sited with GPS.

Spiny Waterflea Containment and Management:

At this time, no known methods to contain or control populations of SWF are available beyond the CD3 and drying recommendations. The LMCD should monitor research and consider options when they become available.

Table 1. Specific actions for preventing new invasions of AIS including Spiny Waterflea via recreational activities and service providers. Source – Adopted from WDNR AIS Management Plan.

Strategy	Specific Actions	Lead Organizations	LMCD Role
Education/ Outreach	Continue to conduct watercraft inspections/year statewide (619,000 in 2019).	DNR, Counties, Conservation Districts, Cities, Lake Associations	Help the DNR and others to coordinate inspection efforts to ensure coverage at priority accesses during peak periods.
	Move towards a mobile data collection and entry system by 2025	DNR, Counties, Conservation Districts, Lake Associations, U of M-Extension	Secure funding to purchase tablets required for data collection/entry for all Watercraft Inspectors on Lake Minnetonka.
	Develop new outreach materials to address boating pathways that may require additional actions to reduce risk (e.g., wakeboard boats, personal watercraft)	DNR, Counties, Conservation Districts, Lake Associations, U of M-Extension	N/A
	Better target transient boaters and boaters from out of state.	DNR, Counties, Conservation Districts, Lake Associations,	N/A
	Communicate with all stakeholders about completed outreach work targeting fishing tournaments, and better implement existing programs	Recreation Associations, B.A.S.S., P.M.T.T., Local Fishing Clubs	N/A
Research	Create a database of lake service providers. Expand the Lake Service Provider Pilot Study Program Statewide if found to be effective	DNR, Conservation Districts, Lake Service Providers	Actively promote Lake Service Providers who are certified and are following best management practices for decontamination.
	Determine risk and appropriate actions to reduce AIS transport risk of specialty recreational watercraft (e.g., wakeboard boats, personal watercraft)	DNR	N/A
Regs/ Enforcement	Support warden education to reduce barriers to enforcement action	DNR, Water Patrol, Conservation Districts	N/A
	Wardens and AIS staff proactively engage with tournament organizers and	DNR, Conservation Districts	N/A

Strategy	Specific Actions	Lead Organizations	LMCD Role
	participants by attending pre-meetings to ensure all are aware of new AIS regulations and regulations are followed		
	Increase the number of law enforcement AIS group checks	DNR	N/A
Agency Collaboration	Explore partnerships across state borders and throughout boating industry to include Stop Aquatic Hitchhikers! prevention message on all marine equipment.	DNR, U of M-Extension	N/A

If spiny waterflea is detected, please contact Vickie Schleuning with the LMCD (*P: 952-745-0789, E: vschleuning@lmcd.org)* or Keegan Lund with the MN DNR (*P: 651-259-5828*) *E: Keegan.Lund@state.mn.us*)

If Spiny Waterflea is found, the location of the siting will be updated here: https://arcg.is/r9OD00

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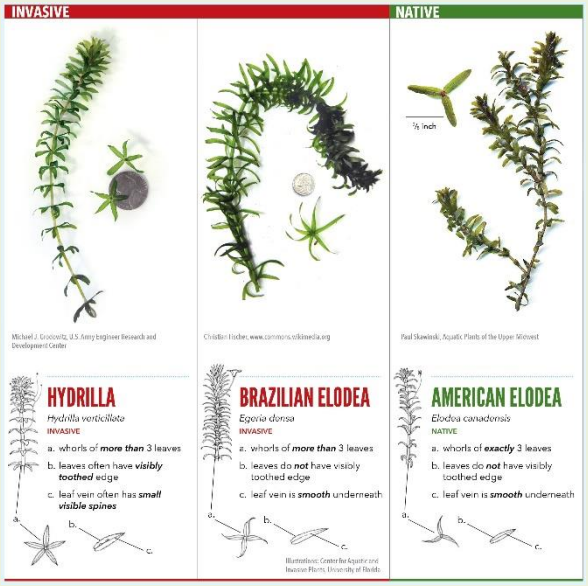
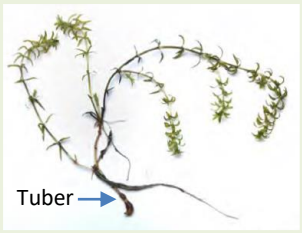
Hydrilla (*Hydrilla verticillata*)

PREVENTION





Characteristics:

- Submerged plant with bright green leaves with center midvein between 1/5 and ¾ inches long
- Leaves and stem: toothed serrated edges; directly attached in whorls of 3-10, often 5
- Tubers or turions: may be present

Can be mistaken for:

Native Elodea, invasive Brazilian waterweed

Photos. *Hydrilla: Comparison with lookalikes (left); green, dense mat (upper), tuber (lower) (Source CRC WMA, MAISRC)*

History:

Hydrilla is native to Asia and Europe. While it has not been found in Minnesota, it has been found in other Great lake states, Ohio, New York, Washington, and Wisconsin. Some of the most impacted states include Florida, where it was first observed in 1952 and then spread to other gulf states in the 1970s and 1980s. It has also been used as an aquarium plant.

Life Cycle:

Hydrilla can be either monoecious (individual plants with both female and male flowers) or dioecious (individuals plants have either female or male flowers but not both). Monoecious hydrilla is the form more likely to occur in northern states. Hydrilla can also reproduce by fragments and turions (buds that can form new plants). It also forms tubers that can stay viable in the sediment for many years.

Hydrilla is a problematic, fast-growing invasive species. Hydrilla is most likely spread through human movement of fragments from lake to lake through boating and can be spread to connected water bodies by water currents.

Impacts:

- Stratification of the water column due to blocked sunlight and decreased amount of dissolved oxygen may cause fish kills and algae blooms
- Forms dense mats, growing in up to 25 feet of water with stem growth up to 30 feet, interfering with boating, fishing and other recreational activities
- Outcompetes natives reducing plant diversity in the lake and harming animal habitat – including shelter, food, and nesting habitat
- May become mosquito-breeding habitat

Regulations:

Hydrilla is classified as a "prohibited invasive species" in the state of Minnesota. It is unlawful to possess, import, purchase, transport, or introduce except under a permit for disposal, control, research, or education.

Context:

While the spread of Hydrilla has seemed relatively slow to the Midwest region, due to its aggressive nature and ecological and financial implications, it is important this species be considered as part of the AIS prevention plan. Early detection and rapid response are crucial for a positive outcome in its eradication or management. Lake Minnetonka is a regional and national boating destination, increasing the risk of new AIS introductions. Refer to Lake Minnetonka watercraft traffic map for more information.

Hydrilla is currently established in 28 states. **Error! Reference source not found.** documents the spread of invasive Hydrilla in the mainland states, first and last years of observations in that state. Four states (Iowa, Kansas, Washington, and Wisconsin) had isolated infestation and were removed or able to be controlled. The majority of transmission is considered through fragments through boats, motors, and live wells. Turions are also important in the transmission and tubers can survive out of water for several days and in sediment for 4 years, thereby re-establishing infestations (Van and Steward, 1990). Tubers are resistant to most control methods.

Extra focus on watercraft launching on Lake Minnetonka from infested lakes is recommended. Exit inspections at the other infested lakes are recommended as well, acknowledging little control of AIS prevention activities that occur at other lakes or states.

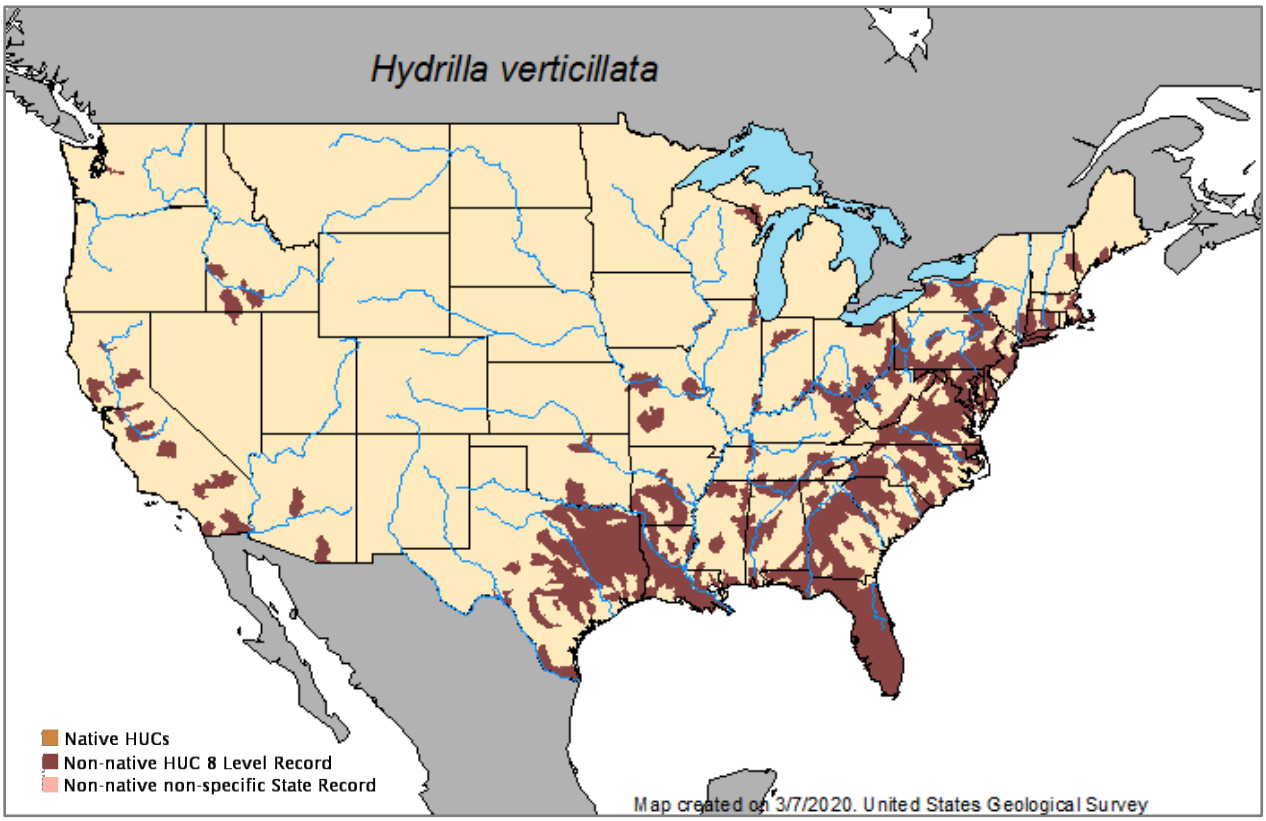


Figure 1. Infestations of Hydrilla, 03/07/2020. Source USGS

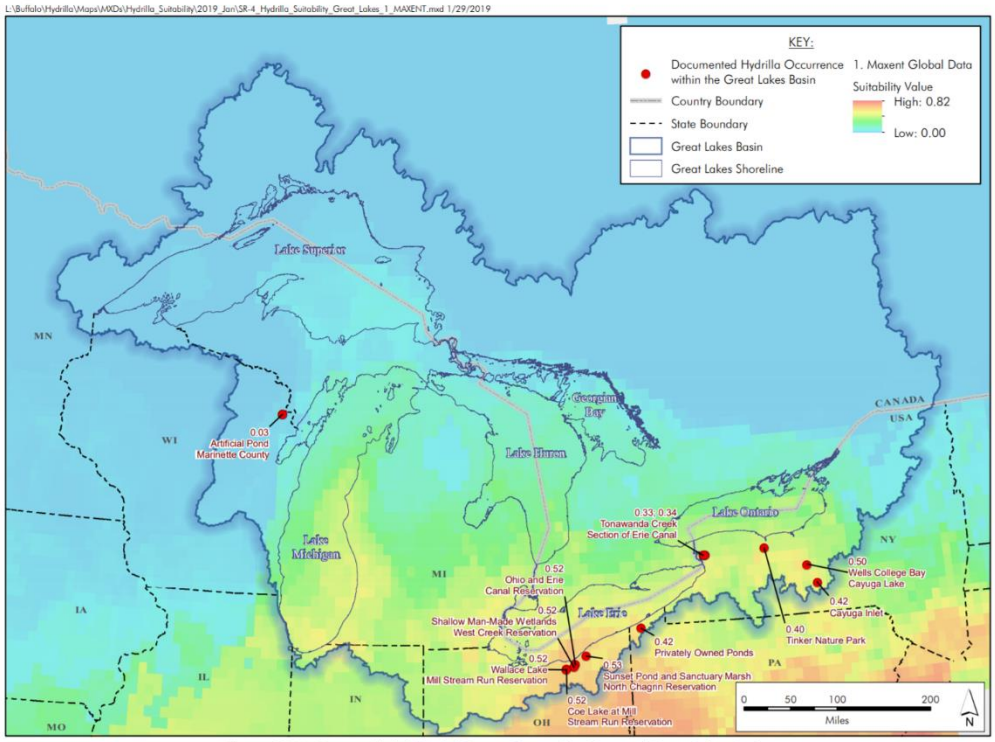


Figure 2. Suitability of Hydrilla in Great Lakes region, 01/29/2020. Source Great Lake Hydrilla Risk Assessment Report February 2019

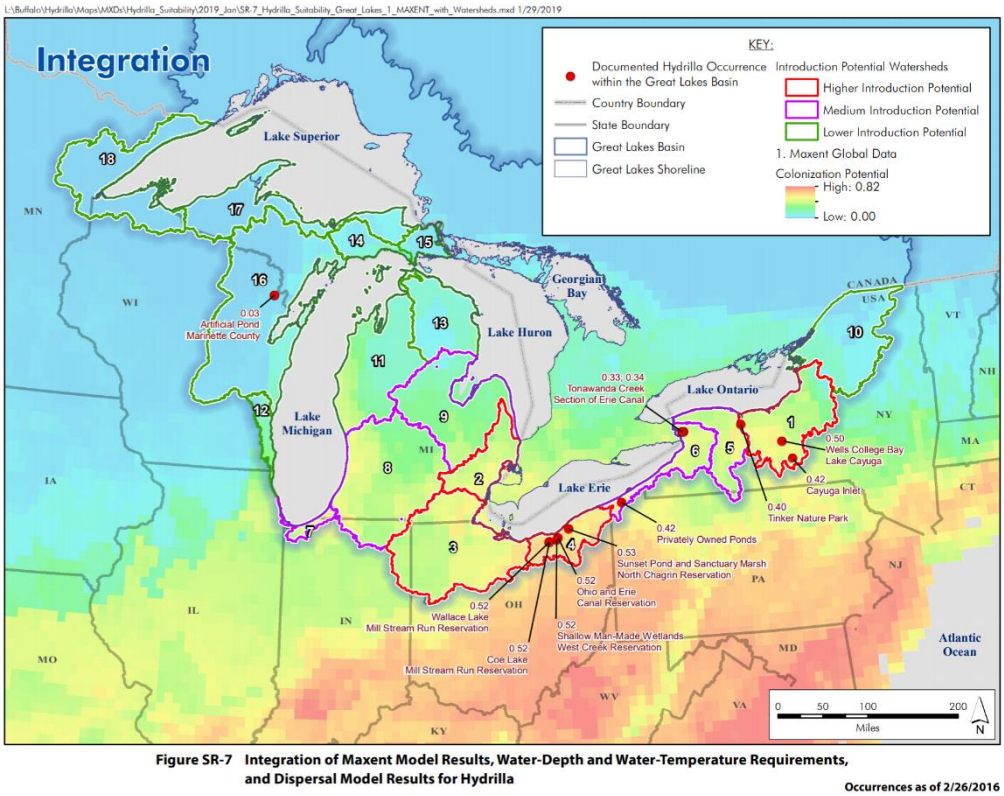


Figure 3. Hydrilla Colonization Potential in Great Lakes region. Source Great Lake Hydrilla Risk Assessment Report February 2019

Suitability Assessment:

Information regarding the suitability of Hydrilla growth in lakes is increasing, but at the present time definitive critical growth factors are speculative. Hydrilla has spread to Midwest States over the years. While the distribution of biotypes continues to change, the northern populations are often monoecious. Florida and southern states are primarily dioecious. Some research indicates that Minnesota may be too cold to support a robust Hydrilla infestation. More research is needed to determine the suitability of Hydrilla in Lake Minnetonka, and in consideration of any warming trends.

Control:

There are three methods of control:

1. Mechanical Control
    a) Diver assisted dredging or excavation can be effective in small areas less than ½ acres to remove tuber bank in the sediment, by removing at least 18 inches of sediment
    b) Dewatering, drawdown, during midsummer can reduce potential for production of a tuber bank. Dewatering in winter is not effective since tubers form 0.5 to 1.5 feet below sediment. Dewatering with sediment applied herbicides can be effective.
    c) Mechanical harvesting has the advantage of removing biomass from a lake system with very dense vegetation masses instead of allowing it to decompose in the water column. Future research will evaluate the economics and feasibility of mechanical harvesting as a complementary action to standard practice.

2. Herbicide control
   Systemic: Fluridone, Bispyribac, Imazamox, Penoxsulam, Topramezone 2,4-D, ProcellaCOR,
   Contact: Endothall, Diquat, Flumioxazin, Chelated copper

3. Non-Herbicidal chemical control
    a) Dyes or colorants

4. Biological Control
    a) Triploid sterile grass carp (White Amur) (where permitted) is the most effective biological control agent but is nonselective in consuming several species of submersed plants but has been used as part of a control or eradication program.
    b) Insects including *Hydrellia pakistanae* and *Hydrellia balciunasi*, a moth *Paraponyx dimunutalis,* and tuber feeding weevil *Bagous affinis* have shown variable efficacy.

Prevention and Early Detection:

High Priority Activities	1. Bi-weekly surveys in conjunction with other AIS surveys at priority boat accesses and launches. 2. Extra boat inspections at priority Lake Minnetonka public accesses. 3. Consider other methods to track watercraft movement from infested lakes such as tagging system, controlled access, etc.
Lower Priority Activities	1. Don't allow any boats to visit Lake Minnetonka, use a boat club approach. 2. I-LIDS: Motion detected video surveillance cameras at boat access are a potential option but rate as low priority. 3. Inspect 100% of incoming boats. 4. Put all boats and trailers through a chemical bath before entering Lake Minnetonka. 5. Using e-DNA monitoring for detecting Hydrilla (not available at this time): Currently (as of 2019) there are no kits for sampling and identifying the presence of Hydrilla in a lake using e-DNA. However, future research efforts may result in a method for detecting a low infestation.

The following sections outline critical measures that must be taken to enhance the existing inspection and prevention program. These critical measures include:

1) **Lake Minnetonka Conservation District website information and citizen reporting.**
   The Lake Minnetonka Conservation District (LMCD) should maintain AIS information on its website and provide links to AIS identification pages to help lake residents identify AIS. Set-up a network for citizen reporting of any AIS observation. LMCD staff will develop and maintain additional tools (ArcGIS Online Maps, Social Pinpoint) to allow vested citizens to review spatial information, including mapped areas of infestation, identify areas where management actions may be needed, and inform citizens about critical AIS issues such as the potential discovery of Hydrilla.

2) **Development of a fundamental understanding of the suitability of Hydrilla.**

   New information should be evaluated in an effort to better determine the suitability of Hydrilla growth and subsequent potential for ecological and economic impacts on a bay-by-bay basis.

3) **Optimizing boat inspections.**
   Two-types of boat inspections are recommended. One type of inspection involves exit inspections at all lakes with Hydrilla present. The other type of inspection is for incoming boats to Lake Minnetonka with enhanced inspection for boats that have recently been in any infested lakes.

There are five priority public accesses on Lake Minnetonka that should have extra inspection hours.

4) Enhanced Hydrilla early detection search programs:

Boat inspectors at the public access should spend a minimum of 1 hour a week using rake sampling to search for Hydrilla. If Hydrilla is found, verify with MN DNR, produce a press release, notify lake residents, and implement a control plan.

5) Licensed Multiple Dock Facility Inspections:

The first infestations are often at boat launches such as public launches or possible where multiple boat launches would occur. In addition to boat inspections conducted at public accesses, the LMCD should spend a minimum of 1 hour a week using rake sampling to search for Hydrilla at private marinas and licensed boat storage facilities.

Photos: *AIS Inspections at boat launch area*

Rapid response assessment:
After the first verified observation of Hydrilla in a Lake Minnetonka bay, conduct an assessment effort. Contractors, MN DNR, and others should conduct an initial search in the most probable locations to determine the distribution of Hydrilla. From 10 - 20 hours of surveying should be conducted for a thorough assessment. All Hydrilla locations should be sited with GPS.

Rapid response action:
If Hydrilla is found only within a public access area (or area less than 20 acres) then the rapid response action could be a containment attempt. LMCD staff and managers would coordinate in decisions as to what type of a rapid response action should go forward. MN DNR permits are necessary for treatments and meetings should be conducted prior to any eradication treatments.

Hydrilla containment:
When the management objective is to contain Hydrilla in a small area, aggressive treatments should be considered. A chemical application (Fluridone, Endothall (or combination) should be applied to a delineated area, wait 2 weeks and resurvey. If Hydrilla is found, additional treatments may be required. The tubers may require treatment for 2-3 years. A step-by-step description of recommended rapid response actions is provided below.

Summary of steps for a rapid response action

1. Before the detection of an introduced species, a treatment action should be planned because the timing of rapid response to an initial observation is critical. Typically, after the first detection for small areas (<20 acres), treatments can occur in 2-3 weeks.
2. After an early detection observation, meet with DNR AIS staff to discuss a protocol for actions and treatment.
3. Conduct the Rapid Response Assessment, beginning with priority accesses. If Hydrilla is detected, move to a full search of the surrounding areas. If the extent of the infestation is a small, isolated location, the LMCD will consider placing physical barriers to prevent boat access through the infested areas. The LMCD has the jurisdiction to place physical barriers around any portion of Lake Minnetonka. The highest priority locations for barriers to be placed include public accesses and high traffic locations such as connecting channels where boaters are most likely to move Hydrilla to new areas of the lake.
4. Evaluate the results of a rapid response assessment. Do results indicate conditions are suitable to contain the Hydrilla in a small area? If a small area of SSW is identified within close proximity to a public landing, the LMCD will place physical barriers within the water that will effectively close the public access in which SSW was found. Boaters will be re-directed to other public accesses to minimize the ability for Hydrilla to spread.
5. If treatment is to occur at a public access, determine if it needs to be closed. Discuss with DNR, LMCD, Angler Groups, and lake associations. Conduct an open meeting to discuss options.
6. Delineate a treatment polygon based on the full search survey results. For new infestations, the treatment area could range from 0.6 acres up to around 20 acres.
7. With early detection, the objective is to contain Hydrilla in a small area of infestation. Once the initial infestation has spread and is widespread (> 50 acres) treatments are reduced to just the areas with the heaviest growth. Multiple treatments over large areas are not warranted due to excessive costs and ecological damage. However, treatment must occur over time to deplete the tubers in the sediment.
8. Conduct pre-treatment plan surveys beginning in mid-July to determine plant locations, type, and dosage of treatments.
9. Chemical treatments should occur after tubers have sprouted (late June to July) but before

formation of new tubers (late August to November).

10. Benthic mats may be helpful on small patches of Hydrilla in shallow, low-velocity water and use of limnocorrals to isolate Hydrilla beds.
11. Estimated costs associated with the application and monitoring are up $20,000 for a containment treatment, dependent on the treatment dimensions and frequency of treatments.

Management Options

After reviewing Hydrilla treatment results in Great Lakes, Wisconsin, California, and Maine, the most cost effective treatment has been identified below. It is a chart adapted from Maine.gov.

Hand pulling can be considered for very limited infestations, but then a follow-up with an endothall application should be considered. Other methods that have been attempted, but have been less effective include dredging, DASH (diver assisted suction harvesting), and drawdown. After a treatment, a post-treatment evaluation is necessary to determine the effectiveness of a containment treatment. This protocol is available from the MN DNR. Components will likely include a thorough search of the treatment area, and a post treatment survey of the treatment area and surrounding area and follow up for 2-3 years

Table 1. Specific actions for preventing new invasions of AIS including Hydrilla via recreational activities and service providers. Source – Adopted from WDNR AIS Management Plan.

Strategy	Specific Actions	Lead Organizations	LMCD Role
Education/ Outreach	Continue to conduct more than 600,000 watercraft inspections/year statewide (619,000 in 2019).	DNR, Counties, Conservation Districts	Help the DNR and others to coordinate inspection efforts to ensure coverage at priority accesses during peak periods.
	Move towards a mobile data collection and entry system by 2025	DNR, Counties, Conservation Districts, Associations, U of M-Extension	Secure funding to purchase tablets required for data collection/entry for all Watercraft Inspectors on Lake Minnetonka.
	Develop new outreach materials to address boating pathways that may require additional actions to reduce risk (e.g., wakeboard boats, personal watercraft)	DNR, Counties, Conservation Districts, Lake Associations, TRPD, U of M-Extension	N/A
	Better target transient boaters and boaters from out of state.	DNR, Counties, Conservation Districts Lake Associations, TRPD	N/A
	Communicate with all stakeholders about completed outreach work targeting fishing tournaments, and better implement existing programs	B.A.S.S., P.M.T.T., Local Fishing Clubs	N/A
Research	Create a database of lake service providers. Expand the Lake Service Provider Pilot Study Program Statewide if found to be effective	DNR, Lake Service Providers	Actively promote Lake Service Providers who are certified and are following best management practices for decontamination.
	Determine risk and appropriate actions to reduce AIS transport risk of specialty recreational watercraft (e.g., wakeboard boats, personal watercraft)	DNR, U of M	N/A
Regs/ Enforcement	Support warden education to reduce barriers to enforcement action	DNR	N/A
	Wardens and AIS staff proactively engage with tournament organizers and participants by attending pre-meetings to ensure all are aware of new AIS regulations and regulations are followed	DNR, Conservation Districts	N/A
	Increase the number of law enforcement AIS group checks	DNR	N/A
Agency Collaboration	Explore partnerships across state borders and throughout boating industry to include Stop Aquatic Hitchhikers! prevention message on all marine equipment.	DNR, U of M-Extension	N/A

If Hydrilla is detected, please contact Vickie Schleuning with the LMCD (*P: 952-745-0789, E: vschleuning@lmcd.or)* or Keegan Lund with the MN DNR (*P: 651-259-5828*) *E: Keegan.Lund@state.mn.us*)

If Hydrilla is found, the location of the siting will be updated here: https://arcg.is/r9OD00

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7. ACRONYMS

AIS – Aquatic Invasive Species

CLP – curly-leaf pondweed

EPA- Environmental Protection Agency

EWM – Eurasian watermilfoil

FR – Flowering rush

LAFF – Local AIS Action Framework

LID – Lake Improvement District

LMA – Lake Minnetonka Association

LMCD – Lake Minnetonka Conservation District

MAISRC – University of Minnesota Aquatic Invasive Species Research Center

MCWD – Minnehaha Creek Watershed District

MDA- Minnesota Department of Agriculture

MNDNR – Minnesota Department of Natural Resources

PLS – Purple loosestrife

SSW – Starry stonewort

TRPD – Three Rivers Park District

USGS – United States Geological Survey

ZM – Zebra mussel

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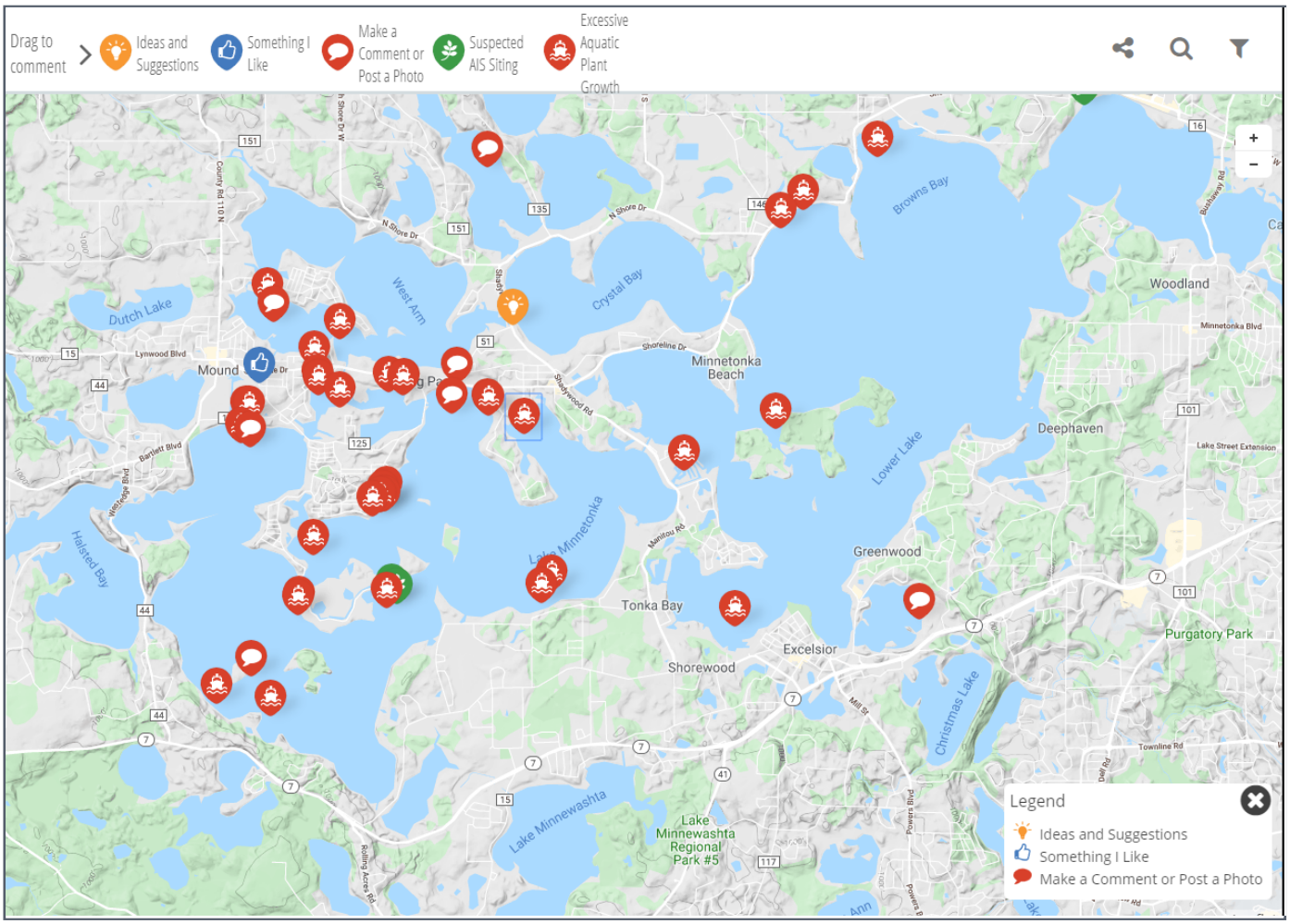
APPENDIX A. SOCIAL PINPOINT & SURVEY RESULTS

Appendix A: Social Pinpoint and Survey Results



Social Pinpoint Comments as of 11/1/2019

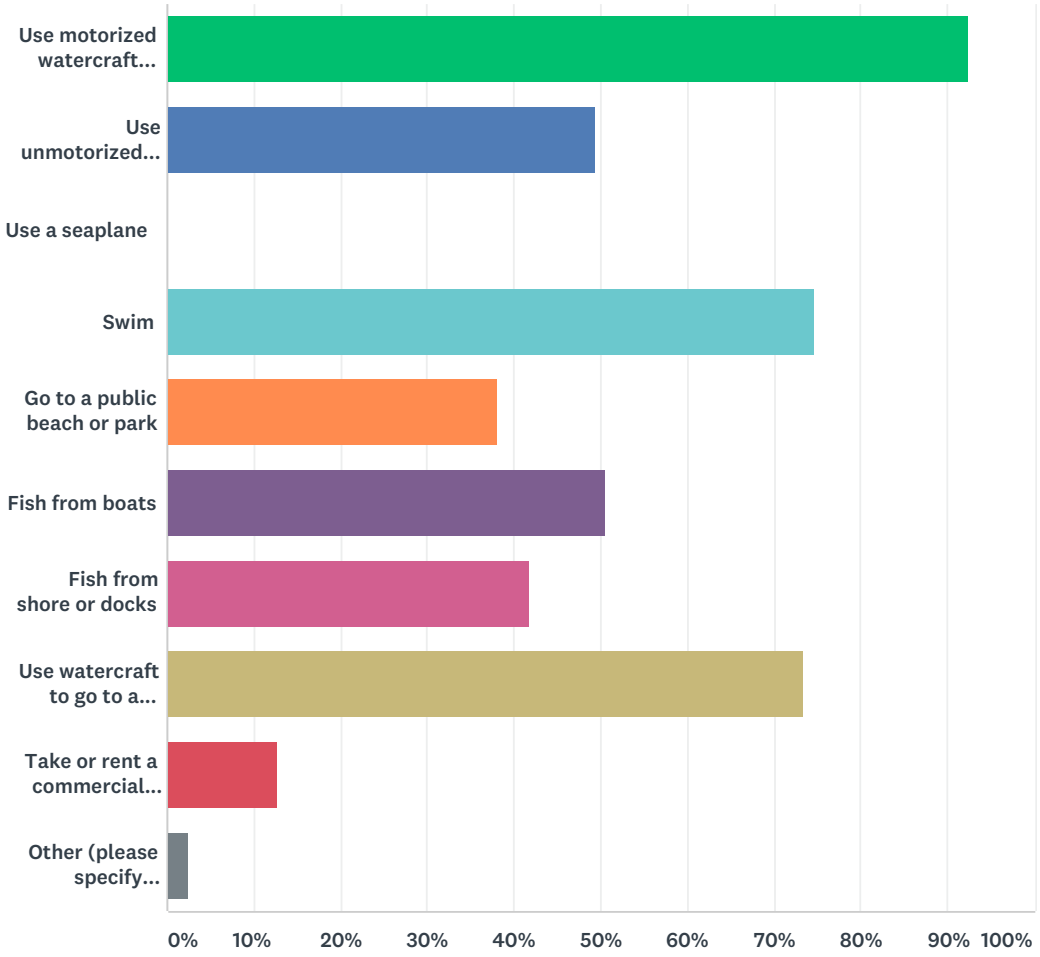
Created on	Type	Comment
2019-08-26 10:39:37 +1000	Excessive Aquatic Plant Growth	The weeds along the north shore of Cooks Bay are the worst we've ever seen. Is there a way we can address this next year. It is not possible to get our jet skis out and very difficult to get the boat out. I believe there was a treatment on Carmens Bay that was effective. Could this be considered for Cooks Bay
2019-08-26 13:20:53 +1000	Make a Comment or Post a Photo	The LMCD was informed years ago harvesting is a poor choice. Think about it. Plants you have pulled apart intentionally or not likely became multiple plants. Harvesters are similar. Broken pieces equal potential plants. The surface looks clean, until floaters, but there are now millions of pieces floating below. Unless your aquatic weed eater collects every piece you are contributing to the problem. Harvesting and shore cutting is a mistake. Benefits only shoreowners temporarily, Not The Lake.
2019-08-31 15:14:08 +1000	Excessive Aquatic Plant Growth	lots of milfoil
2019-08-04 12:57:40 +1000	Excessive Aquatic Plant Growth	milfoil way to much and to thick
2019-08-04 02:20:42 +1000	Make a Comment or Post a Photo	The lake was weedy and didn't catch many fish.
2019-08-23 23:05:17 +1000	Excessive Aquatic Plant Growth	Is there going to be harvesting? Black Lake is really bad. The kayaks can't move.
2019-08-23 23:10:25 +1000	Excessive Aquatic Plant Growth	Will there be harvesting this year? The weeds are really bad in this area.
2019-08-23 23:11:41 +1000	Excessive Aquatic Plant Growth	Weeds are so bad. Difficult to navigate.
2019-08-23 23:17:20 +1000	Make a Comment or Post a Photo	I do not want any harvesting, not even private contracts, to be allowed.
2019-07-06 07:20:20 +1000	Excessive Aquatic Plant Growth	A significant amount of vegetation, both long strands and cut pieces, floating into dock area several times past couple weeks.
2019-07-06 07:28:46 +1000	Excessive Aquatic Plant Growth	Vegetation growth is thick this year.
2019-07-06 07:26:01 +1000	Excessive Aquatic Plant Growth	We find the lake weeds an increasing problem in Smiths Bay. We have a mix of emersed weeds on the inside of our dock area near shore, submersed weeds all around our dock, and increasing amount of floating weeds, which I believe are submersed weeds cut by boat props in the shallow bay that float towards us and get caught up all around our dock. It's really becoming a mess...
2019-08-12 09:49:01 +1000	Make a Comment or Post a Photo	Looks like theyâ€™ve harvested! What a difference! Thank you! We are able to enjoy the lake again!
2019-07-02 01:58:15 +1000	Something I Like	I Like LMCD
2019-08-05 22:07:58 +1000	Excessive Aquatic Plant Growth	Much more milfoil than I remember running parallel to enchanted island.
2019-07-10 00:50:22 +1000	Excessive Aquatic Plant Growth	Vegetation thick in the west side of Phelps Bay. Also noted vegetation growing dense in other areas as well.

2019-07-12 02:53:54 +1000	Excessive Aquatic Plant Growth	Significant amounts of primarily two weed types, assumed to be milfoil and curly pondweed
2019-08-17 04:04:06 +1000	Excessive Aquatic Plant Growth	a lot of vegetation in the bay
2019-07-17 11:53:43 +1000	Ideas and Suggestions	As of last weekend, there is a large tree branch that hangs over the Coffee channel. When boats are going towards Crystal Bay they try to avoid hitting the tree branch and drive too close to the center of the channel. I am not sure if the homeowner on the channel is responsible for trimming this tree. This has been a problem before 4th of July. The branch needs to be trimmed and unsure if the LMCD can help. Thank you!
2019-07-18 01:07:01 +1000	Make a Comment or Post a Photo	Dense algal growth. 6/6/2019
2019-07-22 10:47:59 +1000	Excessive Aquatic Plant Growth	The weeds this year are worse than I've ever seen them! #1-It looks terrible! #2-It has ruined our recreational water sports for the summer. We can't get our jet skis through the weeds without getting them clogged up with weeds, having to jump out into the weedy water and pull them out from underneath.â˜¹ï¸Kayaking and paddle boarding are equally as difficult. Forget about swimming! The kids don't even want to tube or ski. Even the boat propeller gets all tangled up with weeds. It's a nightmare!
2019-07-23 09:45:27 +1000	Excessive Aquatic Plant Growth	Channel off Lafayette Bay to West Point nearly impassable
2019-07-26 01:29:59 +1000	Excessive Aquatic Plant Growth	Thick line of vegetation including millfoil
2019-07-26 01:32:07 +1000	Excessive Aquatic Plant Growth	Thick vegetation along entire ridge across this entire bay making access to Upper Minnetonka Yacht Club and adjacent properties difficult.
2019-08-04 11:20:45 +1000	Excessive Aquatic Plant Growth	Looks like a gator swamp
2019-07-06 07:27:59 +1000	Excessive Aquatic Plant Growth	Vegetation growth is heavy- can you harvest
2019-09-27 11:18:06 +1000	Suspected AIS Siting	Eurasian Watermilfoil
2019-08-10 06:09:42 +1000	Make a Comment or Post a Photo	Water is abnormal color and has no weeds. Is this due to chemical treatment.
2019-08-11 01:19:35 +1000	Excessive Aquatic Plant Growth	So many weeds that my standup paddleboard rudder was getting caught
2019-09-28 00:58:31 +1000	Excessive Aquatic Plant Growth	Worst year of weeds. We believe the decision not to harvest weeds in 2019 was a huge mistake and trust that you will consider and reverse that decision for the 2020 season.
2019-09-28 01:01:07 +1000	Excessive Aquatic Plant Growth	We've spent a lot of money and time removing the lake weeds from our shore for swimming and to get our jet skis out without getting plugged up with weeds. Would like to see the bay being harvested and restored to a usable boating and swimming lake.
2019-08-22 09:13:02 +1000	Excessive Aquatic Plant Growth	A lot of vegetation floating into shore this year.

2019-08-22 08:53:35 +1000	Excessive Aquatic Plant Growth	Milfoil is bad in this area.
2019-08-22 09:06:16 +1000	Excessive Aquatic Plant Growth	Football field sized weeds for 2 or 3 days. LMCD should harvest again.
2019-08-22 09:09:07 +1000	Excessive Aquatic Plant Growth	Weeds are really bad this summer. Already removed five truckloads this past week. Not harvesting seems to have made things worse.
2019-08-23 23:03:38 +1000	Excessive Aquatic Plant Growth	The weeds are usually bad in Cooks bat, but this is the worst year ever.
2019-08-23 23:09:04 +1000	Excessive Aquatic Plant Growth	Harvesting this year? Vegetation is so bad that I can't get my boat out.
2019-08-23 22:59:45 +1000	Excessive Aquatic Plant Growth	It is impossible to keep up with the floating weeds the boats produce. Lived here over 30 years and have never seen such a mess. In the past years harvesters would cut at least one time in the summer which would take care of the weeds growing above the surface in front of the docks.
2019-08-23 23:01:46 +1000	Make a Comment or Post a Photo	Weeds should be harvested along southeastern side of Crane Island. It is a high usage area.
2019-08-23 23:14:21 +1000	Excessive Aquatic Plant Growth	The LMCD did such a beautiful job in past years. My neighborhood and I are disappointed LMCD is not harvesting this year. I don't feel like I can even swim because it's dangerous with the weeds.
2019-08-23 23:28:56 +1000	Make a Comment or Post a Photo	I am in favor of harvesting in Harrsions Bay
2019-08-25 02:41:24 +1000	Suspected AIS Siting	Milfoil
2019-08-25 02:40:14 +1000	Suspected AIS Siting	Milfoil yuck
2019-10-10 00:56:36 +1100	Excessive Aquatic Plant Growth	Lived here 22 years. This year was the worst build up and accumulation of floating weeds by far. I've always thought it was the water current along the point that kept weeds moving, but this summer I realized what a significant benefit LMCD harvesting provided. Please bring back the harvesters.
2019-10-10 01:06:17 +1100	Excessive Aquatic Plant Growth	Weeds floating after private harvester went through.
2019-10-15 07:31:44 +1100	Excessive Aquatic Plant Growth	I was aware the week harvesting was being discontinued in 2019. I can attest that the biggest impace was the amount of weeds that floated into our docks. 4th of July I had a mat of weeds around 4 inches thick between docks and 80 feet out. All weeds cut by watercraft props running through the weed beds. I ended up loading weeds onto barge (twice). If the plan is to discontinue mowing someone needs to collect the mats that end up congesting docks.

Q1 In which of the following summertime recreational activities do you partake at Lake Minnetonka? Please select all that apply.

Answered: 79 Skipped: 0



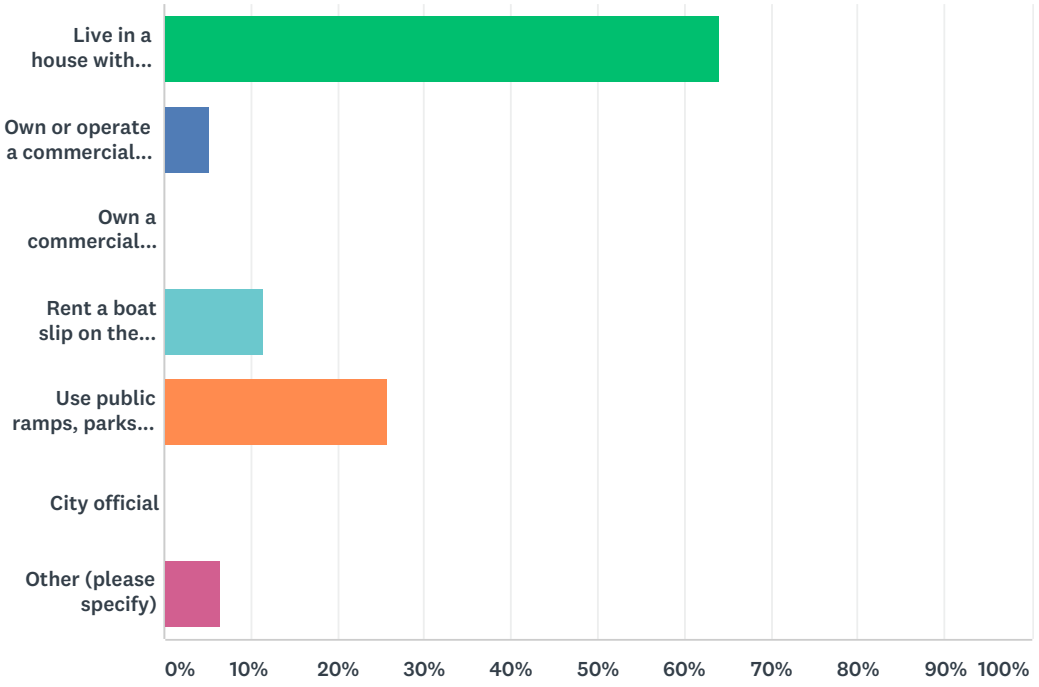
ANSWER CHOICES	RESPONSES	
Use motorized watercraft (e.g. boats, PWC, motorized sailboats, and similar)	92.41%	73
Use unmotorized watercraft (e.g. kayaks, canoes, paddleboards, unmotorized sailboats, and similar)	49.37%	39
Use a seaplane	0.00%	0
Swim	74.68%	59
Go to a public beach or park	37.97%	30
Fish from boats	50.63%	40
Fish from shore or docks	41.77%	33
Use watercraft to go to a food/beverage establishment or to shop	73.42%	58
Take or rent a commercial cruise boat	12.66%	10
Other (please specify activity, company, location, etc.)	2.53%	2

Total Respondents: 79

#	OTHER (PLEASE SPECIFY ACTIVITY, COMPANY, LOCATION, ETC.)	DATE
1	take my dog to the lake to swim	9/16/2019 11:19 AM
2	commute to and fro from summer home	8/1/2019 9:44 AM

Q2 Which of the following best describes your affiliation with Lake Minnetonka? Please check all that apply.

Answered: 78 Skipped: 1

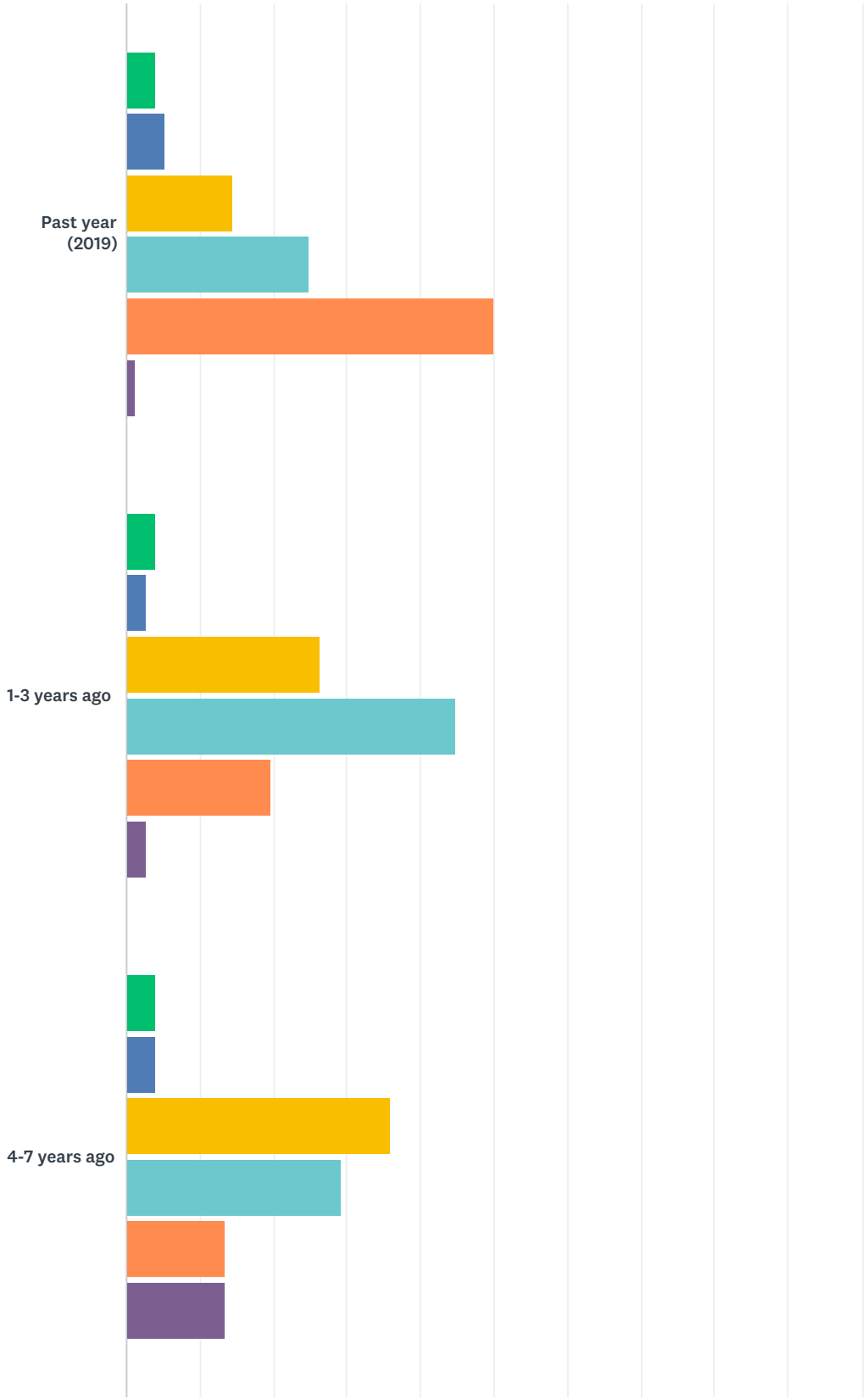


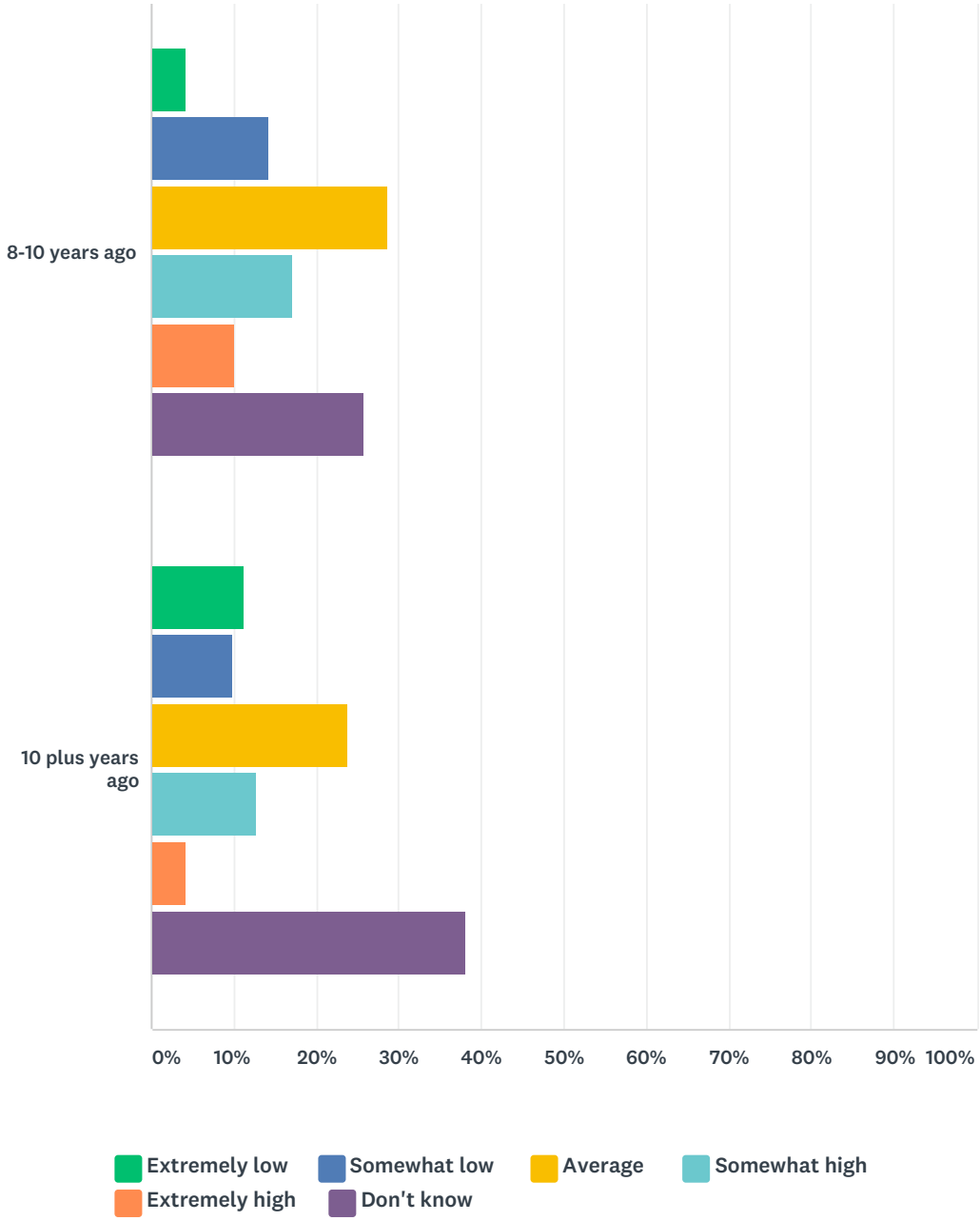
ANSWER CHOICES	RESPONSES	
Live in a house with lakeshore property or that has an outlot with dock or lake access	64.10%	50
Own or operate a commercial marina, watercraft rental business, or lake service provider	5.13%	4
Own a commercial business not specifically related to providing lake services	0.00%	0
Rent a boat slip on the Lake	11.54%	9
Use public ramps, parks, or lakeshore for access to the Lake	25.64%	20
City official	0.00%	0
Other (please specify)	6.41%	5
Total Respondents: 78		

#	OTHER (PLEASE SPECIFY)	DATE
1	Former summer resident of Big Island (BIVC)	8/4/2019 8:05 AM
2	Sailboating, kids enrolled in day camps on the lake	8/3/2019 7:04 PM
3	City has dock slip	8/3/2019 5:31 PM
4	Cabin, seasonal use	7/11/2019 9:59 AM
5	LMCD	7/1/2019 4:23 AM

Q3 How would you rate the presence of aquatic invasive species in Lake Minnetonka as a whole?

Answered: 78 Skipped: 1





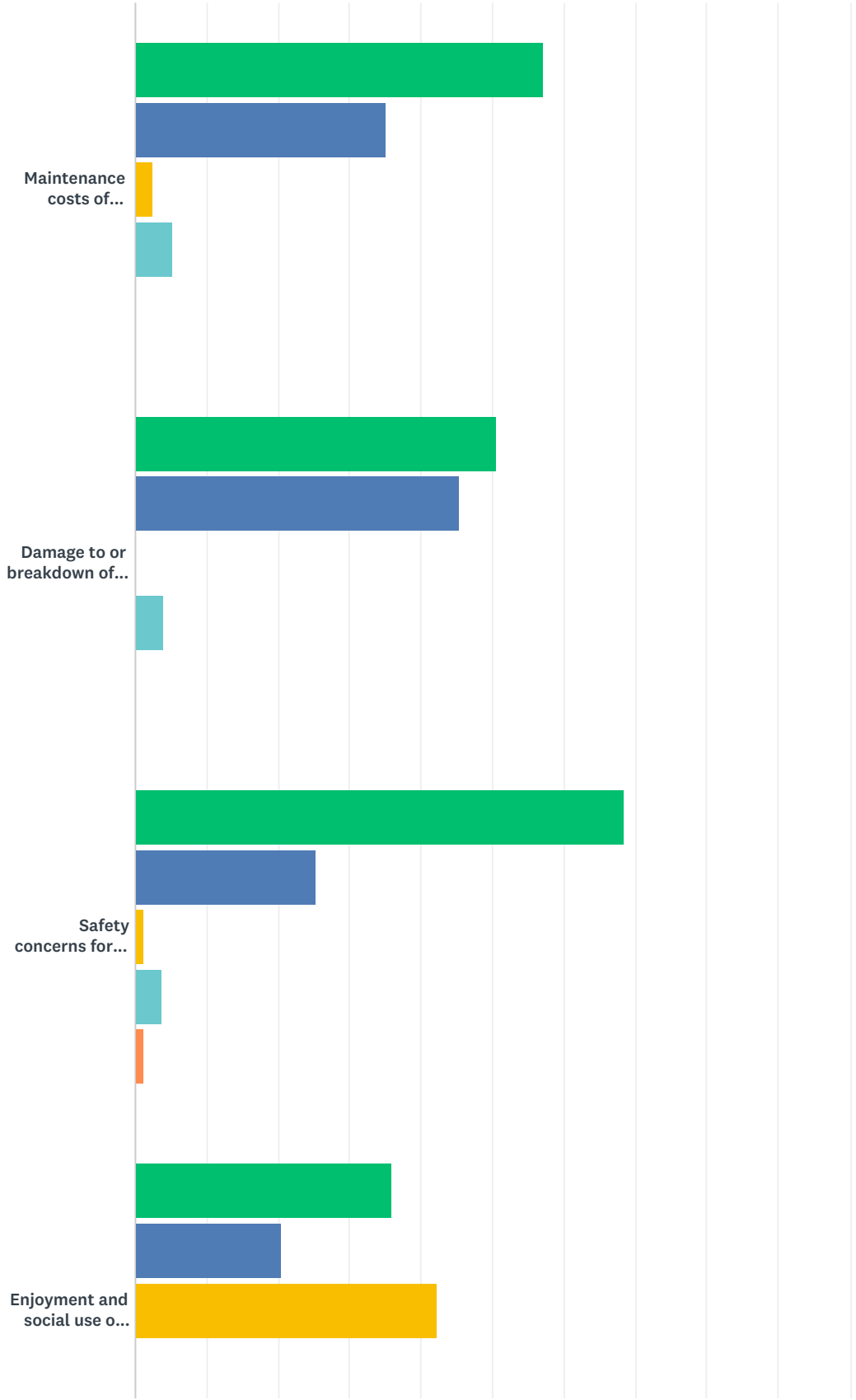
	EXTREMELY LOW	SOMEWHAT LOW	AVERAGE	SOMEWHAT HIGH	EXTREMELY HIGH	DON'T KNOW	TOTAL	WEIGHTED AVERAGE
Past year (2019)	3.95% 3	5.26% 4	14.47% 11	25.00% 19	50.00% 38	1.32% 1	76	4.16
1-3 years ago	3.95% 3	2.63% 2	26.32% 20	44.74% 34	19.74% 15	2.63% 2	76	3.82
4-7 years ago	4.00% 3	4.00% 3	36.00% 27	29.33% 22	13.33% 10	13.33% 10	75	3.84
8-10 years ago	4.29% 3	14.29% 10	28.57% 20	17.14% 12	10.00% 7	25.71% 18	70	3.91
10 plus years ago	11.27% 8	9.86% 7	23.94% 17	12.68% 9	4.23% 3	38.03% 27	71	4.03

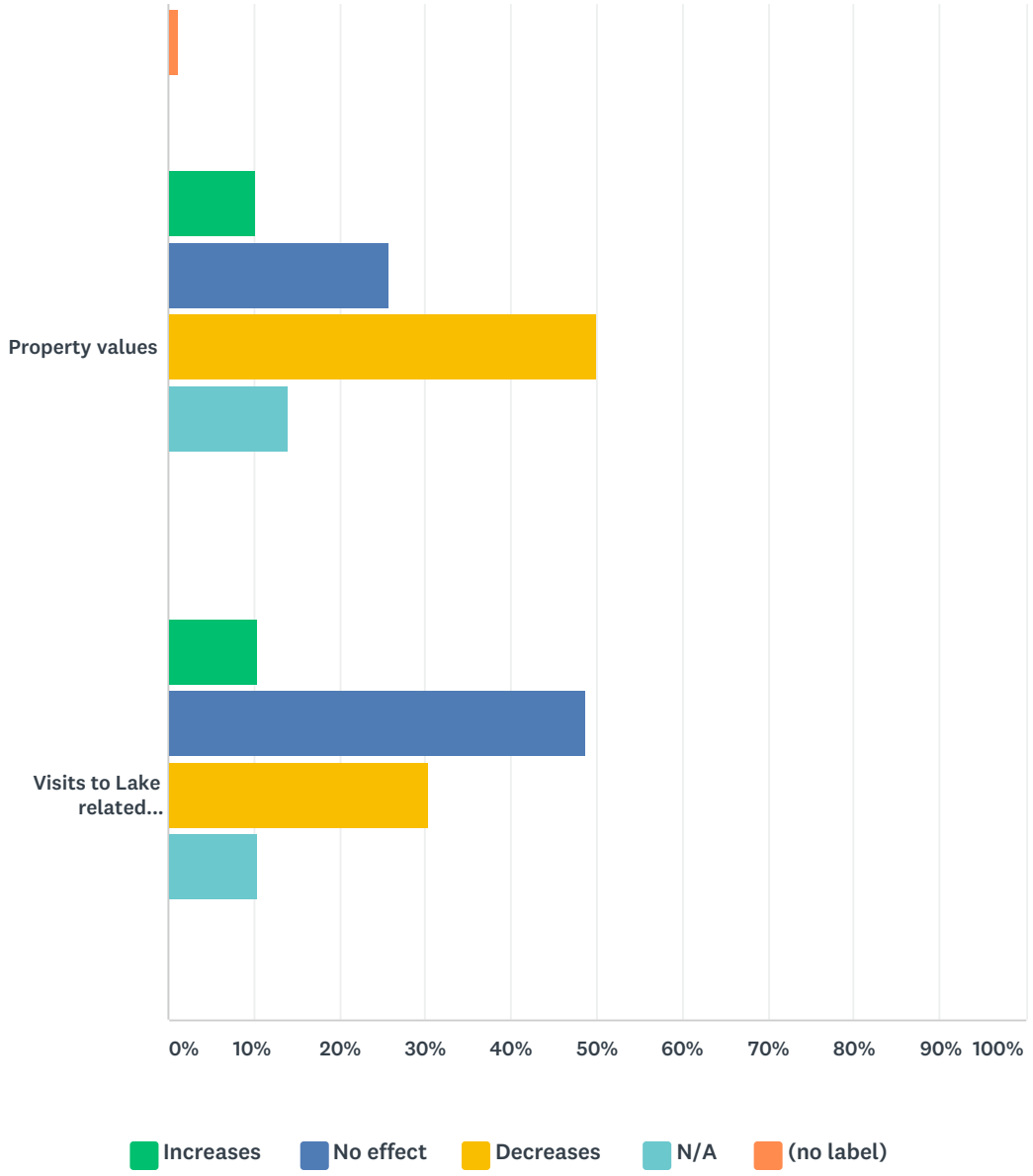
#	OTHER (PLEASE SPECIFY)	DATE

1	Milfoil keeps getting worse.	9/16/2019 11:19 AM

Q4 How do aquatic invasive species affect your use of Lake Minnetonka?

Answered: 79 Skipped: 0

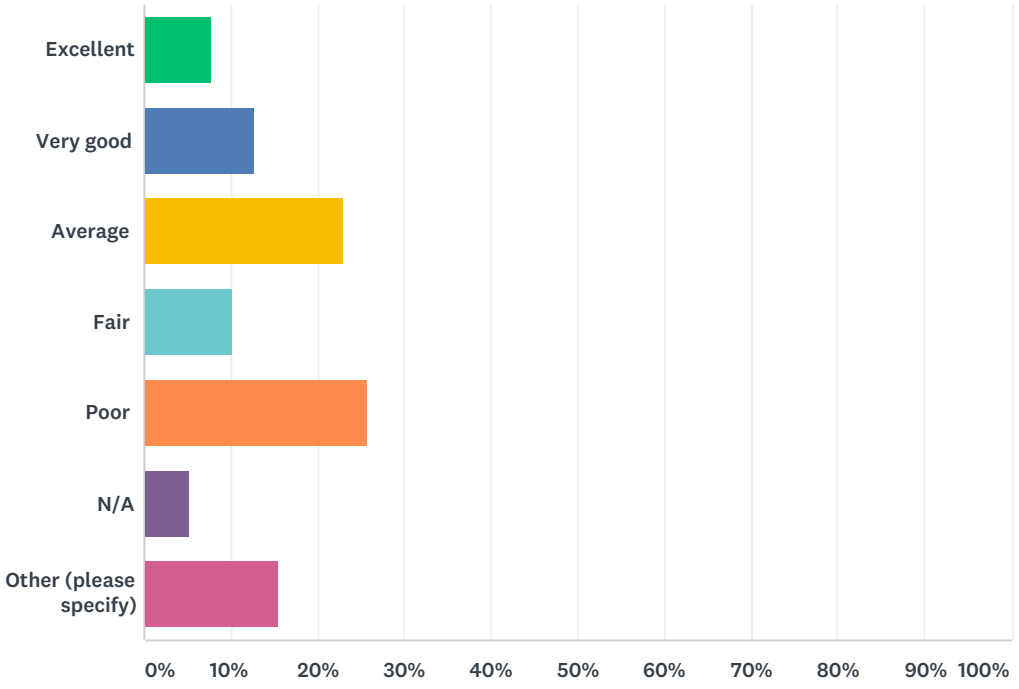




	INCREASES	NO EFFECT	DECREASES	N/A	(NO LABEL)	TOTAL	WEIGHTED AVERAGE
Maintenance costs of watercraft, docks, and appurtenances	57.14% 44	35.06% 27	2.60% 2	5.19% 4	0.00% 0	77	1.56
Damage to or breakdown of watercraft or equipment	50.65% 39	45.45% 35	0.00% 0	3.90% 3	0.00% 0	77	1.57
Safety concerns for swimming, watersports, etc.	68.35% 54	25.32% 20	1.27% 1	3.80% 3	1.27% 1	79	1.44
Enjoyment and social use of the Lake	35.90% 28	20.51% 16	42.31% 33	0.00% 0	1.28% 1	78	2.10
Property values	10.26% 8	25.64% 20	50.00% 39	14.10% 11	0.00% 0	78	2.68
Visits to Lake related businesses	10.53% 8	48.68% 37	30.26% 23	10.53% 8	0.00% 0	76	2.41

Q5 The Lake Minnetonka Conservation District (LMCD) has historically harvested (cut and removed) aquatic vegetation for navigation and safety. How would you rate the past harvesting?

Answered: 78 Skipped: 1



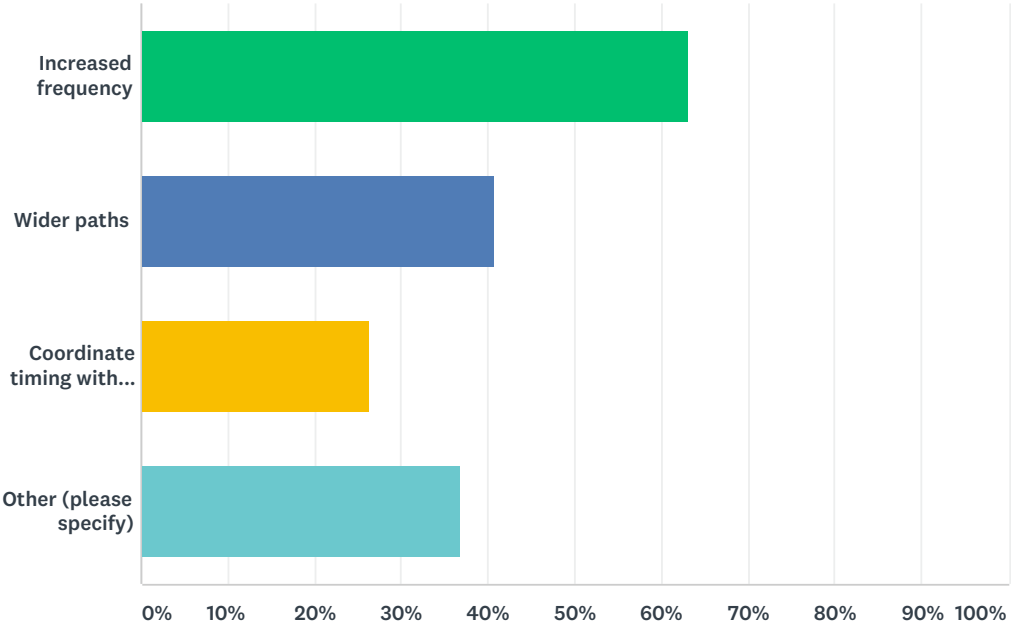
ANSWER CHOICES	RESPONSES	
Excellent	7.69%	6
Very good	12.82%	10
Average	23.08%	18
Fair	10.26%	8
Poor	25.64%	20
N/A	5.13%	4
Other (please specify)	15.38%	12
TOTAL		78

#	OTHER (PLEASE SPECIFY)	DATE
1	2019 is a disaster. Horrible decision to not harvest this year!	9/23/2019 11:44 AM
2	2019 has been the worst	9/16/2019 11:19 AM
3	This year Phelps Bay was not harvested and difficult near our home on Tuxedo,	8/31/2019 1:51 PM
4	2019 no harvesting. Prior years very good.	8/6/2019 10:44 AM
5	Detrimental to the fishery	8/5/2019 5:46 PM
6	Seems like they harvest to much	8/4/2019 6:38 AM

7	A joke. Very poor job. Ineffective because of the way they carried the weed to a truck. A lake barge would have been more effective incurring the weeds.	8/4/2019 3:58 AM
8	Waste of time	8/4/2019 3:13 AM
9	Making the weeds worse year after year!!!!!	8/4/2019 2:55 AM
10	Ineffective at best, detrimental by creating more plants at worst	8/3/2019 7:04 PM
11	Don’t need to cut or spray. Horrible for the eco system	8/3/2019 6:57 PM
12	Haven’t seen them in Black Lake this year	8/3/2019 4:11 PM

Q6 How could the harvesting be improved?

Answered: 76 Skipped: 3



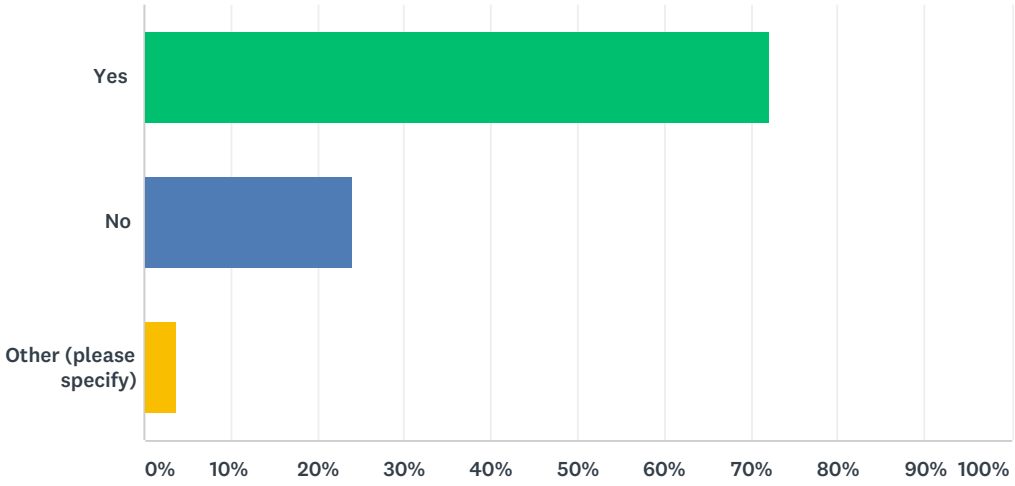
ANSWER CHOICES	RESPONSES	
Increased frequency	63.16%	48
Wider paths	40.79%	31
Coordinate timing with private harvesters	26.32%	20
Other (please specify)	36.84%	28
Total Respondents: 76		

#	OTHER (PLEASE SPECIFY)	DATE
1	Use more effective harvesting machines. Current effort leaves & distributes 30%-40% (?) of wat they harvest	9/26/2019 10:18 AM
2	do not do it!!!	9/26/2019 5:31 AM
3	Root removal, cutting is making it spread!	9/2/2019 10:12 AM
4	end it	8/12/2019 5:00 AM
5	Less frequent	8/5/2019 5:46 PM
6	Minimal benefits, spreads floaters)	8/5/2019 2:55 AM
7	Utilize herbicides	8/4/2019 12:29 PM
8	Harvesters are terrible tat picking up what they cut. Instead the vast majority of what they cut washes up on homeowners shorelines for them to deal with.	8/4/2019 8:32 AM
9	Don't use the weed harvesters.	8/4/2019 7:35 AM
10	More bays	8/4/2019 7:26 AM
11	Dont do it at all . Just spreads the weeds that float to shore.	8/4/2019 6:57 AM
12	You could stop ruining the lake by over harvesting	8/4/2019 6:38 AM

13	Remove and not just cut milfoil.	8/4/2019 4:02 AM
14	Use a barge we're the weeds are cut to take large volumes from the lake vs driving small amounts of weeds to the truck	8/4/2019 3:58 AM
15	Stop the harvesting. You are killing fish and their habitat.	8/4/2019 3:23 AM
16	Quit	8/4/2019 3:13 AM
17	Find a better method!! Stop DESTROYING our fisherys!!!	8/4/2019 2:55 AM
18	combine with chemical treatments	8/4/2019 2:43 AM
19	After watching hundreds of juvinile fish go up the ramp in the harvester and no one sort them out and put them back there should not be any more harvesting!	8/4/2019 2:02 AM
20	By being combined with a herbicide or something similar to eradicate the invasive plants	8/3/2019 7:04 PM
21	Less.	8/3/2019 6:57 PM
22	Pull weeds at the root	8/3/2019 5:31 PM
23	Better clean up	8/3/2019 4:41 PM
24	Keep channels open but I believe cutting machine spread invasive species and send uncollected weeds to shoreline.	8/3/2019 3:28 PM
25	Pick up the plants you harvest	7/16/2019 12:08 PM
26	Only harvest in channels if necessary it spreads the weeds and makes shorelines a mess	7/14/2019 5:32 PM
27	Use all means available to manage beyond just mechanical harvesting	7/11/2019 9:59 AM
28	use machines that actually PULL weeds from the bottom	7/11/2019 6:27 AM

Q7 Are you aware that the Lake Minnetonka Conservation District (LMCD) has suspended the aquatic vegetation harvesting program for 2019?

Answered: 79 Skipped: 0

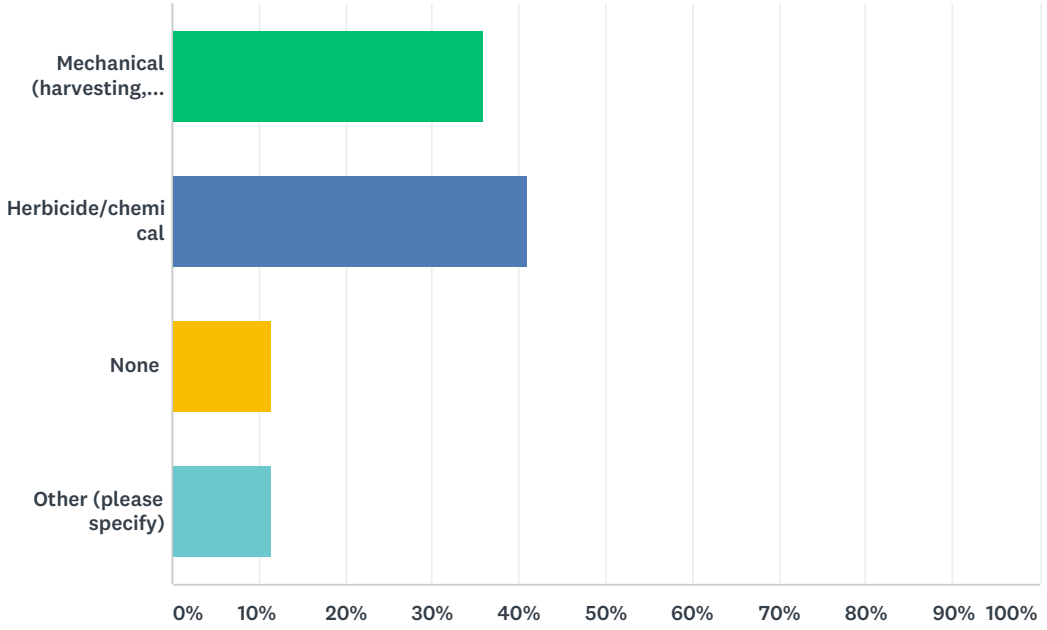


ANSWER CHOICES	RESPONSES	
Yes	72.15%	57
No	24.05%	19
Other (please specify)	3.80%	3
TOTAL		79

#	OTHER (PLEASE SPECIFY)	DATE
1	It seems this organization has ruined the biodiversity of the lake by over harvest of aquatic vegetation	8/4/2019 6:38 AM
2	Good	8/4/2019 3:13 AM
3	Yes. But have still seen harvesters	8/3/2019 6:57 PM

Q8 What type of lake vegetation control method would you prefer?

Answered: 78 Skipped: 1

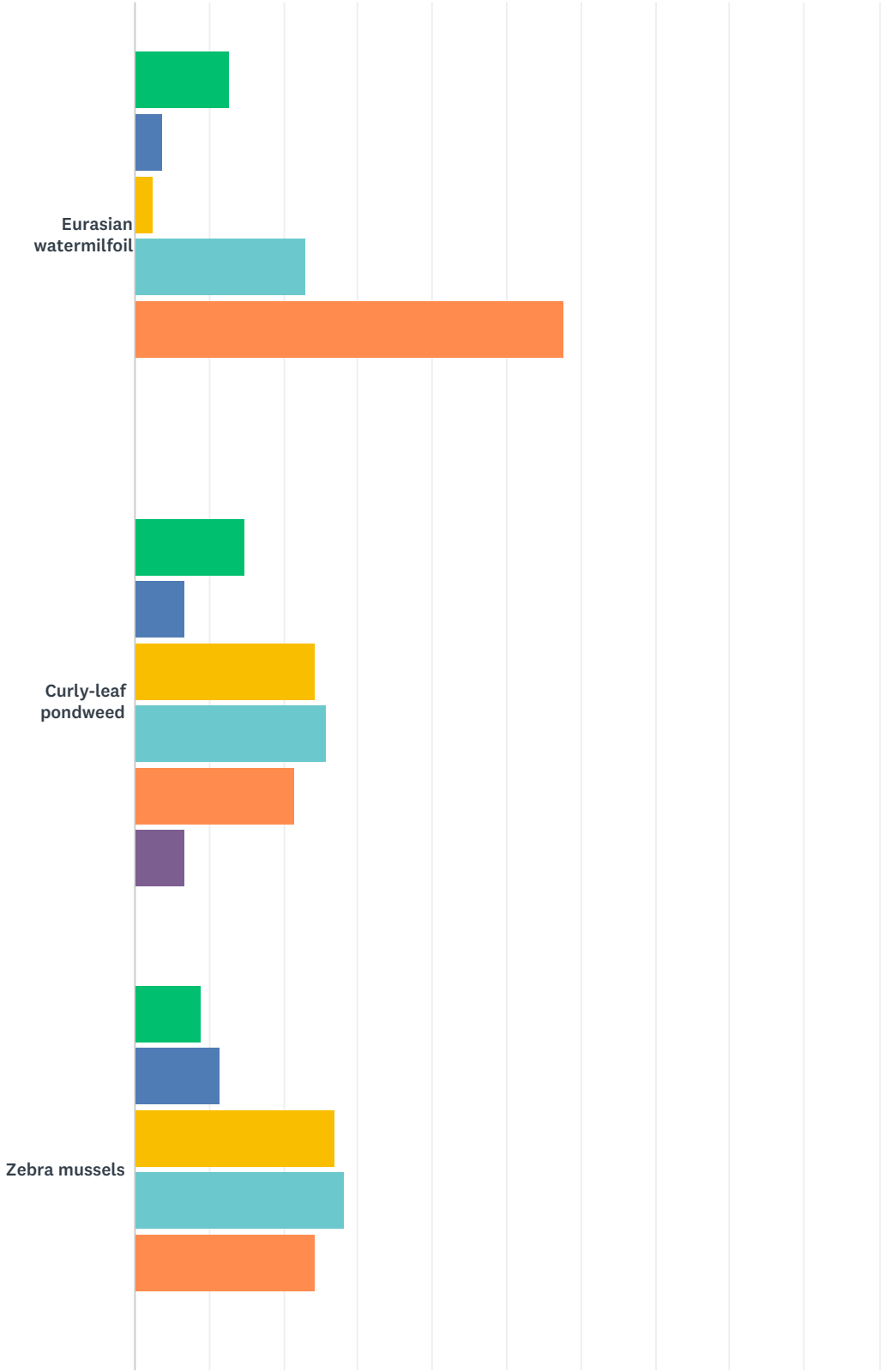


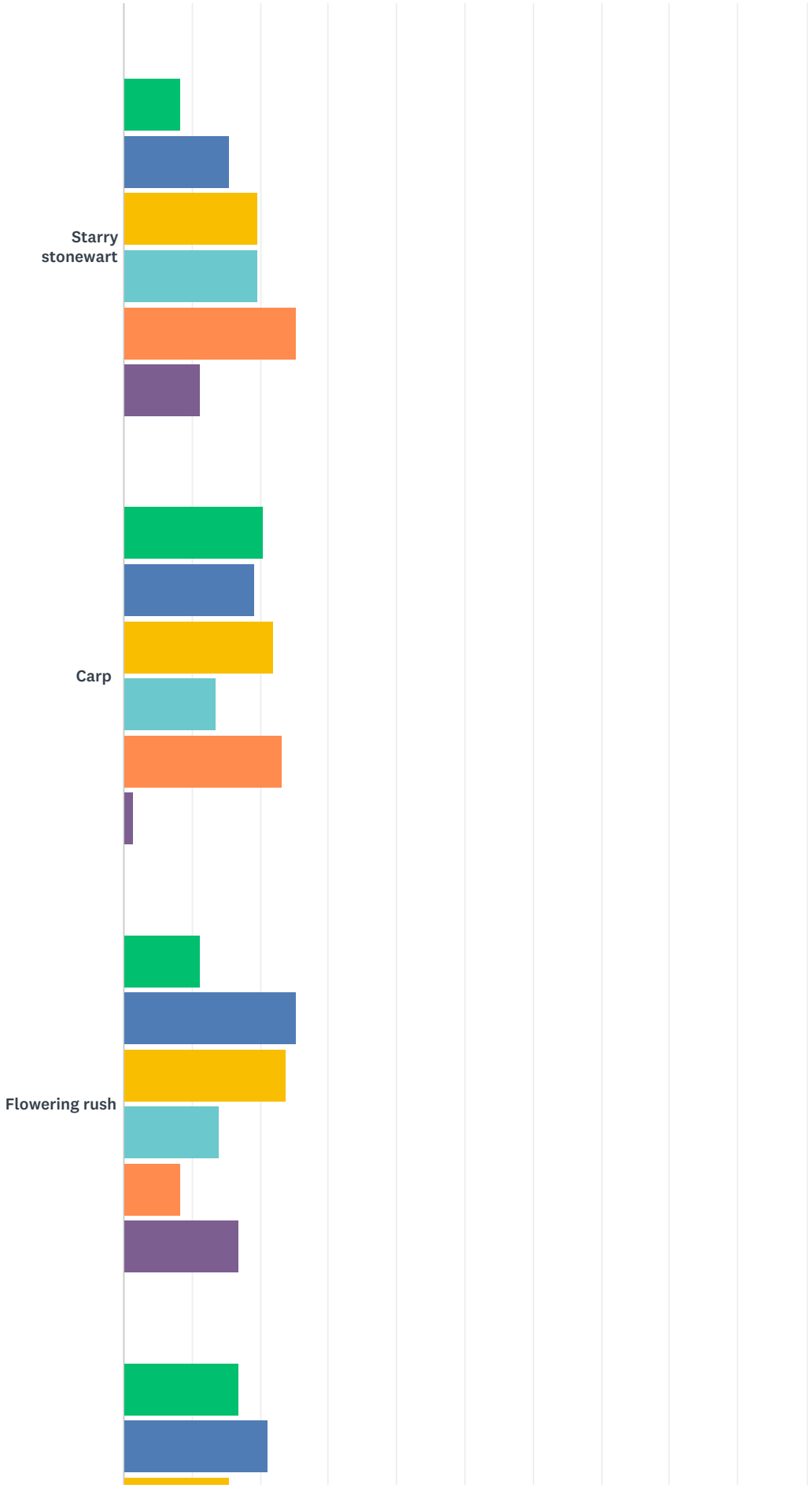
ANSWER CHOICES	RESPONSES	
Mechanical (harvesting, diving, etc.)	35.90%	28
Herbicide/chemical	41.03%	32
None	11.54%	9
Other (please specify)	11.54%	9
TOTAL		78

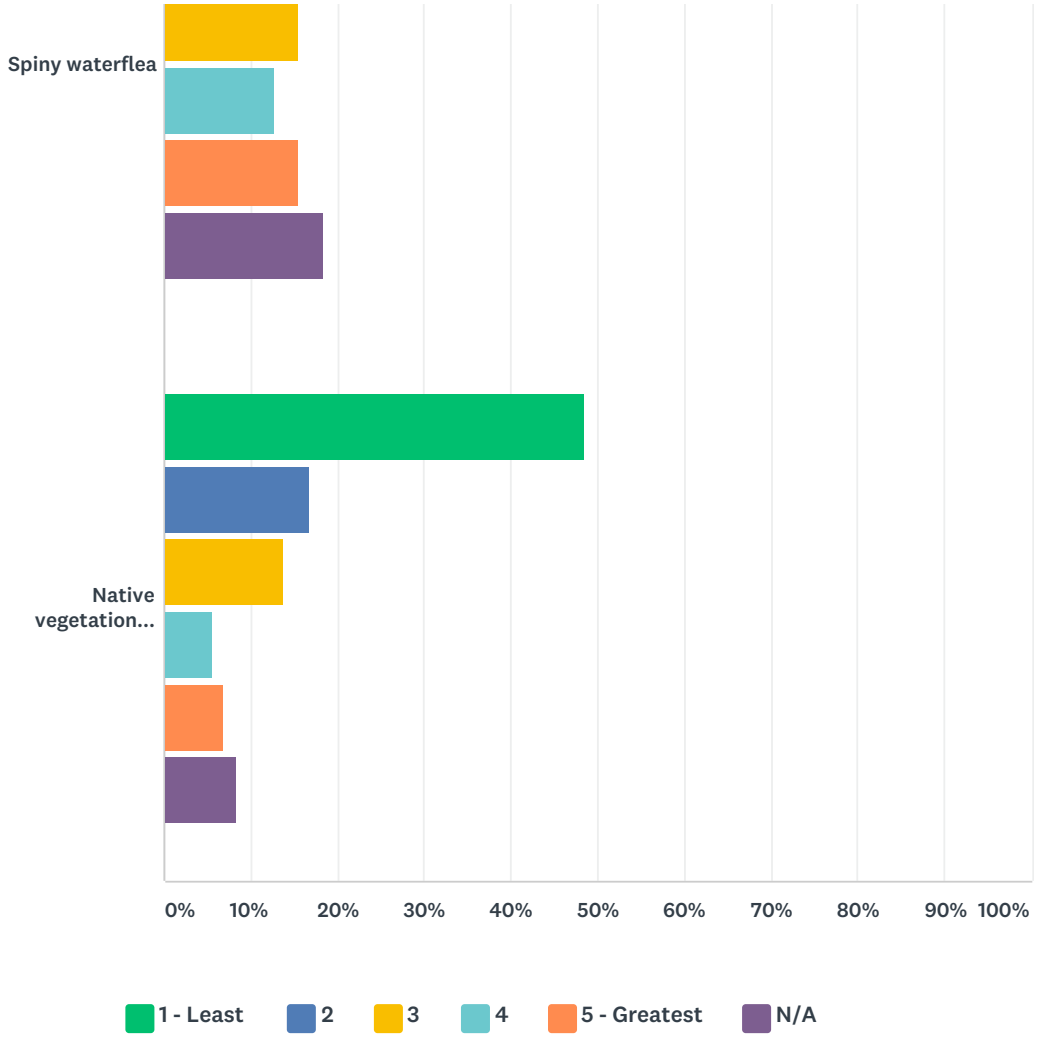
#	OTHER (PLEASE SPECIFY)	DATE
1	Harvesting with follow-up.	9/16/2019 11:19 AM
2	Prohibition of motorized boats would decrease further risk of destroying this ecosystem.	9/2/2019 10:12 AM
3	Diving/vacuum	8/5/2019 2:55 AM
4	Magic	8/4/2019 8:05 AM
5	Combo of chemical and mechanical	8/4/2019 3:15 AM
6	Get smarter	8/4/2019 2:55 AM
7	Use of harvesters with herbicide treatments	7/16/2019 12:08 PM
8	Harvesting, biological, and lake depth manipulation (dam)	7/11/2019 9:59 AM
9	mechanical, but by pulling roots from bottom	7/11/2019 6:27 AM

Q9 In your opinion, which of the following AIS, aquatic disease, or native vegetation/animal, pose the greatest threat to your enjoyment of Lake Minnetonka?

Answered: 78 Skipped: 1




Starry stonewart
Carp
Flowering rush



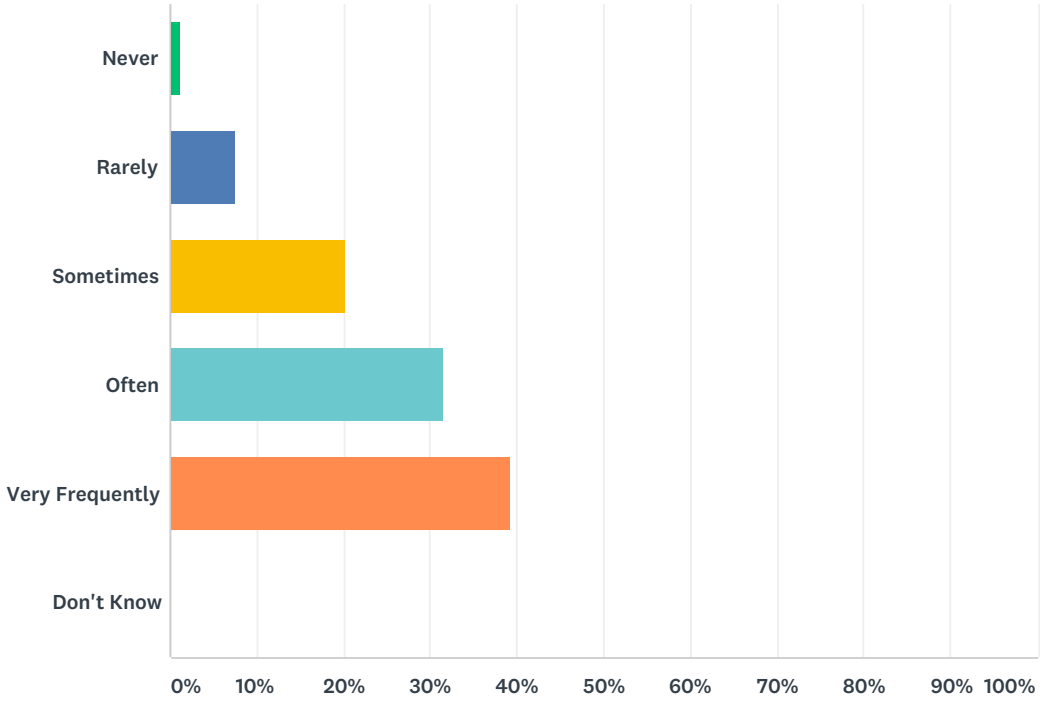
	1 - LEAST	2	3	4	5 - GREATEST	N/A	TOTAL	WEIGHTED AVERAGE
Eurasian watermilfoil	12.82% 10	3.85% 3	2.56% 2	23.08% 18	57.69% 45	0.00% 0	78	4.09
Curly-leaf pondweed	14.86% 11	6.76% 5	24.32% 18	25.68% 19	21.62% 16	6.76% 5	74	3.35
Zebra mussels	8.97% 7	11.54% 9	26.92% 21	28.21% 22	24.36% 19	0.00% 0	78	3.47
Starry stonewart	8.45% 6	15.49% 11	19.72% 14	19.72% 14	25.35% 18	11.27% 8	71	3.43
Carp	20.55% 15	19.18% 14	21.92% 16	13.70% 10	23.29% 17	1.37% 1	73	3.00
Flowering rush	11.27% 8	25.35% 18	23.94% 17	14.08% 10	8.45% 6	16.90% 12	71	2.80
Spiny waterflea	16.90% 12	21.13% 15	15.49% 11	12.68% 9	15.49% 11	18.31% 13	71	2.86
Native vegetation (e.g. wild celery, waterlilies, etc.)	48.61% 35	16.67% 12	13.89% 10	5.56% 4	6.94% 5	8.33% 6	72	1.97

#	OTHER (PLEASE SPECIFY)	DATE
1	boat traffic and/or wake erosion	8/1/2019 9:44 AM

2	I am not familiar with a few of these	7/11/2019 9:59 AM

Q10 Prior to taking this survey, how often have you heard, seen, or read information about aquatic invasive species (AIS)?

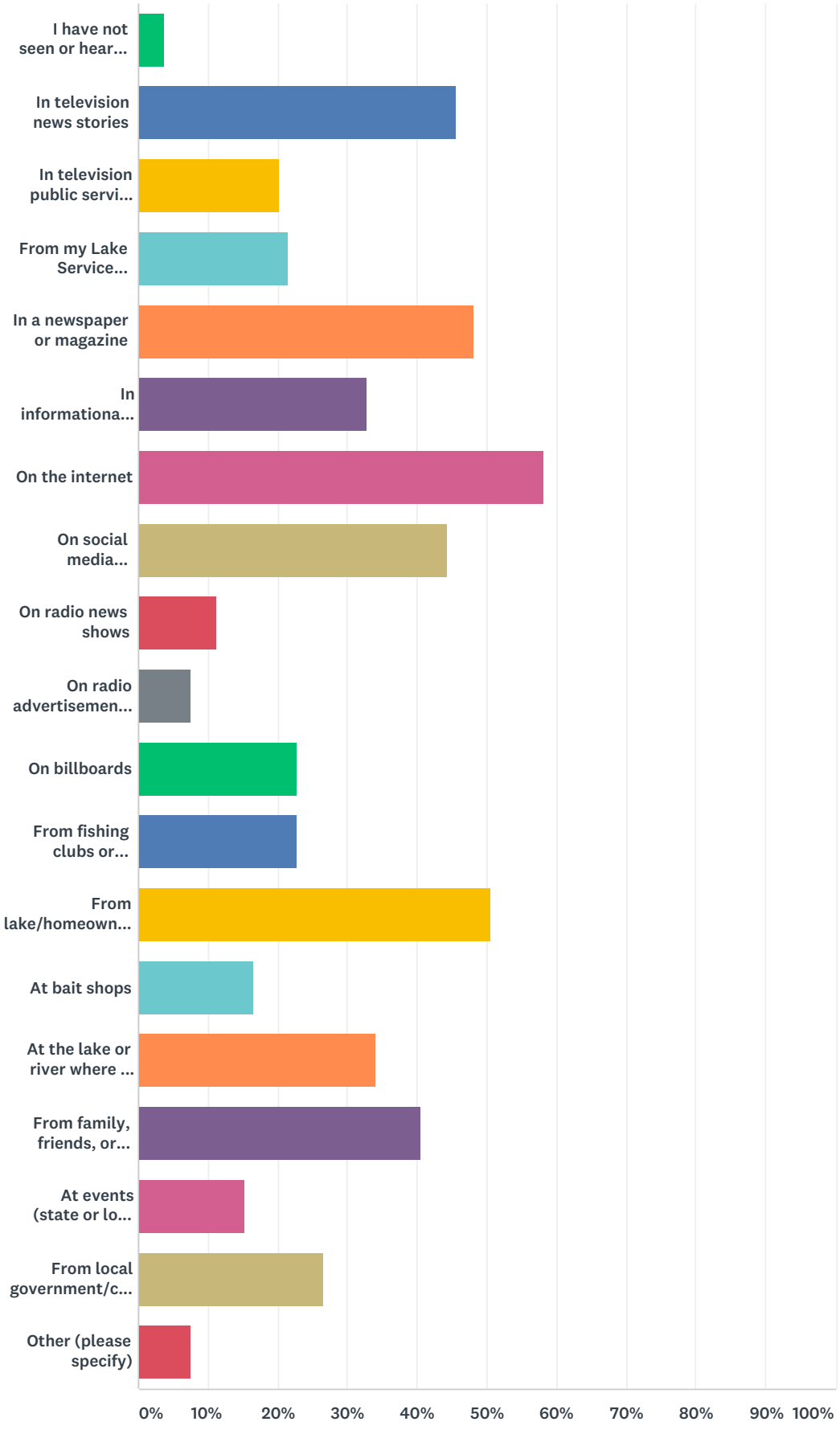
Answered: 79 Skipped: 0



ANSWER CHOICES	RESPONSES	
Never	1.27%	1
Rarely	7.59%	6
Sometimes	20.25%	16
Often	31.65%	25
Very Frequently	39.24%	31
Don't Know	0.00%	0
TOTAL		79

Q11 Over the past year, where have you seen or heard information about aquatic invasive species? Please select all that apply.

Answered: 79 Skipped: 0



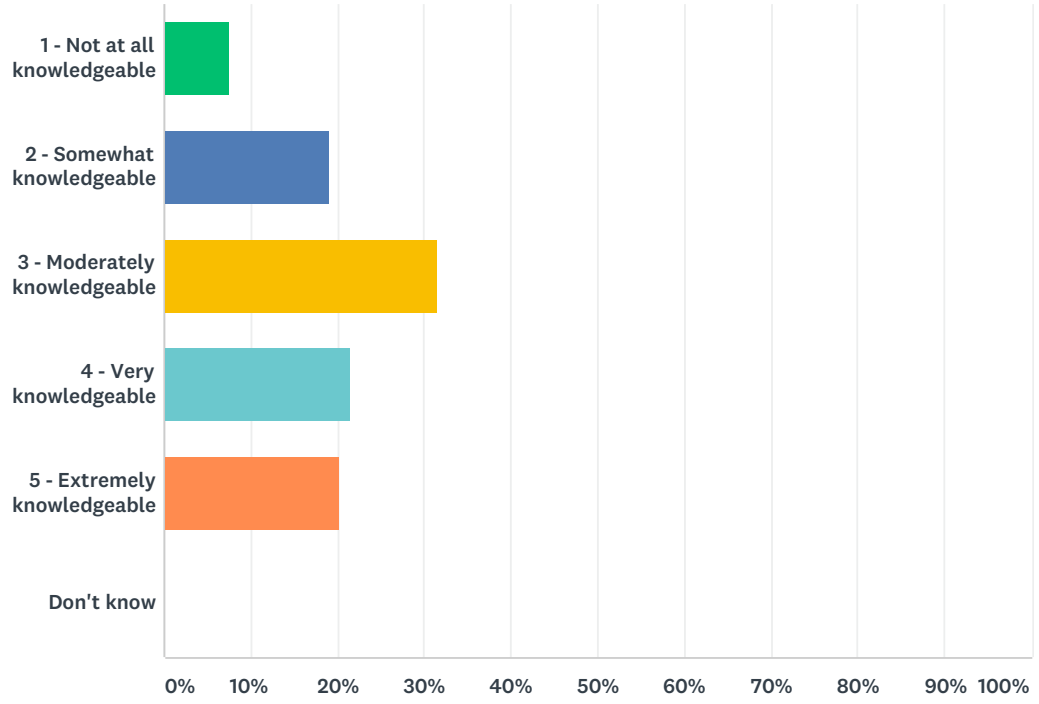
ANSWER CHOICES	RESPONSES

I have not seen or heard information about aquatic invasive species	3.80%	3
In television news stories	45.57%	36
In television public service announcements or advertisements	20.25%	16
From my Lake Service Provider	21.52%	17
In a newspaper or magazine	48.10%	38
In informational pamphlets or resources	32.91%	26
On the internet	58.23%	46
On social media (Facebook, Twitter, etc.)	44.30%	35
On radio news shows	11.39%	9
On radio advertisements or public service announcements	7.59%	6
On billboards	22.78%	18
From fishing clubs or organizations	22.78%	18
From lake/homeowner associations or lake improvement districts	50.63%	40
At bait shops	16.46%	13
At the lake or river where you fish or boat	34.18%	27
From family, friends, or neighbors	40.51%	32
At events (state or local fairs, sport shows)	15.19%	12
From local government/conservation districts	26.58%	21
Other (please specify)	7.59%	6
Total Respondents: 79		

#	OTHER (PLEASE SPECIFY)	DATE
1	Local paper	9/3/2019 5:45 AM
2	DNR representatives	8/5/2019 5:46 PM
3	TV in the narrows channel	8/4/2019 3:58 AM
4	Get rid of DNR great start!!!!!!!	8/4/2019 2:55 AM
5	I'm a volunteer AIS detector for UofMN	8/3/2019 3:28 PM
6	Boat landing AIS inspection stations	7/11/2019 9:59 AM

Q12 On a scale of 1 to 5, how knowledgeable are you about the laws and regulations related to aquatic invasive species?

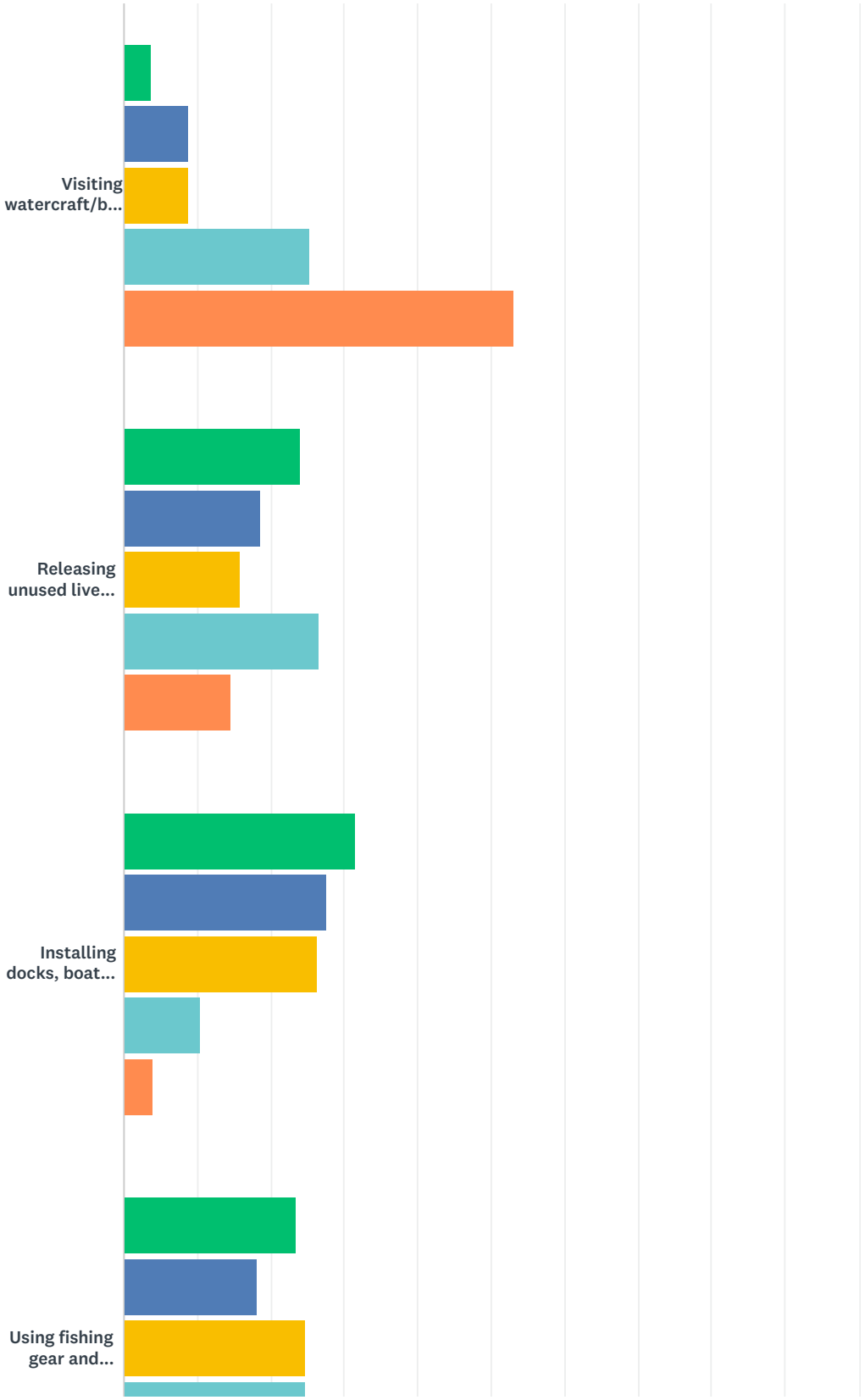
Answered: 79 Skipped: 0

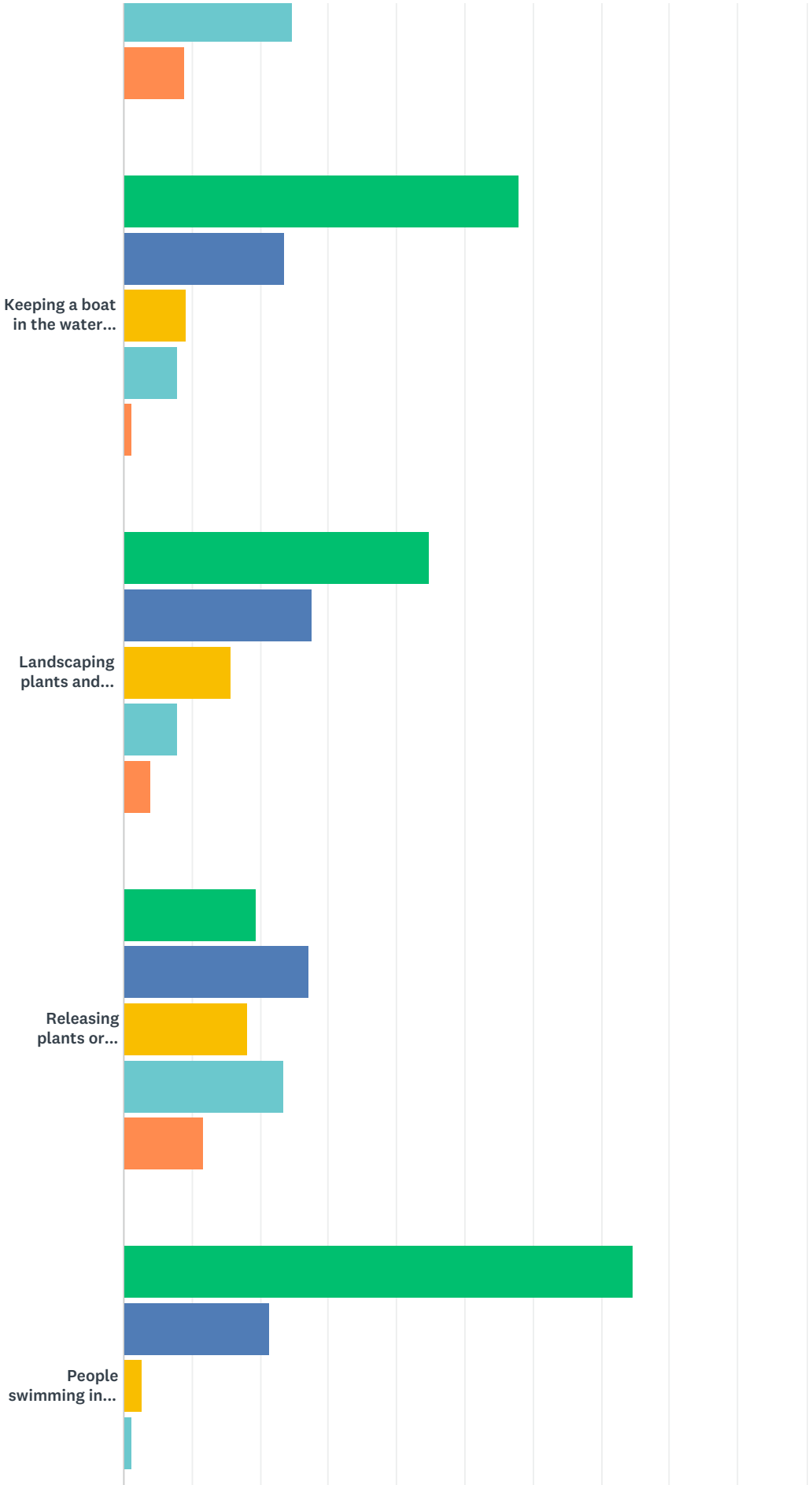


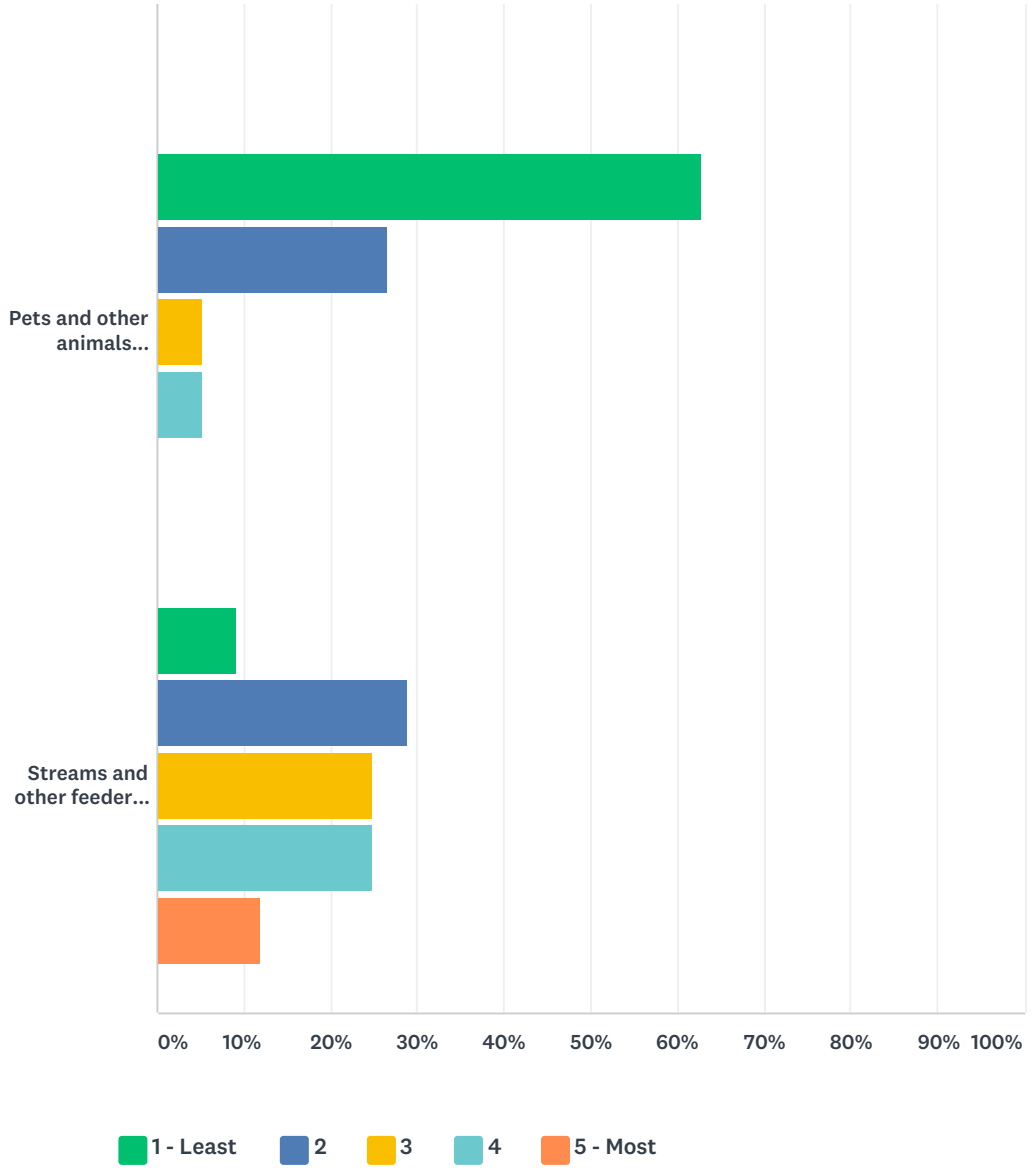
ANSWER CHOICES	RESPONSES	
1 - Not at all knowledgeable	7.59%	6
2 - Somewhat knowledgeable	18.99%	15
3 - Moderately knowledgeable	31.65%	25
4 - Very knowledgeable	21.52%	17
5 - Extremely knowledgeable	20.25%	16
Don't know	0.00%	0
TOTAL		79

Q13 Rank the following activities that you think may contribute the most to the introduction of AIS in Lake Minnetonka?

Answered: 79 Skipped: 0




Keeping a boat in the water...
Landscaping plants and...
Releasing plants or...
People swimming in...

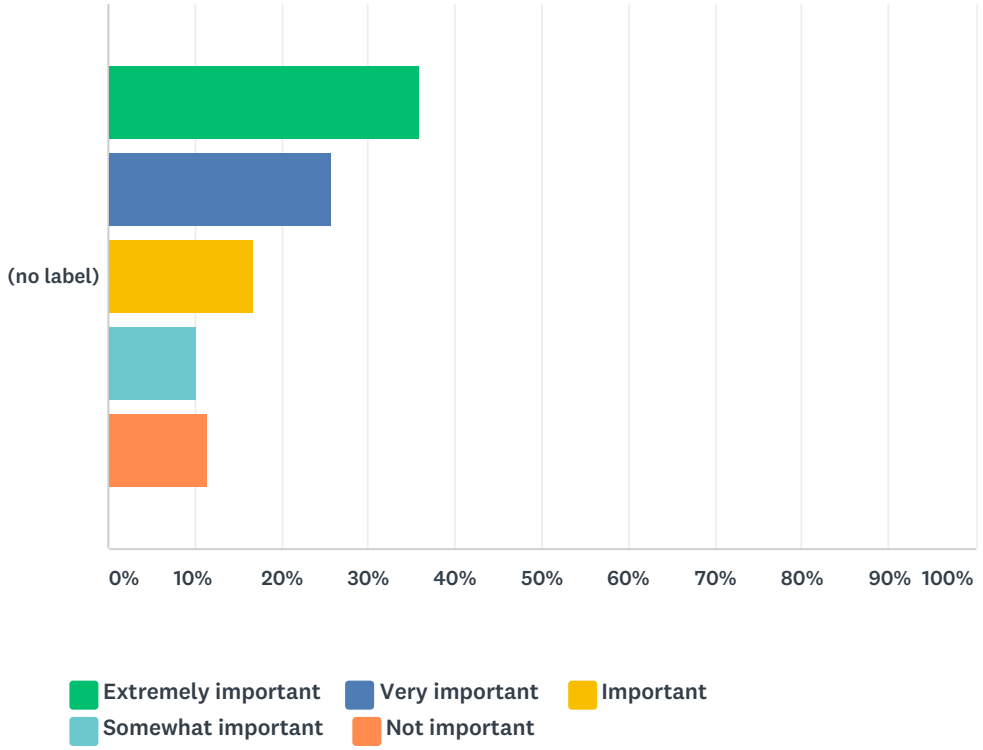


	1 - LEAST	2	3	4	5 - MOST	TOTAL	WEIGHTED AVERAGE
Visiting watercraft/boats	3.80% 3	8.86% 7	8.86% 7	25.32% 20	53.16% 42	79	4.15
Releasing unused live bait when fishing	24.00% 18	18.67% 14	16.00% 12	26.67% 20	14.67% 11	75	2.89
Installing docks, boat lifts, equipment, and materials	31.58% 24	27.63% 21	26.32% 20	10.53% 8	3.95% 3	76	2.28
Using fishing gear and equipment used in infested waters	23.38% 18	18.18% 14	24.68% 19	24.68% 19	9.09% 7	77	2.78
Keeping a boat in the water when not in use	57.89% 44	23.68% 18	9.21% 7	7.89% 6	1.32% 1	76	1.71
Landscaping plants and materials	44.74% 34	27.63% 21	15.79% 12	7.89% 6	3.95% 3	76	1.99
Releasing plants or animals from aquariums, ponds, and similar	19.48% 15	27.27% 21	18.18% 14	23.38% 18	11.69% 9	77	2.81
People swimming in waters that contain AIS	74.67% 56	21.33% 16	2.67% 2	1.33% 1	0.00% 0	75	1.31

Pets and other animals swimming in waters that contain AIS	62.67% 47	26.67% 20	5.33% 4	5.33% 4	0.00% 0	75	1.53
Streams and other feeder waters into Lake Minnetonka	9.21% 7	28.95% 22	25.00% 19	25.00% 19	11.84% 9	76	3.01

Q14 In your view, how important are inspections of watercraft entering and leaving Lake Minnetonka in preventing or slowing the spread of AIS?

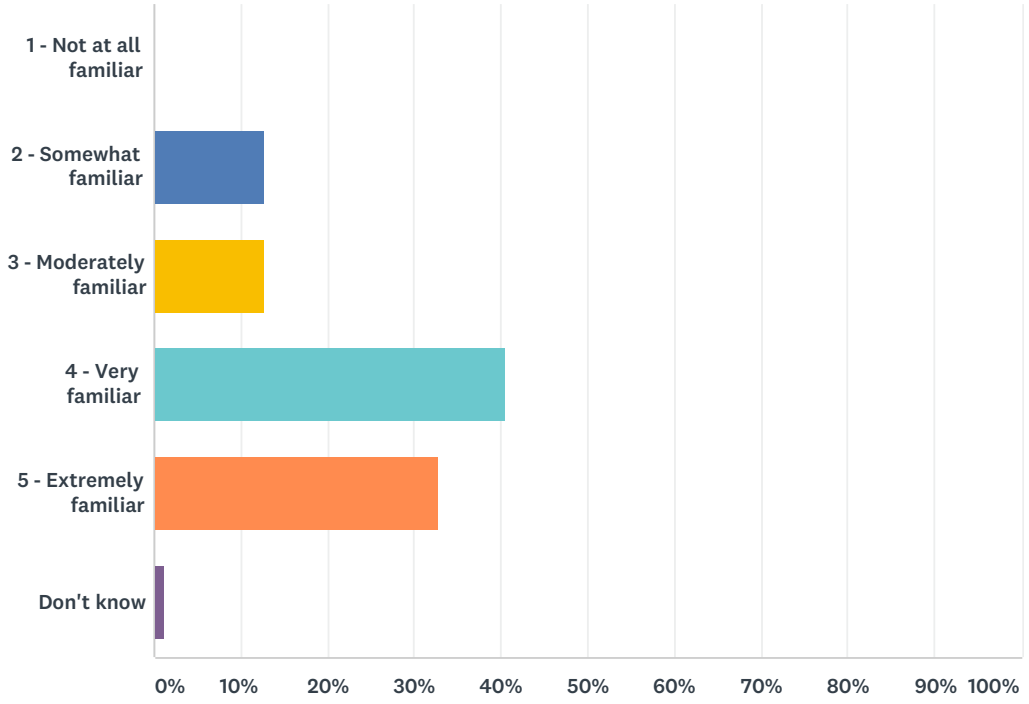
Answered: 78 Skipped: 1



	EXTREMELY IMPORTANT	VERY IMPORTANT	IMPORTANT	SOMEWHAT IMPORTANT	NOT IMPORTANT	TOTAL	WEIGHTED AVERAGE
(no label)	35.90% 28	25.64% 20	16.67% 13	10.26% 8	11.54% 9	78	2.36

Q15 On a scale of 1 to 5, how familiar are you with actions you can take to prevent the spread of aquatic invasive species?

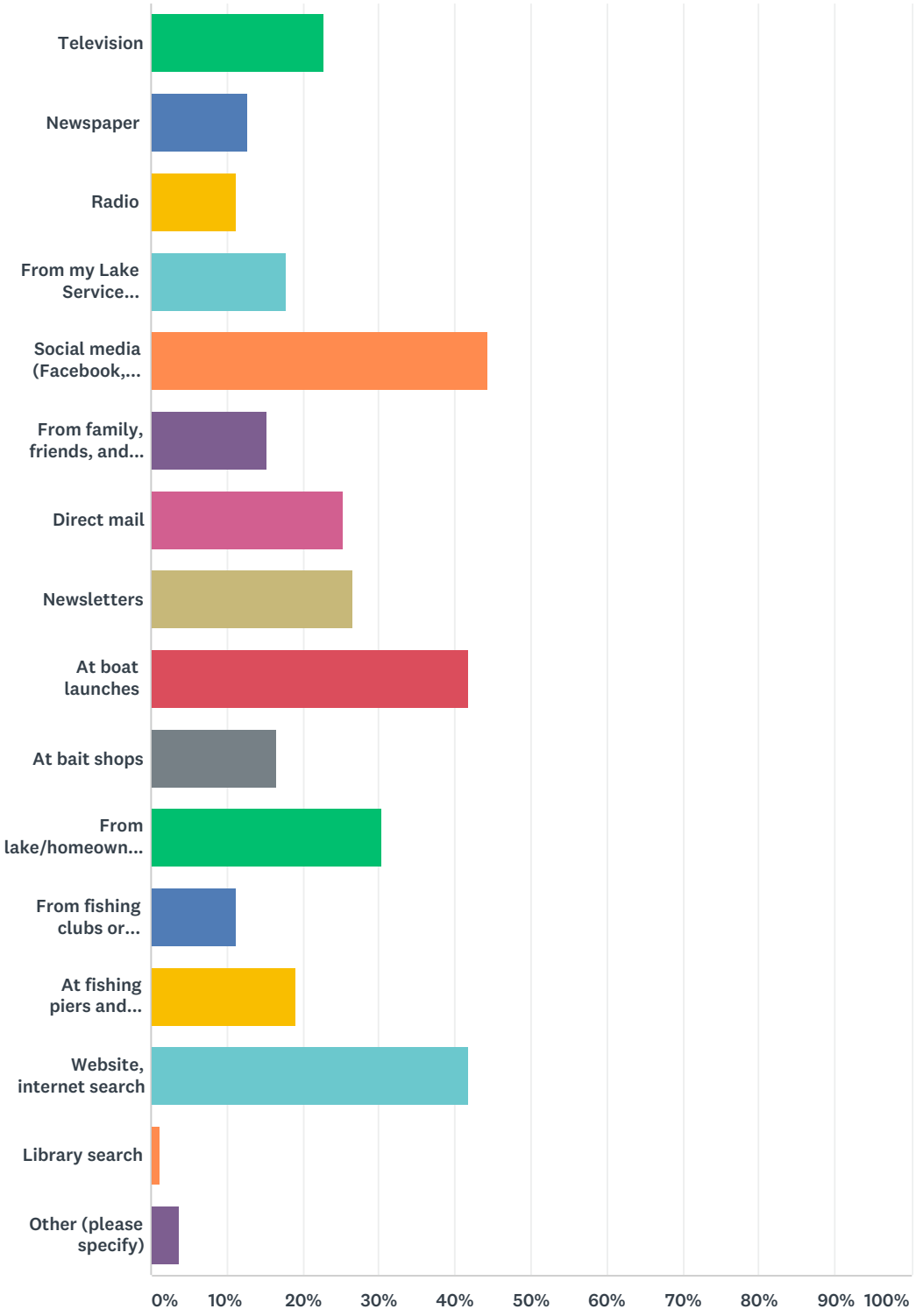
Answered: 79 Skipped: 0



ANSWER CHOICES	RESPONSES	
1 - Not at all familiar	0.00%	0
2 - Somewhat familiar	12.66%	10
3 - Moderately familiar	12.66%	10
4 - Very familiar	40.51%	32
5 - Extremely familiar	32.91%	26
Don't know	1.27%	1
TOTAL		79

Q16 How do you prefer to receive information? Please select all that apply.

Answered: 79 Skipped: 0



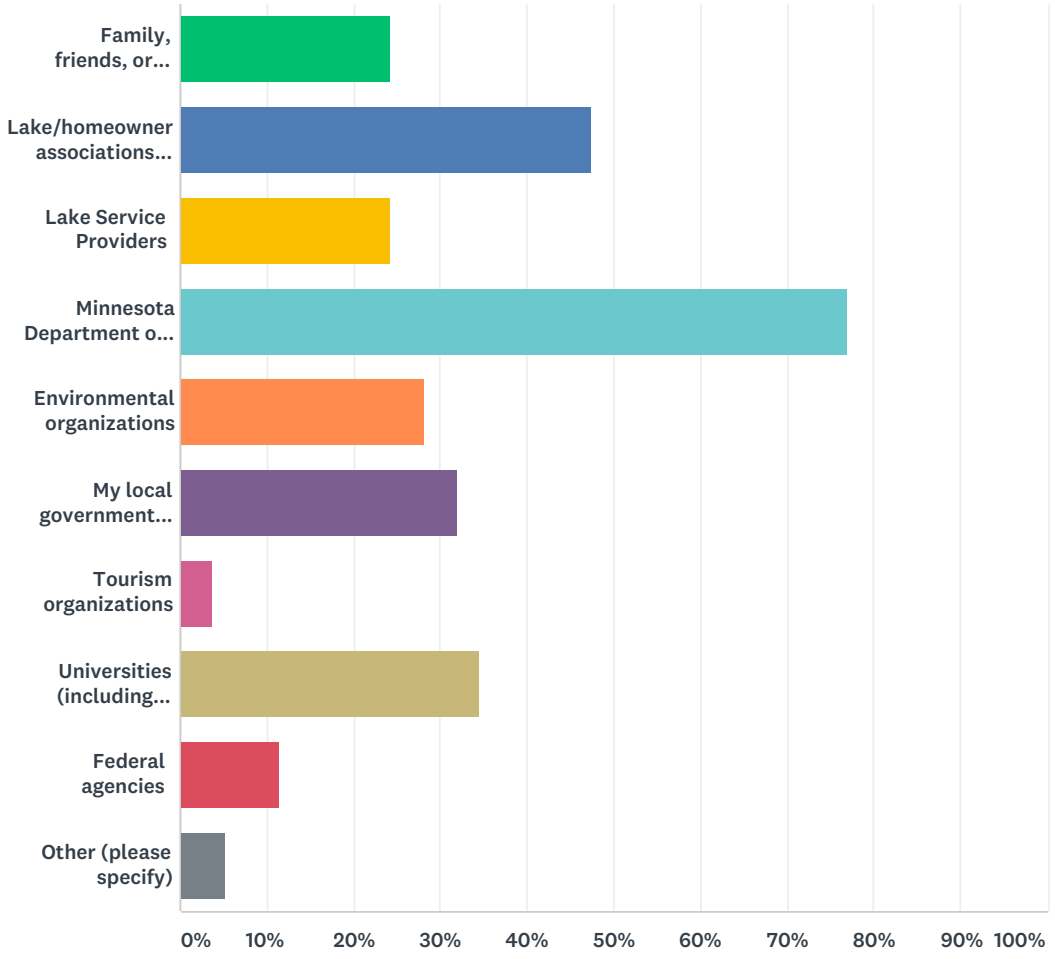
ANSWER CHOICES	RESPONSES

Television	22.78%	18
Newspaper	12.66%	10
Radio	11.39%	9
From my Lake Service Provider	17.72%	14
Social media (Facebook, Twitter, etc.)	44.30%	35
From family, friends, and neighbors	15.19%	12
Direct mail	25.32%	20
Newsletters	26.58%	21
At boat launches	41.77%	33
At bait shops	16.46%	13
From lake/homeowner associations or lake improvement districts	30.38%	24
From fishing clubs or organizations	11.39%	9
At fishing piers and fishing access points	18.99%	15
Website, internet search	41.77%	33
Library search	1.27%	1
Other (please specify)	3.80%	3
Total Respondents: 79		

#	OTHER (PLEASE SPECIFY)	DATE
1	Local newspapers	9/3/2019 5:45 AM
2	Spend money on solutions not communicating	8/4/2019 7:26 AM
3	dont need any	8/4/2019 6:57 AM

Q17 Who do you trust for information about natural areas, water, and invasive species? Please select all that apply.

Answered: 78 Skipped: 1



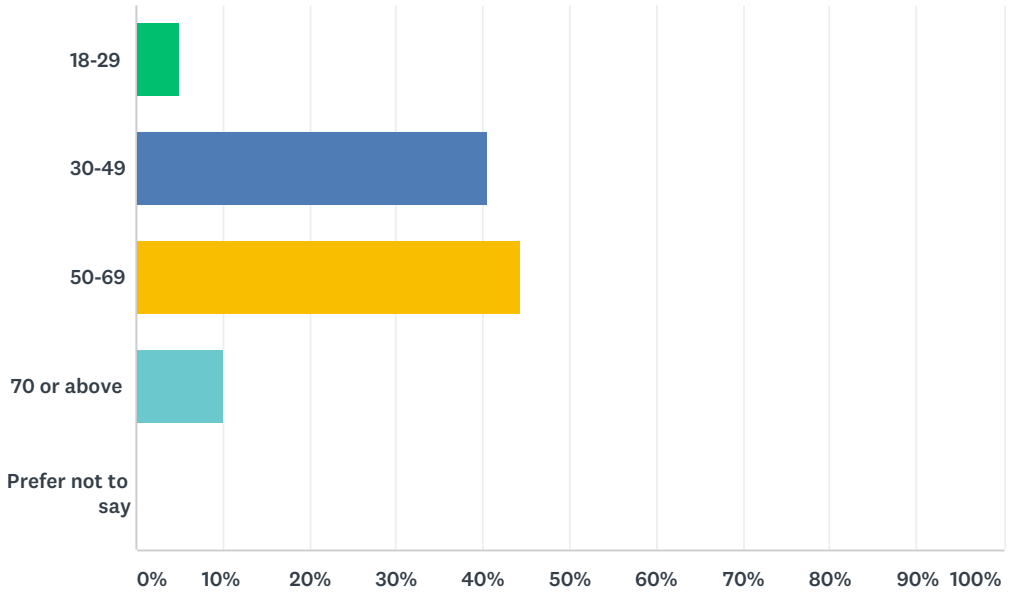
ANSWER CHOICES	RESPONSES	
Family, friends, or neighbors	24.36%	19
Lake/homeowner associations or lake improvement districts	47.44%	37
Lake Service Providers	24.36%	19
Minnesota Department of Natural Resources	76.92%	60
Environmental organizations	28.21%	22
My local government (counties, parks, cities, townships, conservation districts)	32.05%	25
Tourism organizations	3.85%	3
Universities (including Extension staff)	34.62%	27
Federal agencies	11.54%	9
Other (please specify)	5.13%	4

Total Respondents: 78

#	OTHER (PLEASE SPECIFY)	DATE
1	None	8/6/2019 10:44 AM
2	All have agendas	8/4/2019 7:26 AM
3	None of the above!!	8/4/2019 2:55 AM
4	LMCD	7/1/2019 4:23 AM

Q18 Which of the following age group would you classify yourself as?

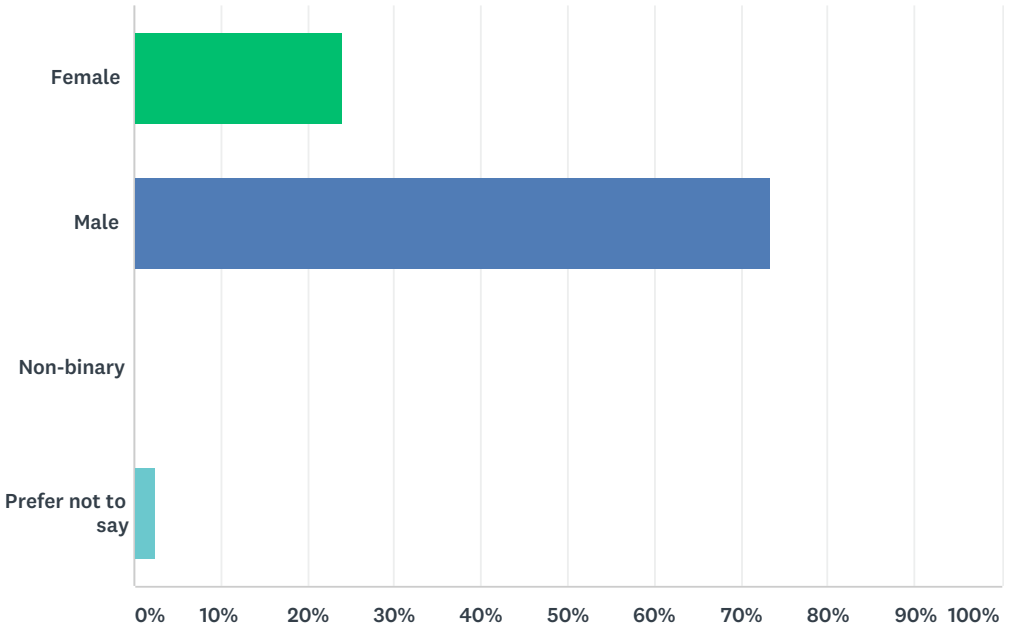
Answered: 79 Skipped: 0



ANSWER CHOICES	RESPONSES	
18-29	5.06%	4
30-49	40.51%	32
50-69	44.30%	35
70 or above	10.13%	8
Prefer not to say	0.00%	0
TOTAL		79

Q19 What gender would you classify yourself as?

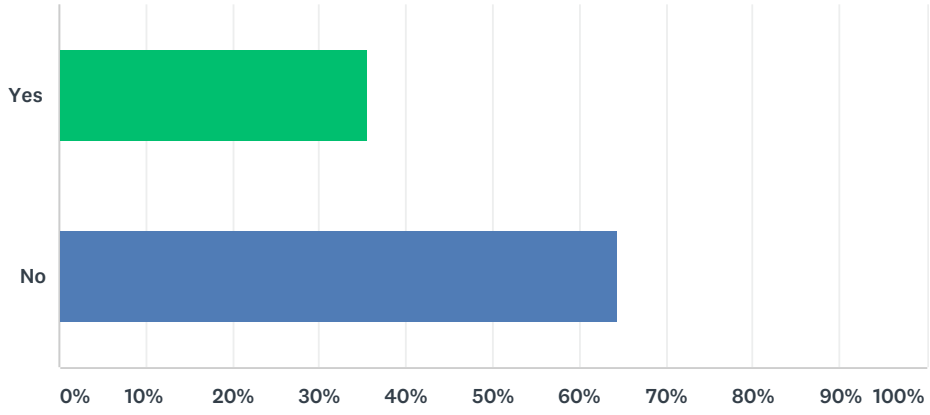
Answered: 79 Skipped: 0



ANSWER CHOICES	RESPONSES	
Female	24.05%	19
Male	73.42%	58
Non-binary	0.00%	0
Prefer not to say	2.53%	2
TOTAL		79

Q20 A Lake Minnetonka Vegetation & AIS Master Plan is being developed. Input is important to the process. Would you like to be contacted about the Plan? If yes, please be sure to complete the Contact Information.

Answered: 76 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	35.53%	27
No	64.47%	49
TOTAL		76

Q22 Would you like to share any additional comments?

Answered: 16 Skipped: 63

#	RESPONSES	DATE
1	We really need a plan that works for AIS! Harvesting isn't the answer. It actually spreads it more.	9/26/2019 5:32 AM
2	As noted above, the decision to not harvest this year was a big mistake, not only because of unsightly above surface emergent weeds in places where they've never been before, but also because of the time and expense associated with cleaning up floating weeds chopped up by boat traffic on our shoreline.	9/23/2019 11:48 AM
3	Please consider how good it would be for the ecosystem of Lake Minnetonka if we prohibited use of gas powered motorboats. Not only would it slow the spread of invasive species, it would also slow the pollution going into the lake. With less boats on the lake we can give the ecosystem a fighting chance to return to its natural balance. Thank you.	9/2/2019 10:16 AM
4	I am concerned with the private/service use of chemicals.	8/5/2019 5:21 AM
5	I live in st alban’s bay and the water has gone from an “A” to “C” this summer. Rumor is your are doing zebra mussel management testing. Is this true?	8/4/2019 5:30 PM
6	The weeds on the lake are getting out of control. They get stuck in motors. I support safe chemicals to eliminate the weeds.	8/4/2019 4:26 PM
7	Worst year yet !	8/4/2019 2:07 PM
8	Compare with Lake Washington, Seattle, WA.	8/4/2019 8:05 AM
9	Too many wasted labor hours with 2 or more workers sitting at landings during non peak hours (call in help if needed). Wastfull spending on oververeach programs against homeowners. Don't for who pays the bills!	8/4/2019 7:31 AM
10	Wake board boat ballast tanks & Ducks and geese. Do not ruin this lake with poison sprays. Your harvesters do enough damage.	8/4/2019 6:41 AM
11	Thanks for doing this important work	8/4/2019 3:59 AM
12	All the poisoning and cutting has not done anything the lake is still full of weeds they are just different kinds of weed species Quit poisoning and cutting it is a waste of money The huge pleasure boats cut up tons of weeds when they are cruzin close to shore through the weed beds then they float which ever way the wind blows spreading weeds randomly based on the wind Ducks geese and other birds than eat weeds spread them naturally So many factors that can not be controlled	8/4/2019 3:26 AM
13	Allowing marinas to have unlimited boats in dry dock storage is a bad idea. Don’t let Gabe bring you down!	8/4/2019 3:18 AM
14	DNR has been TERRIBLE for Minnesota lakes!!! Blaming boaters for years!!! Chemicals, fertilizers and birds transporting from lake to lake make WAY more sense!!!!!!!! PLEASE FIND A BETTER WAY!!!!	8/4/2019 2:59 AM
15	Lake Minnetonka has always had weeds in it. Before it was dammed it had wild rice. The massive dumping of chemicals into a natural water supply is shameful and in the long run will have more negative effects than invasive species.	8/4/2019 2:06 AM
16	I've always wondered why there's so much emphasis on boat inspections at launches when water inside the water pump impeller and fairings can house aquatic invasive species. There's no quick way to inspect those elements at a launch so I don't see how those inspections can be completely effective.	7/11/2019 10:01 AM

APPENDIX B. COMMUNITY ENGAGEMENT PLAN

LAKE MINNETONKA CONSERVATION DISTRICT
5341 MAYWOOD ROAD, SUITE 200 • MOUND, MINNESOTA 55364 • TELEPHONE 952/745-0789 • FAX 952/745-9085

January 10, 2019

LMCD NEWS - FOR IMMEDIATE RELEASE

Contact: Vickie Schleuning, LMCD Executive Director
952-745-0789, vschleuning@lmcd.org

LMCD Takes New Steps to Address AIS

The Lake Minnetonka Conservation District (LMCD) is taking new steps to identify, prevent, and manage Aquatic Invasive Species (AIS) threats on Lake Minnetonka.

On December 12, 2018, the LMCD Board agreed to proceed with a master plan to identify, prevent, and manage AIS on Lake Minnetonka. At the January 9, 2019 Board meeting, the LMCD Board unanimously passed a motion authorizing a Request for Proposal to contract with an AIS specialist to:

- Develop an AIS monitoring and response program
- Initiate a vegetation identification and mapping of each bay
- Review the operation of the harvesting program, and,
- Initiate a program cost analysis to determine the costs and funding sources.

Pending the program analysis outlined above, mechanical harvesting of Eurasian watermilfoil and curly-leaf pondweed will likely be temporarily suspended in 2019.

According to the Executive Director Vickie Schleuning, "The recent identification of starry stonewort in Medicine Lake underscores the importance of a master plan to address AIS with both a holistic and data-driven approach." Oftentimes, AIS are not effectively eradicated, instead becoming nuisances and hazards that require expensive management to control. The costs of AIS management are significant due to the size of Lake Minnetonka, more than 14,000 acres. Since Lake Minnetonka is one of the busiest lakes in the state, the risk of spread of AIS to other lakes also increases.

This is an exciting and promising step forward to manage the ever-increasing threats to the enjoyment and recreational use of this great natural resource. The LMCD Board and staff look forward to working with the public and Lake stakeholders to continue to preserve and enhance the "Lake Minnetonka experience."

For more information, please visit the LMCD's website, www.lmcd.org, or call the LMCD at 952-745-0789.

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LAKE MINNETONKA CONSERVATION DISTRICT
5341 MAYWOOD ROAD, SUITE 200 • MOUND, MINNESOTA 55364 • TELEPHONE 952/745-0789 • FAX 952/745-9085

May 24, 2019

LMCD NEWS - FOR IMMEDIATE RELEASE

Contact: Vickie Schleuning, LMCD Executive Director
952-745-0789, vschleuning@lmcd.org

Lake Minnetonka Conservation District Launches the Development of A Lake-Wide Vegetation & AIS Master Plan

LMCD selects the team of Emmons & Olivier Resources, Inc. and Blue Water Science to guide the process and development of a master plan.

Mound, Minn. – The development of the Lake Minnetonka Vegetation & Master Plan (Plan) launches with a **public meeting scheduled for June 18, 2019 at 6:00 pm** at the Centennial Building, 5341 Maywood Road, Mound. With the changing landscape of Aquatic Invasive Species (AIS) and ecology of Lake Minnetonka, having a holistic and scientific approach to effectively address the current and future health of Lake Minnetonka is critical. An important aspect of the process is stakeholder participation and LMCD meetings are open to the public.

The Lake Minnetonka Conservation District (LMCD) Board approved seeking a specialist to assist in developing a lake-wide plan. With the infestation of starry stonewort in a nearby lake, the uncertainty of hybrid Eurasian watermilfoil, and other threats, a plan to protect Lake Minnetonka is more important than ever.

The LMCD has selected the team of Emmons & Olivier Resources, Inc. (EOR) and Blue Water Science (BWS) to assist in the development of this Plan. Both EOR and BWS have long-standing familiarity with Lake Minnetonka in conjunction with a team of specialists with more than 35 years expertise in lake management and AIS. “Our staff have decades of experience in watershed planning, lake management, and engaging stakeholders and Lead Scientist Steve McComas’ knowledge of AIS and lake ecology will facilitate the scientific rigor and ecological viability of the Plan,” stated Project Manager Jason Naber of EOR.

“We are excited to begin a partnership with an interdisciplinary team of this caliber to develop a dynamic and comprehensive plan to protect such a great natural, recreational, and economic resource,” according to LMCD Executive Director Vickie Schleuning. LMCD wants to promote a collaborative environment to create a plan to preserve the lake for future generations.

The Plan is expected to be completed in 2019. For more information and updates, visit the LMCD’s website at www.lmcd.org or call 952-745-0789.

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memo

Project Name |	Lake Minnetonka Vegetation & AIS Master Plan	**Date** |	07/01/2019
To / Contact info |	Lake Minnetonka Conservation District		
Cc / Contact info |	Vickie Schleuning- Executive Director; Bill Cook- Board Director		
From / Contact info |	Camilla Correll, Jason Naber		
Regarding |	Community Engagement Plan Update		

This document describes the LMCD's Community Engagement Plan for development of the lake vegetation and AIS Master Plan. It should be recognized that this plan differs from the one included in EOR's Contract for Services. EOR's role in the Community Engagement Plan is to participate in the meetings identified in Table 4. All other components of this Plan that the LMCD decides to implement will be led by LMCD staff. Community engagement is a process that requires flexibility and adaptation. As the LMCD considered its goals and objectives for engagement, potential participants and engagement methods and techniques, it adjusted the original proposal. These adjustments are reflected in this Community Engagement Plan and will continue to be adjusted by the LMCD as it proceeds through the plan development process.

There are a number of items (suggestions) included in the Community Engagement Plan that would require additional resources if the LMCD decided to incorporate these elements in their engagement plan for this project. The revised meeting recommendations (per the Contract for Services) are included in Table 4 of this engagement plan.

Scope and Purpose of Engagement Process

- Over-arching goal is to retain and develop meaningful engagement with stakeholders
- Engage a broad audience in the plan development process
- Interactive and engaging events
- Help develop a common vision
- Inform the decision-making process
- Identify and/or prioritize needs for AIS management on Lake Minnetonka
- Review progress on the AIS Management Plan
- Develop a consensus on the AIS Management Plan

What does a successful engagement process look like?

- Define the challenge
- Establish why LMCD is the appropriate entity to take the lead
- Communicate LMCD's approach to stakeholders
- Engage stakeholders in a meaningful transparent process to inform, solicit feedback, and engage them in decision-making and developing solutions
- Participation by a broad and under-represented audience

Stakeholder Identification

Lake Minnetonka is a 22 square-mile lake that is the tenth largest, and one of the most heavily recreated, waterbodies in Minnesota. It is the largest lake in the Twin Cities Metropolitan Area. Recognizing the regional significance of this resource, the LMCD should seek to cast a wide net in

soliciting input on the AIS Management Plan development process. Additionally, the regional significance of this resource increases its susceptibility to AIS infestations due to the amount of traffic the lake receives over the course of a year. An important component of the Community Engagement process will be to educate a broader audience on AIS Best Management Practices emphasizing the role that the public plays in prevention. It will be important to ensure that the individuals and entities responsible for helping with implementation are invited to participate in the plan development process.

Every community is made up of a range of stakeholder interests including local residents, member communities, regulatory agencies, non-profit organizations, various generations, ethnic and cultural groups, businesses, local community and volunteer groups, and web-based or virtual groups. How these stakeholders are asked to participate depends upon the goals and objectives of the Community Engagement Plan. Participation can range from being informed and asked for input to assisting in decision-making and developing solutions (see Figure 1). Each of these levels of participation requires a different level of engagement. As a result, it is important to have a good understanding of what is being asked of participants.

Table 1. Range of Options for Stakeholder Engagement and Participation

Role of Participants		Level of Engagement	Stakeholder Groups
Being Informed		Consulting	Local Residents, Public, Area-Based Groups, Business Community, Community Groups, Generations, Visitors
Being Asked			
Assisting in decision-making		Engagement	
Developing Solutions		Partnership	MNDNR, cities, SWCDs, MCWD, TRPD, U of M, Hennepin County, Carver County, Coalition of Lake Associations (COLA), MAWD, Minnesota Lakes and River Advocates (Jeff Forester), Lake Improvement Districts/Bay Groups

The following entities have been identified as stakeholders that the LMCD should reach out to for participation in the plan development process. It will be important to leverage existing community networks or forms of communication in reaching out to these stakeholder groups during the plan development process.

Local Residents or Area-Based Groups (Role: being informed and being asked)

- Lakeshore Owners (individual, associations, LID/bay leaders)
- AIS Committee/Task Force

Business Community (Role: being informed, being asked)

- Businesses/Lake Service Providers (Marinas, Charters, Rental and Tour Businesses, Dock Installers, Vegetation Management, Fishing Guides, etc.)
- Landscapers

Environmental, Community Organization and Volunteer Groups (Role: being informed, being asked)

- Minnesota Lakes and Rivers Advocates
- MCWD CAC Group
- North American Lake Management Society
- Clubs and youth
    - America's Boating Club (former Minnetonka Power Squadron Yacht Clubs)
    - Wayzata Sailing School/youth
    - Schools (note: Boater Safety Course June 10, 2019)
    - Wakeboarders
    - Other?

General Public, Recreational Groups (Role: being informed, being asked)

- General Public (e.g. Visitors/Lake Users/Swimmers/Boaters)
    - Anglers Associations (vs businesses)
    - Shore anglers
- Special Event Participants on the Lake

Web-Based or Virtual Groups (Role: being informed, being asked)

Communities of Interest (Role: being informed, being asked, assisting in decision-making and developing solutions)

- 14 Member Cities
    1. Deephaven
    2. Excelsior
    3. Greenwood
    4. Minnetonka
    5. Minnetonka Beach
    6. Minnetrista
    7. Mound
    8. Orono
    9. Shorewood
    10. Spring Park
    11. Tonka Bay
    12. Victoria
    13. Wayzata
    14. Woodland
- Hennepin and Carver Counties

Regulatory Agencies (Role: being informed, being asked, assisting in decision-making and developing solutions)

- MN DNR
- Minnehaha Creek Watershed District (MCWD)
- Hennepin County Environmental Services
- Three Rivers Park District

- HCSO Water Patrol

Academic/Research Partners

- U of M Fisheries & Wildlife
- U of M MAISRC

Lake Associations (Role: being informed, being asked, assisting in decision-making and developing solutions)

- Lake Minnetonka Association (LMA), LID/bay leaders
- MN COLA
- Other?

Communications

Participants should be informed or offered the opportunity to shape both the engagement process and AIS Management Plan. Setting expectations and making it clear how information shared will be used to shape the Plan helps to reinforce participation and encourage stakeholders to continue to be active as the engagement evolves. It will be important for the LMCD to clearly communicate the following:

- Project Overview Document/Key Messages/Timeline/Engagement
- How and when feedback will be provided
- Other elements of the engagement process
- How and when decisions will be made
- Further opportunities for engagement
- How stakeholder input has influenced and contributed to plan content

The LMCD should develop a communications packet, consistent with the EOR communication materials, including a one-page document that can be used to create consistent messaging. Board Members and staff can share this one-page document with local partners and stakeholders to inform them of the planning process and provide content that they can share on their communications and social media platforms.

Addressing Barriers to Participation

An effective community engagement plan identifies potential barriers to participation and implements techniques to alleviate those barriers. Table 2 identifies the barriers anticipated by the LMCD at this stage of the plan development process. Additional barriers may be identified during the project. These barriers will be taken into consideration when planning for, locating and facilitating meetings.

Table 2. Potential barriers to participation in the Community Engagement Process

Potential Barriers	Techniques to Consider in Addressing Barriers
Capacity and ability of different stakeholders to participate	Location and accessibility of the venue, transport requirements, communications should be jargon-free (easy to read), available

	in accessible formats and provided in alternative languages
Hard to reach groups such as young people, older people, families, minority groups or socially excluded groups, or visitors to the lake	Childcare needs, use of interpreters and signers, location and accessibility of the venue, provide food and refreshments
Economic barriers	
Political nature of the subject	
Contested or divided communities	
Gaps in information or accessibility to available information	

Community Engagement Techniques/Methods

To be most effective it will be necessary to combine a range of complementary methods. The following methods will be considered by the LMCD during the course of the plan development process.

Community Mapping

Community mapping is a useful way to engage people of all ages, abilities and backgrounds. This technique adds variety to consultation and can engage people who might not otherwise get involved. It can help people see and understand the geographic nature of the issue, where there are concentrations of AIS-related issues, how many people have issues/concerns related to AIS management and the range of issues related to AIS management.

EOR recommends that the LMCD consider using the web-mapping feedback tool (e.g. Social Pinpoint) to collect information, ideas and feedback on Vegetation and AIS management for Lake Minnetonka.

Public Meetings

Public meetings provide an opportunity to consult large numbers of people. Meetings can be organized to allow for small group discussions which helps to engage people more effectively. Public meetings provide an opportunity to explain the plan development process, provide information and gather feedback. It demonstrates openness and transparency, but is unlikely to be representative. Not everyone has the time or inclination to attend. Attendance is often low unless people feel personally connected to the issue or are deeply concerned about the issue. Some people are inhibited from speaking in a large group.

Meetings with Member Communities

LMCD staff will meet with or provide information to member communities to keep them abreast of project progress and solicit input on plan content and decisions being made.

Workshops and Focus Groups

- Water Bar Pop-Up or Workshop: https://www.water-bar.org/popups

This could be hosted at a meeting, community event or other public event. These events "serve" water and information about water sources. A typical Water Bar pop-up includes a custom menu of drinking waters tailored to your event, information about the value of that water, and ways to take action to protect it.

Local and Regional Media

Use existing community networks and forms of communication to publicize events and identify opportunities to align or hold combined events for greater impact.

LMCD Newsletters: Summer and Fall

- Summer: Describe Community Engagement Process, including meeting schedule, identify how people can participate in the engagement process (e.g. meetings, web-mapping feedback tool (e.g. Social Pinpoint), LMCD website, etc.)
- Fall: Share results of Community Engagement Process and identify where people can go to review the draft Vegetation & AIS Master Plan.

Web-based Engagement (Social Media)

There are a variety of web-based engagement methods which could be used in the community engagement plan including online discuss forums and blogs, Facebook, online surveys, and social networking. Web-based activities enable people to choose where, when and for how long they want to participate in the plan development process. Particularly useful for those who may be homebound (e.g. elderly people, parents with young children, younger audiences).

- Announcement on LMCD website.
- Include an announcement about LMCD Vegetation & AIS Master Plan on partner websites such as the MCWD website/AIS in the News sidebar.

Outdoor Displays

Outdoor displays such as information booths and idea walls can be used to capture the views and comments of large numbers of people. This can be a cost-effective method of collecting information if these displays are part of an existing event. For example, display boards created for the public meeting (meeting #1) could be used by the LMCD at future public events. Table 1 identifies a number of events taking place in the Lake Minnetonka drainage area that the LMCD may want to consider as venues for collecting additional information. The maps and plans for the project can be displayed and event attendees can be asked to comment on particular issues, generate ideas or vote for particular activities.

Table 3. 2019 Events in the Lake Minnetonka Area

Event	June	July	August	Sept.	Oct.
Excelsior Art on the Lake	06/08/2019				
Boater Safety Course	06/18/2019				
Starry Trek			08/17/2019		
Lake Minnetonka Summer Splash	06/21-23				

Music by the Lake	06/26/2019	07/10, 07/24, 07/31			
Wine on Wayzata Bay	06/28/2019				
Apple Day				09/21/2019	
James J Hill Days				09/06/2019, 09/07, 09/08	
Lake Minnetonka Association Annual Meeting					
Minnetonka Summer Festival	06/22/2019				
Minnetonka Fire Open House					10/2019?
City Events- we could add to					

Community Surveys

The LMCD should consider developing a survey, consistent with the EOR communication materials that could be distributed in hard copy format at meetings and events or provided electronically on the LMCD's website or at meetings/events for participants using a mobile device.

Recommendation for Meetings/Meeting Schedule

The following table identifies EOR's recommendations for engaging the public and stakeholders in project-specific meetings. As this table indicates, it is proposed that three groups be established to facilitate participation in the plan development process. It is assumed the LMCD will invite group participants and coordinate meetings.

1. Citizen Advisory Group (CAG) - being informed, being asked
2. Technical Advisory Group (TAG) - being informed, being asked, helping with decision-making, developing solutions
3. Implementation Partners (IP) - developing solutions and defining responsibilities

Each of these groups will have different roles in the plan development process and be engaged according to their roles. The meeting format and content will be structured to fit the groups and their roles. It should be noted that there may be overlap amongst groups (e.g. members of the TAG may also be asked to participate in later meetings as Implementation Partners).

Table 4. Recommended Approach to Community Engagement Meetings

Meeting	Objectives	J	J	A	S	O	N	D
Public Meeting #1 of 2	Project Launch (Meeting #1) - Scope of the project - Who is involved	6/18						

	- What has been done/what is being done (historical + current roles and responsibilities) - Describe the Community Engagement Process and goals/ expectations for engagement - Introduce web-mapping feedback tool (e.g. Social Pinpoint) - Collect information (issues and concerns)							
Web-mapping feedback tool (e.g. Social Pinpoint)	- Identify issues and concerns related to Vegetation and AIS management - Map areas of infestation - Identify where people would like to see management happen - Early AIS detection and problem vegetation							
Technical Advisory Group	- Review Starry Stonewort Protection Plan - Confirmation on AIS to be addressed by the Master Plan - Harvesting Program Review and Recommendations Meeting Goal: Does the TAG think we missed anything? Is there something else to consider? Do they agree that EOR's recommendations is the best course of action based on current information?		Mid-July					
Technical Advisory Group	- Review web-mapping feedback tool (e.g. Social Pinpoint) results to determine how it informs the harvesting and Vegetation & AIS master plan - Review maps of AIS data provided by LID, MNDNR, LMA, etc. - Review species-specific management strategies - Introduce the modules and plan framework/structure							
Technical Advisory Group	- Review Vegetation and AIS Master Plan - Discuss comment period and review process							
Citizens Advisory Group	- Review Starry Stonewort Protection Plan - Confirmation on AIS to be addressed by the Master Plan - Harvesting Program Review and Recommendations							
Citizens Advisory Group	- Review web-mapping feedback tool (e.g. Social Pinpoint) results to determine how it informs the review of harvesting and the Vegetation & AIS master plan - Review maps of AIS data provided by LID, MNDNR, LMA, etc.							

	- Plan framework/structure – what species will be included and what types of strategies							
Citizens Advisory Group	- Review DRAFT Plan - How are we going to do this – what's our plan? - Goal: Managing the public's expectations							
Implementation Partner Meeting	Define roles and responsibilities. Here are all the things we discussed/identified. Take it back to talk to your people and decide what you can do, when you can do it and what funding is needed for implementation.							
Implementation Partner Meeting	Bring information back to the group and develop the formal action plan.							
Public Meeting #2 of 2	Present DRAFT Plan							
TBD	- Presentations to Board Meetings - Focus Group Meetings - Meetings with other groups identified during plan development process							
TBD								

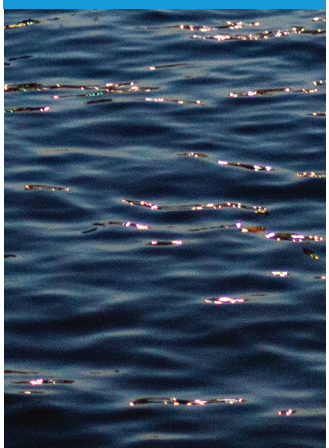
The Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Master Plan

will address the dynamic lake management activities needed to preserve and enhance the lake's ecology, recreational, and economic experience. The project is just starting and completion is expected by the end of 2019.

1ST MEETING

JUNE 18th
6-7 pm

LMCD OFFICE



LAKE MINNETONKA
CONSERVATION DISTRICT

5341 Maywood Rd - 200
Mound, Minnesota 55364

Phone: 952-745-0789

Website: www.lmcd.org

Twitter: @LakeMtkaCD

Facebook: @LakeMinne-tonkaConservationDistrict

What's the Challenge?

- AIS threats are real and imminent
- Unmanaged lake vegetation can affect lake health and ecology, recreation, public safety, and the economy
- Many partners are needed to manage lake vegetation and AIS for a unified vision, leaving no gaps

Why LMCD is Taking the Lead?

- LMCD represents the lake, has established partners and history
- LMCD is organizationally and legally structured to manage and administer funds/programs
- LMCD considers the interests of all stakeholders: cities, agencies, residents, visitors, organizations, businesses, and others in its decision-making process

Our Approach?

- Develop master plan to guide lake vegetation and AIS management activities using the most current scientific data and innovative approaches
- Develop action plan to address most imminent threat first- Starry Stonewort
- Compile and inventory existing lake vegetation and AIS data- develop public webmapping feedback tool
- Lake weed harvesting- determine if it is beneficial and key requirements for a successful program in relation to alternative control methods for existing and future threats
- Outreach, communication, stakeholder participation, public data collection

Be Involved!

Public:
- Be Informed - *attend meetings, Website, Twitter, Facebook*
- Be Engaged - *provide input, webmapping feedback tool*

Advisory Groups:
Assist in decision making

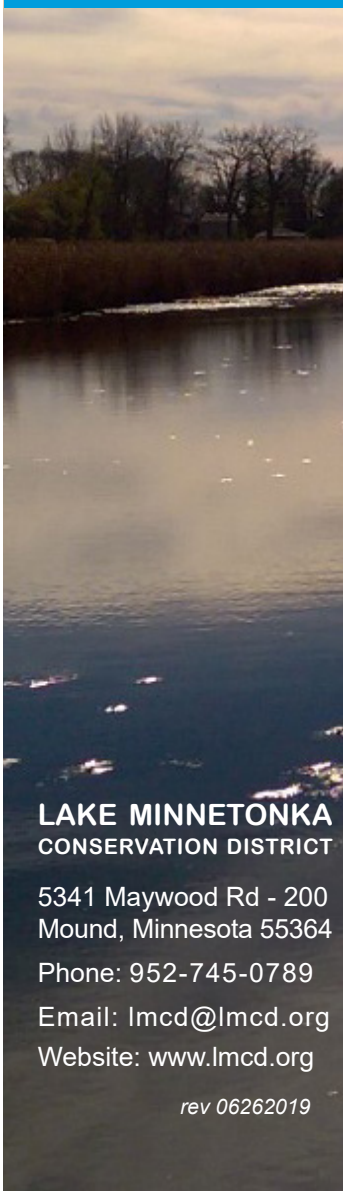
Implementation Partners:
Develop solutions, put plan in action

form 06112019

The Lake Minnetonka Vegetation and Aquatic Invasive Species Master Plan

will address the dynamic lake management activities needed to preserve and enhance the lake's ecology, recreational, and economic experience. The project is currently underway and completion is expected by the end of 2019.

PROJECT INFORMATION



Starry Stonewort Protection Plan & Emergency Action Plan

Starry stonewort is an imminent AIS threat to Lake Minnetonka. It currently is found in 13 Minnesota lakes with the closest being Medicine Lake. This project will develop a plan that will assess protection strategies by utilizing information gained through practice, review of best available science and an established network of AIS experts. An emergency action plan that addresses response to infestation will also included.

Assessment of Existing Harvesting Program

LMCD has been conducting lake vegetation management since 1989. The organization owns and operates three paddlewheel harvesters and one transport barge. The typical harvesting season is mid June through mid August. Seasonal employees hired by LMCD perform harvesting work. The program was suspended in 2019 for review and development of alternatives as part of the Lake Minnetonka Vegetation & AIS Master Plan.

Consultants were hired to provide scientific review of benefits and liabilities of the current LMCD program. This review includes a financial summary of the program and a cost comparison of the existing program vs the cost of hiring private contractors. The consultants will evaluate if the program should be continued in its current fashion, modified or discontinued. If the program is to be continued, recommended changes will be provided. If the program is to be discontinued, recommended alternatives will be provided.

Online Mapping and Spatial Data Consolidation

Ecological data for Lake Minnetonka is collected and stored by several agencies and organizations. The consultant team will contact parties with this information and compile the data in a centralized location for data management. ArcGIS Online maps have been constructed to host the information and will allow interested parties to view geographic data. Watch the ArcGIS Online map develop over the year here: https://arcg.is/11G4rb.

Lake Vegetation and AIS Master Plan

The consultant team will develop a Lake Vegetation and AIS Master Plan for Lake Minnetonka. Several modules for known AIS within Lake Minnetonka will be included such as Eurasian watermilfoil, curly-leaf pondweed, flowering rush, purple loosestrife, and zebra mussels. Further, a module template will be developed for potential AIS threats that can be modified according to future needs. The development of the plan will consider the impact of other vegetation. The final plan will also establish a framework for funding opportunities and implementation methods.

Your Voice in the Planning Process

Your input is valuable to us. Please share your observations about AIS and aquatic vegetation in Lake Minnetonka by:

- **Attending upcoming meetings – LMCD will host a series of meetings from June through November. Please check the project website to see upcoming meeting dates and locations**
- **Visiting our webmapping feedback tool – available June through October, 2019**

  https://lmcd.mysocialpinpoint.com/Lake-Mtka-Vegetation-and-AIS
- **Visiting our project website and social media**

  https://lmcd.org/aquatic-invasive-species/new-ais-initiatives/

  Twitter: @LakeMtkaCD Facebook: @LakeMinnetonkaConservationDistrict

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rev 06262019

memo

Project Name |	Lake Minnetonka Lake Vegetation & AIS Master Plan	**Date** |	6/13/19
To / Contact info |	Project File		
Cc / Contact info |			
From / Contact info |	Jason Naber, Steve McComas		
Regarding |	Agenda- LMA-requested Consultant Meeting		

Meeting Agenda

Meeting Location: Dunn Brothers, Excelsior

Meeting Date: June 14

Meeting Time: 8:30 to 9:30 a.m.

Eric Evenson requested a meeting with the EOR and BWS in advance of the Public Meeting scheduled for June 18. Eric is unable to attend the meeting on June 18th due to a prior commitment. Following are a list of discussion topics.

- Project Status
  - Starry Stonewort
  - Harvesting Program Review
  - Web Mapping
  - Communications
  - Public Meeting #1
- Review Community Engagement Plan
  - Scope and Purpose
  - Stakeholder Identification
  - Range of Engagement and Participation
  - Communication Techniques/Methods
    - Media
    - Public Meetings
    - Advisory Groups
    - Social Pinpoint
    - Events
- Ongoing communication/coordination with LMA

memo

Project Name |	Lake Minnetonka Lake Vegetation & AIS Master Plan	**Date** |	7/12/19
To / Contact info |	Technical Advisory Group		
Cc / Contact info |	Vickie Schleuning- Executive Director; Bill Cook		
From / Contact info |	Jason Naber		
Regarding |	Technical Advisory Group Meeting #1- Agenda		

Meeting Agenda

Meeting Location: LMCD Office

Meeting Date: July 15, 2019

Meeting Time: 1 to 3.

1. **Starry Stonewort Protection and Emergency Action Plan**
    a. Current distribution in State of Minnesota (currently 13 known lakes in MN)
    b. Input on Lake Minnetonka suitability for SSW growth
    c. Input on proactive and treatment approaches
        i. Herbicide and chemical treatments (copper sulfate, etc.)
        ii. Mechanical/Physical (hand pulling, dredging, DASH, drawdown, etc.)
        iii. Biological
        iv. Permitting considerations
    d. Input on spread prevention options
        i. Enhanced exit inspections at infested lakes
        ii. Boat inspections/decontamination at Minnetonka accesses (all vs priority locations)
        iii. I-LIDS: video surveillance
    e. Input on early detection options
        i. Boat inspector SSW searches at accesses
        ii. Bi-weekly surveys at accesses (all vs priority)
        iii. e-DNA
    f. Discuss actions and responsible parties (See Table)
        i. Prevention & early detection
        ii. Rapid response assessment
        iii. Rapid response action

2. **Harvesting Program- discussion/input on components included in review**
    a. Variables to include in Scientific Review of Harvesting Program
        i. Impacts on native plants and animals
        ii. Options and costs for native plant community restoration
    b. Key Components for existing harvesting program evaluation
        i. LMCD staffing and qualifications

ii. Program implementation
    1. Training
    2. Safety
    3. Field supervision

c. Financial summary
    i. Costs of current AIS program
    ii. Cost comparison of LMCD conducting harvesting vs private contractors (current, 5, 10, 20 yr.)

d. Harvesting program recommendations, alternatives, consequences
    i. Continue Program
    ii. Modify Program
    iii. End Program

e. TAG Input on harvesting options
    i. Are there other entities with capability to do harvesting?
    ii. Are there strategies that avoid/minimize risk of spreading invasive species (FR & EWM)?
    iii. Are there new or alternative vegetation management practices to consider?

3. Data Collection & Mapping

a. Review Data Collected Date (EWM, CLP, FR, PL)
b. AcrGIS online webmap: https://arcg.is/10TT5y

4. Community Engagement

a. Meetings/Advisory Groups
    i. Public Meetings
    ii. TAG
    iii. CAG
b. Website https://lmcd.org/aquatic-invasive-species/new-ais-initiatives/
c. Social Media & Outreach Programs
d. Social Pinpoint https://lmcd.mysocialpinpoint.com/lake-mtka-vegetation-and-AIS/
    i. Mapping Tool
    ii. Public Survey

Lake Minnetonka Vegetation & AIS Master Plan (Plan)
Technical Advisory Group (TAG)- 1st Meeting-- Minutes
July 15, 2019: 1:00 pm to 3:20 pm

ATTENDANCE
Present:
Adam McLain, Premier Lake Harvesting: Bill Cook, LMCD; Brian Vlach, Three Rivers Park District (TRPD); Eric Evenson, Lake Minnetonka Association (LMA); Gabriel Jabbour, Tonka Bay Marina; Gregg Thomas, LMCD; James Wisker, Minnehaha Creek Watershed District (MCWD); Jason Naber, Emmons & Olivier Resources, Inc. (EOR); Keegan Lund, MN Department of Natural Resources (MN DNR); Matthew Cook, LMCD; Rob Dodd, MN DNR; Rod Kern, LMA; Steve McComas, Blue Water Science (BWS); Tom Frahm, LMA; Tony Brough, Hennepin County; Vickie Schleuning, LMCD

Absent:
Christine Hokkala-Kuhns, MN DNR; Diane Waller, United States Geological Survey (USGS); Ray Newman, University of Minnesota – Fisheries and Wildlife

The Big Island sickness outbreak was discussed prior to starting the TAG meeting.

TOPICS
Meeting Format and TAG Structure
Jabbour stated that he believes some of the recipients on the email list for the TAG will not be active participants in the TAG. He said that the TAG's active members should be identified and have the authority to represent their organization.

B. Cook stated that the roles and responsibilities of the TAG members should be clarified, including the delineation of which TAG members / organizations will be active participants, and which will passive observers.

It was stated that some people can make meetings, some will review information and provide feedback, and some will be included as part of the communication of the initiative.

Starry Stonewort Protection and Emergency Action Plan
Naber said that portions of the Starry Stonewort Plan require TAG input, and invited TAG members to provide input. He stated that he expected to incorporate TAG input from this meeting and have a draft plan out for review in a few weeks.

Naber stated that 13 lakes in Minnesota are currently infested with starry stonewort (SSW).

Lund added that the DNR will know typically by August if more lakes have been infested.

Naber stated that the EOR / BWS team has combed through MN DNR data for boat traffic from SSW-infested lakes to Lake Minnetonka.

Jabbour noted that the data was incomplete, as many boaters – especially fisherman – avoided inspections.

B. Cook agreed, noting that the data should be characterized to identify what types of lake users are typically represented by the MN DNR watercraft inspection data.

Lund noted that even lakes with a constant inspector presence can still become infested with SSW, as has already happened in some cases. So while some boaters may not have been inspected, the inspection data does show that connections between lakes with SSW and Lake Minnetonka have been made.

Brough stated that he and others worked with the LMCD in the early 2000s to analyze the different pathways of AIS transportation, and encouraged the LMCD's consultants to review that information. He added that the Starry Stonewort Plan should clarify whether all possible pathways of SSW transport are being considered, or primarily the pathway of boats entering via public launches.

McComas stated that he has compared all instances of SSW-infested lakes in the country with the water quality parameters for those lakes. He noted that through this comparison, he has noted that some bays of Lake Minnetonka have a water quality status outside the parameters of what appears to support SSW growth. McComas explained that SSW seems to not grow or establish well in eutrophic conditions. He pointed to a map in the meeting packet which shows several bays on Lake Minnetonka that have eutrophic conditions.

McComas explained that given this information, launches on bays with eutrophic conditions could be given a low priority for watercraft inspections, while bays with higher water clarity could be given a higher priority for watercraft inspections. He added that bays with relatively clear water and a high number of parking spaces for boat trailers would receive the highest priority.

It was noted that zebra mussels would, by filtering the water, improve water clarity and thereby increase the suitability of a given bay for SSW.

Thomas asked if SSW could be transported by a boat launched in a eutrophic bay and driven to a clearer bay.

McComas noted that because SSW has primarily been found around launches, the assumption is that boat trailers are the most likely vector for SSW transport.

Frahm stated that the plan should look at more kinds of AIS than just SSW.

B. Cook stated that the SSW plan was something the Board saw as a high priority, and would be used as a blueprint for developing plan modules for other types of AIS. He added that Carson Bay has two large parking lots nearby, which would provide many more parking spots than currently listed in the meeting packet for the Carson Bay launch.

Vlach added that the Hennepin County Public Works parking lot by the Spring Park Bay launch provides additional boat trailer parking. He questioned why North Arm was listed as eutrophic.

McComas noted that North Arm may, in fact, be clear enough to support SSW. Once all the feedback is gathered, they will make sure the data is reported correctly.

Naber asked the TAG if prioritization of launches for watercraft inspections seemed like a viable strategy.

It was also noted that marinas also launch a lot of boats.

Evenson noted that periodic early detection surveys for SSW would still be needed.

Kern noted that because SSW introduction is likely inevitable, early detection may be more important than watercraft inspections.

Lund agreed that early detection would be important, stating both are important.

B. Cook stated that removing or controlling SSW would be more expensive than prevention of its introduction.

Vlach noted that TRPD is trying to cover prevention and early detection by training its inspectors to take rake samples at launches periodically.

Lund stated that SSW bulbils are tiny, which make them very difficult to detect via watercraft inspection.

Frahm suggested that preventative chemical treatments be used to prevent the establishment of undetected SSW.

Lund noted that the MN DNR may or may not allow preventative algaecide treatments.

Dodd noted that anyone apply for a permit to do such a treatment at a MN DNR launch would have to account for public safety risks.

It was suggested that the LMCD propose a pilot project for preventative treatments to the DNR.

Lund noted that SSW is difficult to eradicate because it is not a plant. He explained that because SSW is not vascular, each cell of the algae must be in contact with a lethal dose of algaecide to effectively kill it.

McComas stated that in four lakes with very small-scale SSW infestations, treating four times per year for three years did not eradicate the SSW. Prevention copper sulfate or derivative may not work.

Brough suggested that agencies pool money and invite private contributions to the fund to raise money for research on algaecides for SSW.

Lund stated that preventative treatment is an option, but not the best option. He suggested a focus on monitoring for SSW, preventing its introduction, and researching control methods.

B. Cook stated that he wanted the SSW plan to review all options for preventing the introduction of SSW to Lake Minnetonka, detecting infestations early, and controlling any established SSW.

Lund noted that algae control is very different than plant control, in part because so few researchers are working on algae control – only four or so world-wide.

Naber directed the TAG's attention to the table of roles and responsibilities.

B. Cook stated that the table could be filled out offline.

Wisker suggested that the plan include an analysis of the risks and potential impact of a SSW infestation in Lake Minnetonka, and compare those findings with LMCD goals for the Lake. He said that strategic options and criteria for evaluating said options should be developed. Wisker said that once the table of roles and responsibilities was filled out, the LMCD could review where any gaps lay and what future roles an organization might take to address said gaps.

Harvesting Program – Discussion / input on components included in review

Evenson stated that the LMCD should define the purpose for the program prior to review.

Naber stated that the review of the program will seek to determine what the program should look like if it is continued or if it should not be continued.

B. Cook stated that the LMCD should define the purpose of the Harvesting Program.

Schleuning said that the review will help identify what useful applications the harvesting program could have as part of the larger vegetation management plan.

Wisker suggested that the program review set up a measure of program effectiveness if the program is continued.

Lund stated that harvesting is a coarse tool for aquatic plant management and a good tool for keeping recreational or navigational areas open. He explained that herbicides are cheaper and more effective. Lund added that municipalities that used to harvest have since eliminated their harvesting equipment.

Naber asked if the TAG members believed that the LMCD could effectively continue harvesting by contracting with private harvesters.

Jabbour stated that if the scope of the harvesting was relatively limited, that perhaps private harvesters could do the work. He suggested that if the LMCD hires harvesting operators, the LMCD should raise its standards for employee training. Jabbour handed out written information

regarding the training standards for Minneapolis Park & Recreation Board employees tasked with harvesting duties.

Brough noted that boat propellers cut and spread aquatic vegetation. He suggested that by harvesting in navigation channels and gathering most of the clippings, perhaps the spread of weeds would overall be reduced because there would be less vegetation for the boats to chop.

B. Cook stated that scale of operation for the harvesting program in previous years was too big. He said that the review should incorporate an evaluation of how a program with 50%, 10%, or 0% of historical output would compare.

Evenson noted that training standards for maintenance personnel should be included as well. He added that funding opportunities should be identified.

Data Collection and Mapping
Naber stated that the EOR / BWS team has begun collecting and mapping data regarding aquatic vegetation and AIS locations on Lake Minnetonka. He noted that the URL provided for the mapped data will change as data is added.

Community Engagement
Naber noted that one of the community engagement meetings has already been held and more are planned. He referred to other tools that were located on the LMCD website.

General Discussion and Adjournment
Lund stated that the DNR is offering to help with a lake-wide delineation of Eurasian Watermilfoil.

B. Cook stated that the LMCD would likely offer the services of McComas of Blue Water Science to assist in the effort.

Lund asked if the MCWD could provide a boat and staff.

Brough offered his boat and three or four days of his time for the delineation.

Naber stated that the EOR / BWS team would be developing draft materials for TAG review in a few weeks.

After discussion, Schleuning stated that the TAG would meet again on August 19, 2019 at the same time of day, with August 20, 2019 a possible alternate date.

Minutes

Public Meeting #1

June 18, 2019: 6-8 pm, LMCD Office

Team Attendees: Vickie Schleuning, Jason Naber, Camilla Correll, Steve McComas, Joe Pallardy-by phone

Channel 9 was present:

http://www.fox9.com/web/kmsp/news/lake-minnetonka-launches-new-plan-to-combat-invasive-species.

Data Collection – comments on the map illustrating vegetation management over time (2010-2018)

- Phelps Bay does not treat with herbicide any more
- Consider contacting lake service providers to collect information on vegetation and herbicide management. Lake Service Providers report to MNDNR. They have delineation reports and issue permits. Contact Adam at Premier Harvesting per Nicole Stone- LMCD
- Questions about the timing of information presented on the map of historic harvesting locations. EOR clarified that the map presented information from 2010 through 2018 and was based upon the information provided from LMCD.
- Consider contacting Dr. Neumann to collect his information about Eurasian Watermilfoil in Lake Minnetonka.

Public Engagement

- People concerned that there will not be opportunity for debate/discussion.
- Recommend publishing an article in the local papers on engagement and the social pinpoint site. Information in articles and social media should frame the feedback we are looking for and be educational to help readers identify invasive species we are concerned about.
- Press releases should be scientific.
- Create a list serve to let people know when new information is available for input.
- How will public-provided input be handled. Evaluate options for providing information using social pinpoint to target feedback. All information will be reviewed by the Administrator.
- Pictures of AIS species of concern should be on Social Pinpoint
- Political nature of the subject is going to consume a lot of time and energy over the course of the plan development process. There will be many policy discussions that need to be held as part of the plan development process.

What is the scientific approach we are using to inform the Plan? What are measuring?

- Using existing information, existing programs and research to evaluate the different management options the LMCD should consider. Not science from Lake Minnetonka specifically.
- It would be good to present trends in aquatic vegetation densities and distributions and pairing it with vegetation management to see if there is cause and effect. How to articulate all of the factors that play a role in species representation (richness and diversity) to make the point that isolated management actions may not be a direct influence on these variations.
- Will this Plan include a survey of aquatic vegetation? No, the consultants will use existing information to characterize past management activities and use social pinpoint to identify where nuisance vegetation is located on the lake. Meeting participant felt a vegetation survey would substantiate the information on social pinpoint (it would verify that what is being recorded is accurate).
- Eric- the time consuming part of this effort is not the science- it will be the politics.

Management Plan Content

- Will the Plan address invasive animals? We will build a Master Plan that includes modules for the imminent species (as defined in the scope of services). The Starry Stonewort Protection Plan and Emergency Response Plan is an example of what these modules will look like. The template will be set up so that new species can be added as needed.
- Need good lake-wide data- lots of gaps, need to prioritize data collection, sediment samples are needed where gaps exist
- Eric- climate change suitability analysis would be useful to have in MP- note Curly-leaf response to climate change
- Meeting participant asked if we were conducting a bay-by-bay assessment. No, the consultants are conducting a risk assessment of species that are not in Lake Minnetonka or in all of the bays yet. This will give the LMCD an idea of what to really be worried about.
- Again, meeting participants asked how the consultant will come to a conclusion (develop recommendations) without a trend line. Suitability analysis is going to give us a good indication. There are a lot of factors that play a role in the proliferation of aquatic vegetation including climate change, sediments in the bays.
- Runoff affects weed growth- need to coordinate with MCWD and Cities to control fertilizer and other nutrients entering the lake
- Need to understand effect of wastewater discharge points- excessive N will cause rapid growth of EWM
- Large support for lake-wide LID model.
- Rod Kern- adopt a shoreline. Break shoreline into manageable units. He thinks LMCD is being wasteful of a huge annual budget. Rod and Gregg Thomas debated this for some time.
- Participants questioned the motivation for getting the Plan done in the next 6 months. Vickie clarified that the timeline was established by the desire to develop a Starry Stonewort Emergency Response Plan.
- It was also noted that the Plan would not address all comments. During the plan development process gaps me be identified that preclude the ability to address all comments. Comments that cannot be addressed may be reflected as next steps in an on-going lake vegetation and AIS Management process. If priorities shift over the course of the project, this may also influence plan content. In the end the LMCD will have more information and will be better informed in making future decisions.
- It has always been LMCD's intent to leverage partnerships in conducting lake vegetation and AIS management. LMCD cannot do all the work and the outcome will be better if more people are involved.

Aquatic Vegetation Harvesting Program Review

- Will the harvesting review effort as part of this project be used to make decisions about 2020?
- Gregg Thomas-LMCD- No preconceived notions on harvesting. He is confident there will be holes identified in the program. The harvesters are already paid for, the capital is already spent, it does not make sense to say we have to keep using them because we already paid for them. That just means more money spent.
- Michael Mason- no harvesting needed in channels- boat traffic takes care of that by chopping it up.

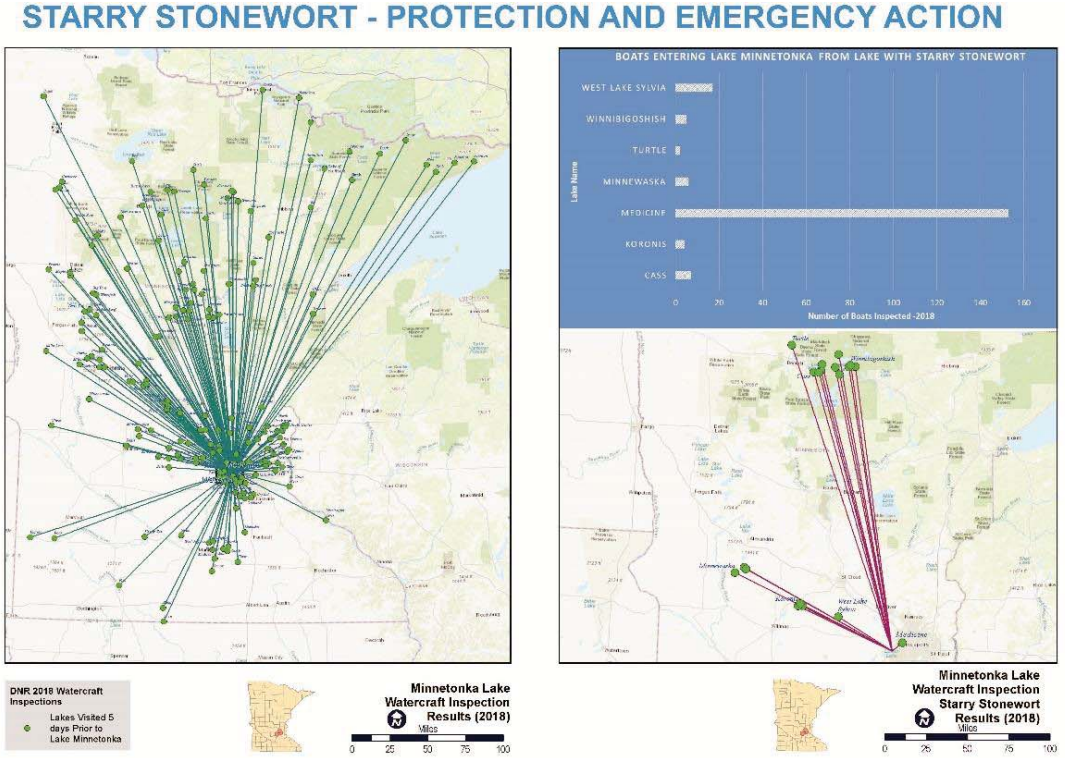
- Martin Sundquist- weeds are a big problem this year. In past years harvesting in August is too late. He made the analogy of a snow plow clearing your street a week after a blizzard; by that time you have dealt with it too long. Transient users of the lake need to pay.

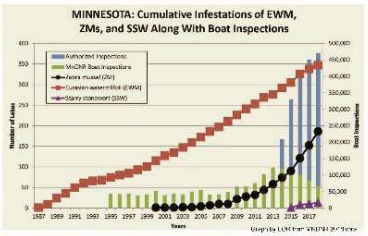
Lake Minnetonka Vegetation & AIS Master Plan

Task 1 & 5: Starry Stonewort Protection Plan

STATUS

- **Completed to date**
  - **Initial drafts**
    - May
  - **Public meeting**
    - June
  - **TAG discussion**
    - July
  - **Updated draft**
    - August
  - **Revised draft**
    - September
- **Next Steps**
  - **Final TAG review**
  - **Final document**





Task 2: Harvesting Program Review

STATUS

- **Completed to date**
  - **Harvesting equipment review**
    - May
  - **Program review outline**
    - June
  - **Public review of harvest maps**
    - June
  - **Prepare info request memo & TAG input on review parameters**
    - July
  - **Received info request response**
    - July
  - **Financial assumptions review**
    - August
  - **Financial model review**
    - September
- **Next Steps**
  - **Prepare final report**

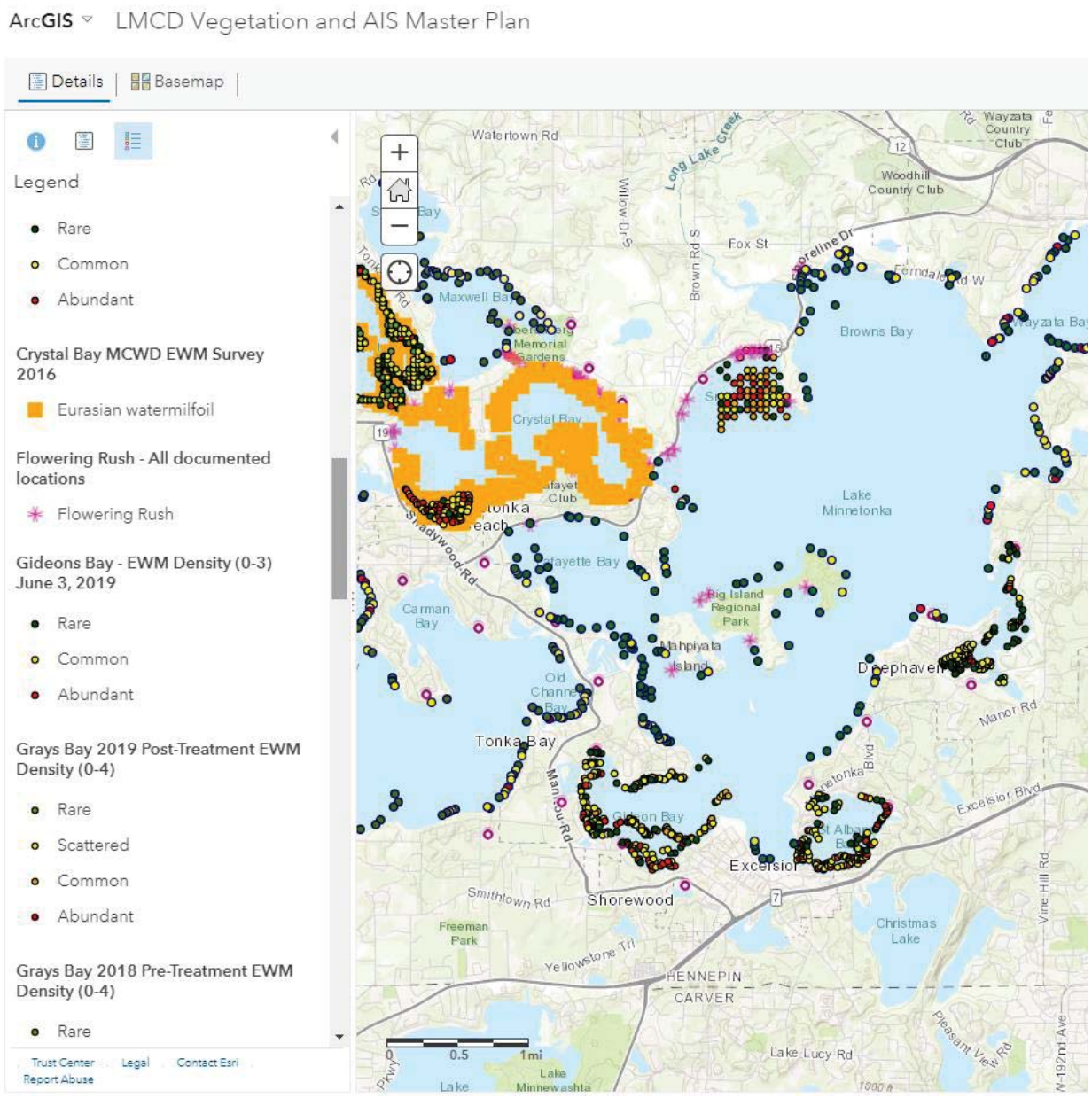
LMCD Harvesting Program
Operations & Safety Program Manual

LMCD Harvesting Program Manual | 5341 Maywood Road, Suite 200, Mound, MN 55364
Ph: 952-745-0789 | lmcd@lmcd.org | www.lmcd.org rev 112018

Task 3: GIS Mapping

STATUS

- **Completed to date**
  - **Build online GIS tool**
    - May
  - **Public meeting**
    - June
  - **Data presented to TAG**
    - July
  - **Updates to GIS map**
    - August
  - **Incorporate new data from partners**
    - September
  - **BWS/EOR lake data**
    - September
- **Next Steps**
  - **Updates as needed.**



Task 4: Lake Vegetation & AIS Master Plan

STATUS

- **Completed to date**
  - **Master Plan Outline**
    - July
  - **Master Plan Outline Meeting**
    - July
  - **Input on Master Plan Outline**
    - August
  - **Input on AIS module content**
    - August
  - **AIS Policy Discussions**
    - August
  - **Goals & Roles Memo**
    - September
- **Next Steps**
  - **Review of Goals & Roles by LMCD**
  - **Finalize outline and module**
  - **Master Plan writing**

Category	*This is a compilation of existing agency goals found in the plans reviewed for this task.*	Existing Planning Documents	Geographic Nature of Goal(s)
Prevention	*Work collaboratively to* implement procedures and practices to prevent new introductions or dispersal of aquatic invasive species within the District.	• MCWD • Minnesota State Mgmt. Plan • LMCD	• Local • Regional
Containment	Develop *and implement* management strategies to limit the spread of established invasive species to and from the District. Work to detect new invasive species infestations and support the infrastructure necessary to rapidly eradicate, or suppress, and contain high priority infestations.	• MCWD • Minnesota State Mgmt. Plan	• Local
Control/ Management	Abate (reduce impacts), and where possible, eliminate harmful ecological, economic, social, recreational, and public health impacts resulting from the infestation of aquatic invasive species in *Lake Minnetonka*.	• MCWD • Minnesota State Mgmt. Plan • MAISRC • LMCD	• Local
Leadership & Coordination	Collaborate with intrastate, interstate, and international partners to help coordinate invasive species related efforts.	• Minnesota State Mgmt. Plan • MAISRC • LMCD • LAAF	• Local • Regional

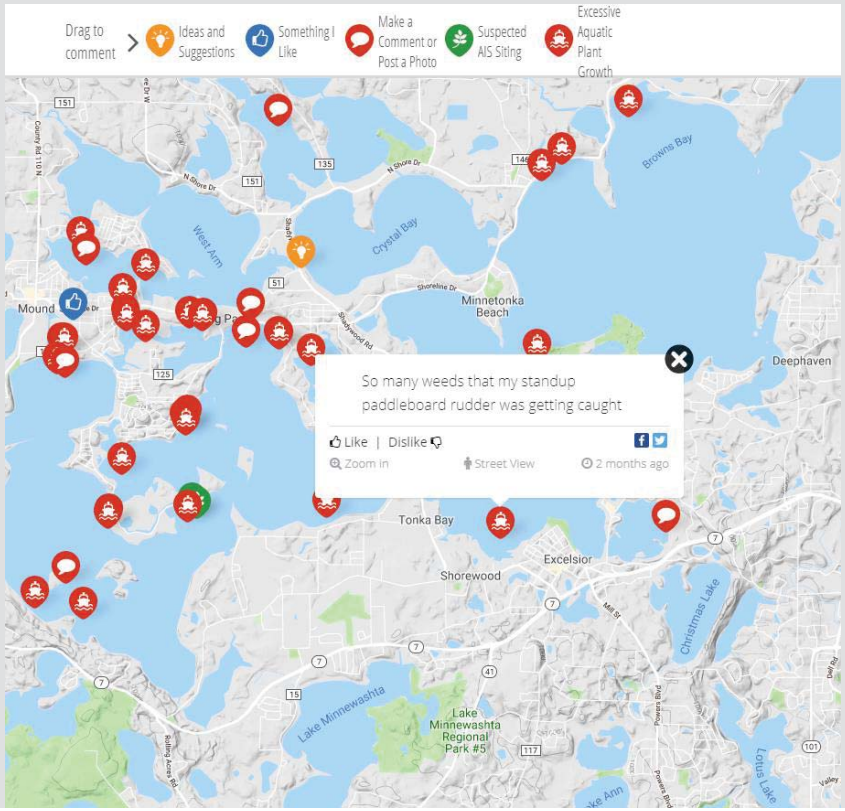
Task 6: Presentations & Meetings

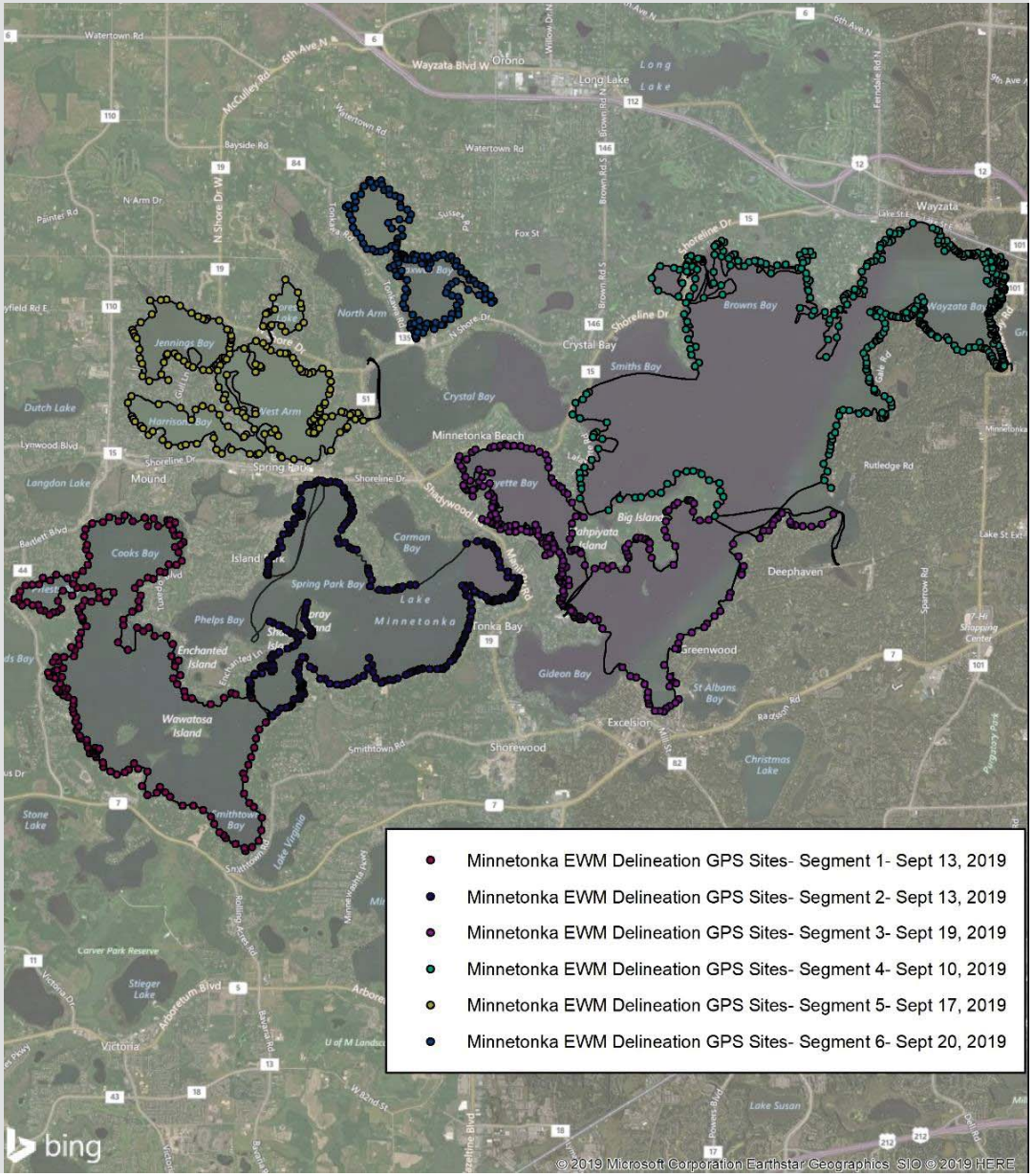
STATUS

- **Completed to date**
  - **Draft Engagement Plan**
    - May
  - **Media release**
    - May
  - **Project flyer**
    - June
  - **Public Meeting #1**
    - June
  - **TAG Meeting #1**
    - July
  - **Attend Board Workshop**
    - October
  - **LMCD Staff meetings- ongoing**
- **Next Steps**
  - **TAG Meeting #2**
  - **CAG Coordination**

Task 7: AIS Program Support

- **Completed to Date**
  - **Public Survey**
  - **Social PinPoint Web Tool**
  - **Lake Vegetation Survey- baseline & long term**

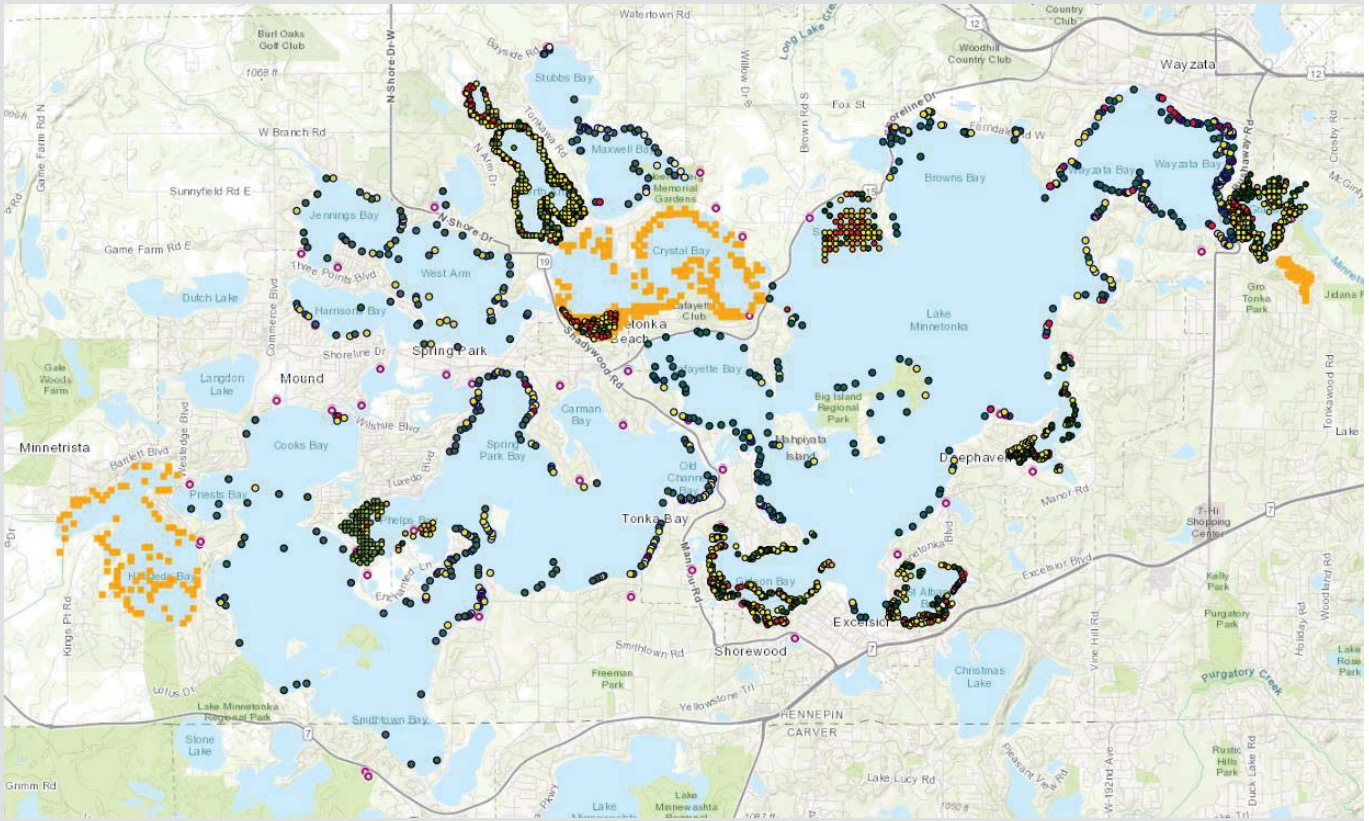




Harvesting Program Discussion

KEY TOPICS

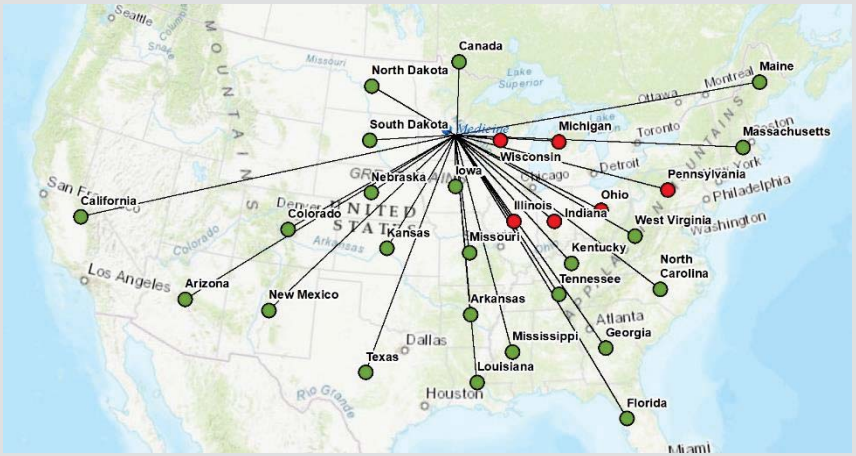
- **Data collected in 2019**
- **What will lake look like in 20yrs if we continue, quit or modify program?**
- **Is lake at equilibrium?**
- **What should LMCD consider for 2020?**
- **Seek input from TAG, CAG and general public**



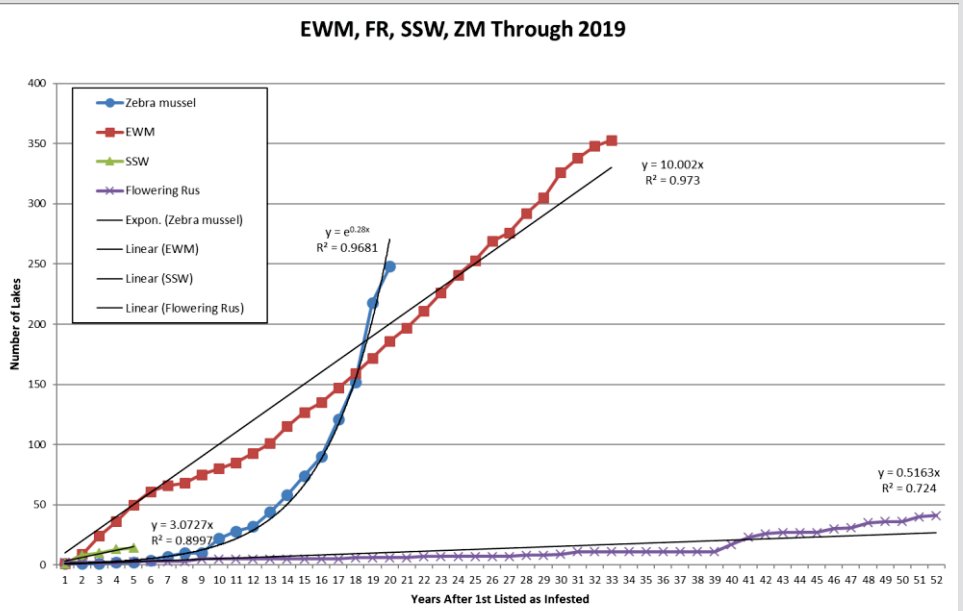
Starry Stonewort & Flowering Rush Discussion

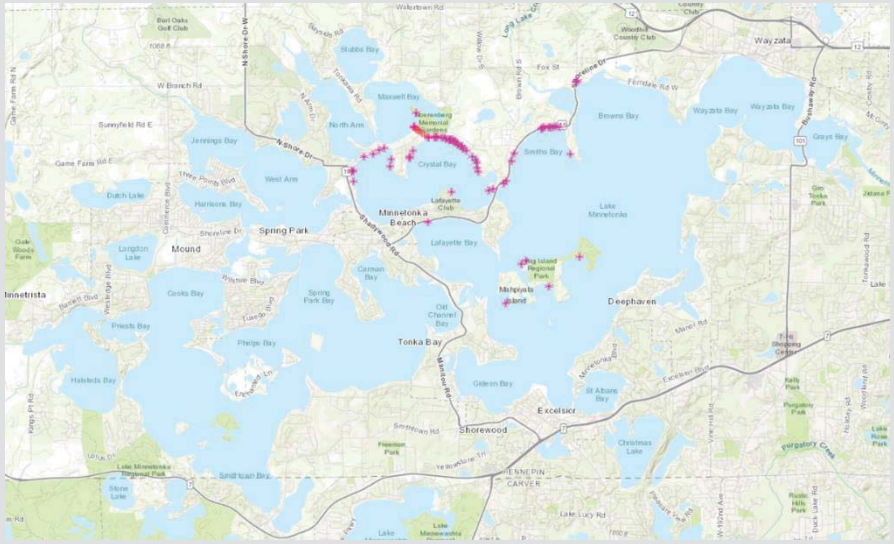
KEY TOPICS

- Latest on SSW work in MN & beyond
- SSW Prevention Pilot Study
- Early detection surveys
- Approvals needed to enact rapid response
- Rate of spread predictions
- Flowering Rush vs native species



Boats inspected in 2018 that entered from other states with SSW (noted with red dots)





Current known Flowering Rush locations

technical memo

Subject |	Aquatic Vegetation Harvesting Program Review	**Date** |	11/15/2019
To / Contact info |	Vickie Schleuning, Executive Director; Bill Cook, Board Director		
Cc / Contact info |			
From / Contact info |	Jason Naber, Camilla Correll, Steve McComas, Joe Pallardy		
Regarding |	11/21/19 TAG Meeting Discussion Topic		

Background

Per the Scope of Services for the Lake Minnetonka Vegetation and AIS Master Plan, EOR and BWS were to prepare an Aquatic Vegetation Harvesting Program Evaluation report prior to completing Master Plan. A draft of this report was released for comment on October 11, 2019. Comments were received by the following entities/persons:

- ✓ Three Rivers Park District
- ✓ Lake Minnetonka Association
- ✓ Minnehaha Creek Watershed District
- ✓ Minnesota Department of Natural Resources
- ✓ Tonka Bay Marina
- ✓ City of Greenwood
- ✓ City of Orono
- ✓ Private parties/lakeshore owners

The purpose of this memorandum is to:

1) Provide a summary of comments received pertaining to the Draft Aquatic Vegetation Harvesting Program Evaluation report dated October 9th, 2019;
2) Provide recommendations for the LMCD mechanical harvesting program as one tool in an overarching integrated aquatic plant management approach.

General Issues/Concerns from Comments Received

The LMCD received a number of comments on the draft Aquatic Vegetation Harvesting Program Evaluation report. All comments have been recorded and tracked so that they can be addressed in a clear and transparent manner. To facilitate this process, EOR/BWS organized the comments into the following categories:

<u>Scientific Support:</u>
Concerns surrounding the scientific support behind the report and the focus on organizational issues as opposed to the effectiveness of harvesting. Also comments were offered regarding the limited science on other topics that were of concern to stakeholders. These included use of herbicide, use of biocontrol tools such as weevils to control EWM, harvesting effects on fishery and nutrient removal associated with vegetation management tools.

<u>Financial Evaluation:</u>
Concerns about the limitations to the evaluation, with specific concerns regarding equipment expenditures and comparisons between different treatment options such as herbicide.

<u>Compatibility/Congruity with the AIS Master Plan:</u>

The draft Aquatic Vegetation Harvesting Program Evaluation report did not provide context as to the roll mechanical harvesting plays in an overarching aquatic plan management plan.

Planning Process:
Some parties felt there was a lack of transparency/clarity, issues with goals and the allocation of responsibilities. Some positive comments have been received from the public on the process to date.

Lake Use & Navigation:
Public comments were received noting severity of weed related issues in 2019. Suggestions were made to include a summary of how harvesting or not harvesting affects navigation on the lake. Some comments related to navigability should be summarized. .

Solutions:
A number of solutions to the lake weed issue on Lake Minnetonka were offered. In terms of the LMCD harvesting program suggestions included ranged from stopping completely to continuing with some suggested beneficial modifications. Herbicide was offered as an alternative to harvesting.

Discussion Item: The LMCD is looking for feedback on the following proposed revisions to the pre-2019 LMCD Harvesting Program. This item is on the agenda for the November 21, 2019 Technical Advisory Committee meeting.

Mechanical Harvesting

The draft Aquatic Vegetation Harvesting Program Evaluation report focused on an evaluation of the existing program (pre 2019). Input received through the process will be used to finalize the report. Following are potential changes to the program that will be discussed with the TAG and stakeholders.

Proposed Pilot Study:
Beginning in 2020, the LMCD should initiate a 1 to 3 year pilot program in which mechanical harvesting efforts will be contracted out to private contractors on a project-by-project basis. After running a pilot, the LMCD could consider selling harvesting equipment if the pilot program is successful. It is recommended the LMCD hire an aquatic plant/lake management specialist who will be responsible for clearly defining when and where mechanical harvesting is to take place based on results from an annual pre-treatment survey and continued communication with vested stakeholders.

Mechanical Harvesting Acreage:
The overall scope of the mechanical harvesting program is recommended to be reduced during this pilot program to be less than 100 acres. Mechanical harvesting should be considered as a secondary treatment option in areas not suitable/appropriate for herbicide use. One important objective of the harvesting is to collect fragmented, floating vegetation, which remains a persistent problem on Lake Minnetonka for recreational boaters, primary contact recreation (swimming/diving), and anglers alike. The aquatic plant/lake management specialist will also be responsible for collecting and maintaining spatial information on the LMCD website or via Social Pinpoint that clearly shows where mechanical harvesting efforts take place along with before and after pictures and data collection of the harvested areas.

Distance from Shoreline:

At this point in time, it is recommended that the LMCD harvesting program focus squarely on managing problematic, submergent aquatic plant growth in areas 150 feet or greater from the shoreline. Additionally, mechanical harvesting can be used to enhance navigational access in connecting channels and/or to collect floating, fragmented vegetation at public access locations to minimize the spread of invasive species like EWM. The LMCD will set up a contractor's short list and assign aquatic plant harvesting where it is needed. The most likely areas in which mechanical harvesting will be applied include:

- Areas that are not being targeted through herbicide treatments.
- Open water areas 150 feet or further from shore where dense native plant growth is impeding navigation and an immediate solution is required to provide recreational access to open water from riparian areas.
- Navigational channels from one bay to another.
- Areas where genetic composition of EWM/Hybrid EWM suggests resiliency to herbicides.
- Skimming of rafts of floating plant fragments in open water based on feedback received from Social Pinpoint or other social media.
- Removal of floating/nuisance aquatic plants and debris at public access points in an effort to help prevent the spread of AIS.

Herbicide Treatments:

During this pilot study (and potentially beyond) the LMCD will not conduct any of its own herbicide treatments. Homeowners wishing to treat aquatic plants within 150 feet of the shoreline should continue to work the LMA, private contractors, bay captains, or representatives from Lake Improvement Districts (e.g., North Arm Bay Homeowners) to secure the necessary permitting to conduct the treatment.

Prioritization of Harvesting Areas:

The prioritization of areas to target via mechanical harvesting will begin each year with a lake-wide pre-treatment, meander survey conducted between May 15th and June 15th annually. If CLP is a target for harvesting, earlier survey dates may be necessary. The meander survey could incorporate biomass-sampling techniques via the use of sonar units capable of recording aquatic plant biomass. Annual pre-treatment surveys estimates are required because aquatic plant growth can change from year to year. As aquatic plant growth changes from year to year and within a given year, the role of each management tool will also need to change accordingly.

Results from the pre-treatment survey will be made publicly available via the LMCD website, social media, and/or Social Pinpoint. Subsequently, a meeting will be held with the LMA, bay captains, DNR, and other vested stakeholders to determine where aquatic plant management is proposed, determine site priorities, and determine the appropriate control tool. This exercise will begin with a review of previously managed areas. Ultimately, all areas within the lake will be mapped and prioritized for management actions. The end goal of this exercise will be a bay-by-bay map showing all areas of the lake to be treated and the proposed method of control.

Evaluate Return on Investment:

Regardless of the treatment method used, having a quantifiable goal is therefore useful in determining if results from treatment efforts are worth the cost over broad temporal and spatial scales. As part of documenting progress towards established goals, EOR recommends graphing the total surface area of EWM, CLP, and native species present before and after treatments on a bay-by-

bay basis and engaging vested stakeholders in each bay in a goal-setting discussion. Graphing this type of information on an annual basis is useful in demonstrating the Return on Investment (ROI), this data is currently lacking in Lake Minnetonka, which is currently managed by multiple entities operating with disconnected agendas.

All harvesters will be outfitted with GPS so the LMCD can track their time on the water, where they are harvesting and the loads (total amount of aquatic vegetation) being hauled out of the lake. Based on an average harvesting rate of 20 hours/week for 15 weeks (300 total hours). In terms of the scale of the harvesting operation, mechanical harvesters operate at a rate of 3 hours/1 acre of harvest or cutting channels at about 2 mph. Using these estimates the contracting fee for the mechanical harvesting program is expected to be approximately $60,000 based on an industry standard rate for contracted mechanical harvesting services of $200/hour. The $60,000 fee is significantly less than the average cost for mechanical harvesting from 2008-2018. This does not include transportation services to offload the aquatic vegetation or administrative personnel responsible for program oversight.

technical memo

Subject |	Starry Stonewort Protection & Emergency Action Plan	**Date** |	11/15/2019
To / Contact info |	Vickie Schleuning, Executive Director; Bill Cook, Board Director		
Cc / Contact info |			
From / Contact info |	Jason Naber, Camilla Correll, Steve McComas, Joe Pallardy		
Regarding |	11/21/19 TAG Meeting Discussion Topic		

Background

Per the Scope of Services for the Lake Minnetonka Vegetation Management and AIS Master Plan, EOR and BWS were contracted to prepare a Starry Stonewort Protection & Emergency Action Plan as one of the first deliverables. A draft of this report was released for comment on October 11, 2019. Comments were received by the following entities/persons:

- ✓ Three Rivers Park District
- ✓ Minnehaha Creek Watershed District
- ✓ Minnesota Department of Natural Resources
- ✓ Tonka Bay Marina
- ✓ City of Greenwood
- ✓ City of Orono
- ✓ Private parties/lakeshore owners

This purpose of this memorandum is to:

1) Provide a summary of comments received with regards to the draft Starry Stonewort Protection & Emergency Action Plan developed by BWS and EOR on October 11th, 2019.
2) Provide framework for discussion on starry stonewort prevention and early detection/rapid response methods.

General Issues/Concerns from Comments Received

The LMCD received a number of comments on the draft Starry Stonewort Protection & Emergency Action Plan. All comments have been recorded and tracked in a spreadsheet so they can be addressed in a clear and transparent manner. To facilitate this process, EOR/BWS organized the comments into the following categories:

Starry Stonewort Prevention:
It should be noted that there is potential for introduction of SSW from Wisconsin lakes or lakes with undiscovered populations of SSW. Watercraft inspections have not been capable of preventing the spread of other AIS species but are part of the recommended SSW prevention strategy and the plan also notes prevention has not been 100% effective.

Pre-emptive and Early Detection Options:
Copper sulfate treatments have not eradicated SSW in other lakes despite these being recommended in the plan. It needs to be determined who/which entity is responsible for what and who will fund SSW treatments.

Roles & Responsibilities:
More dialog is needed with partnering agencies and parties prior to determining who can fulfill roles related to technical assistance, management and funding. The LMCD should be focusing its limited dollars on long-term strategies that have the potential for greater general lake-wide benefit.

Lake Use Comments:
SSW was identified by the public to be the greatest threat to the enjoyment of Lake Minnetonka.

Discussion Item: The LMCD is looking for feedback on the following recommendations related to the Starry Stonewort Protection & Emergency Action Plan. This item is on the agenda for the November 21, 2019 Technical Advisory Committee meeting.

Prevention Recommendation

A chart listing several prevention methods, the probability of a SSW prevention, and the probability of implementing the prevention method on Lake Minnetonka is shown in Table 1. **Error! Reference source not found.**.

At this time, based on available technology and economic considerations, **a feasible, 100% preventative solution** designed to prevent the introduction of SSW into Lake Minnetonka is not practical. From comments received, no clear solutions were offered that pertained to SSW prevention however, until a 100% preventative solution is identified, the LMCD should partner with the DNR to secure funding for bi-weekly surveys at priority boat accesses from May through October. The LMCD should also work with the DNR and lake representatives from the 14 SSW lakes to secure funding for additional watercraft inspections and copper sulfate treatments to reduce SSW biomass and prevent SSW transport by a boat trailer.

EOR recognizes the following deficiencies with the recommended approach:

1) Does not take into account that it is likely there are some lakes where SSW infestations have not yet been discovered and it is likely more will be infested however, this recommendation is based on information available at this time. Additionally, does not take into account SSW-infested lakes in Wisconsin or other nearby states.
2) Watercraft inspections have not been able to prevent the spread of other AIS, including EWM and zebra mussels. Data show the number of EWM, zebra mussel, and SSW infested lakes in Minnesota and Wisconsin continue to increase despite increasing boat inspections.

Currently, the sort of impacts SSW will have in terms of ecology and economics are speculative. What is known is that in Minnesota lakes in which SSW is found early such as Sylvia, Rice, Pleasant, and Grand Lakes, SSW has been successfully contained. As such, EOR and BWS have developed a rapid response action plan based on lessons learned from SSW rapid response efforts across the country. To protect Lake Minnetonka, EOR recommends that the LMCD focus on early detection and response strategies, which have the greatest opportunity for protecting Lake Minnetonka over the long run.

Table 1. Evaluated methods to prevent a SSW introduction into Lake Minnetonka. Methods 1, 2, and 3 would be the most practical and effective for implementing.

Method	Politically Acceptable	Technically Achievable	Economically Feasible	Probability of Preventing a SSW Introduction (points)	Probability of Implementation (points)	Total Score (points)
1. Bi-weekly surveys at priority boat accesses.	Yes	Yes	Yes	**High (4)**	**High (4)**	**8**
2. Extra boat inspections at priority Lake Minnetonka public accesses	Yes	Yes	Yes	**Moderate (3)**	**High (4)**	**7**
3. Conduct exit inspections on 100% of the boats on all Minnesota lakes that currently have SSW. Also, apply copper sulfate at public accesses at the 13 SSW lakes to reduce SSW biomass and prevent SSW transport by a boat trailer.	Unlikely – Who is responsible?	Yes	Yes	**High (4)**	**Moderate (3)**	**7**
4. Don't allow any boats to visit Minnetonka, use a boat club approach.	No	Unlikely	Unlikely	**High (4)**	**Very Low (0)**	**4**
5. I-LIDS: Motion detected video surveillance cameras at boat access are a potential option but rate as low priority.	Yes	Yes	Yes	**Very Low (0)**	**High (4)**	**4**
6. Inspect 100% of incoming boats.	No	No	No	**Moderate (3)**	**Very Low (0)**	**3**
7. Put all boats and trailers through a chemical bath before entering Lake Minnetonka.	Unknown	No	No	**Moderate (3)**	**Very Low (0)**	**3**
8. Develop a Preemptive Pilot Study* which incorporates the use of pre-emptive copper sulfate dosing at prioritized Lake Minnetonka public accesses every 2 to 4 weeks during the growing season. Treatments are prioritized on a launch-by-launch basis, but focus will be on t higher risk launches.	Unknown	Yes	Yes	**Low (2)**	**Very Low (0)**	**2**
9. Using e-DNA monitoring for detecting SSW (not available at this time): Currently (as of 2019) there are no kits for sampling and identifying the presence of SSW in a lake using e-DNA. However, future research efforts may result in a method for detecting a low infestation.	Yes	No	No	**Very Low (0)**	**Low (1)**	**1**

*note this is not an introduction prevention strategy. It assumes that SSW has already been introduced into Lake Minnetonka, but has not yet become fully established Initially, EOR and the LMCD recommended working with the DNR and MAISRC to develop a pilot program to attempt preemptive copper sulfate applications at priority public access points in Lake Minnetonka. Since meeting with the LMCD, EOR and BWS have determined that preemptive copper sulfate treatment at public accesses are not a viable solution for the following two reasons:

1) DNR is not likely to allow pre-emptive copper sulfate treatments due to potentially negative impacts to non-target species.

2) Copper sulfate treatments conducted on Minnesota lakes with SSW have not eradicated SSW. Therefore, if SSW was introduced to Lake Minnetonka, there is no guarantee that a preemptive copper sulfate treatment would achieve a 100% eradication rate.

Early Detection and Rapid Response Recommendation

Rapid response assessment:

After the first verified observation of starry stonewort in a Lake Minnetonka bay, contact Keegan Lund at the DNR. Work with Keegan Lund at the DNR to conduct a rapid response assessment effort within 2 to 3 days of the verified observation. Contractors, DNR, and others should conduct an initial search in the most probable locations to determine the distribution of starry stonewort. From 10 - 20 hours of surveying should be conducted for a thorough assessment. All SSW locations should be sited with GPS.

Rapid response action:

If SSW is found only within a public access area (or an area less than 20-acres) after the rapid response assessment then the rapid response action will be a containment attempt similar to those performed on other Minnesota lakes with a small infestation at the public access. LMCD staff and managers would coordinate in decisions as to what type of a rapid response action should go forward. DNR permits are necessary for treatments and meetings should be conducted prior to any eradication treatments.

Starry stonewort containment:

When the management objective is to contain SSW in a small area, aggressive treatments should be considered. Apply a copper sulfate product or a permitted algaecide product to a delineated area, wait 2 weeks and resurvey. If SSW is found, treat with algaecides again. Repeat up to 4 times during the SSW growing season from June- October.

Summary of steps for a rapid response action

1. Before the detection of an introduced species, a treatment action should be planned because the timing of rapid response to an initial observation is critical. Typically after the first detection for small areas (<20 acres), treatments can occur in 2-3 weeks.
2. After an early detection observation, meet with DNR AIS staff to discuss a protocol for actions and treatment.
3. Conduct the Rapid Response Assessment, beginning with priority accesses. If SSW is detected, move to a full search of the surrounding areas.
4. Evaluate the results of a rapid response assessment. Do results indicate conditions are suitable to contain the SSW in a small area? If a small area of SSW is identified within close proximity to a public landing, the public access in which SSW was found may be closed while treatment occurs. Boaters will be re-directed to other public accesses to minimize the ability for SSW to spread.
5. Delineate a treatment polygon based on the full search survey results. For new infestations, the treatment area has ranged from 0.6 acres up to around 20 acres.
6. Containment of SSW should be measured based on results of a rapid response assessment. With early detection, the objective is to contain SSW in a small area of infestation. Previous projects (Sylvia, Rice, Pleasant, Grand) have found aggressive multiple treatments have successfully contained SSW at the public access. Once the initial infestation has spread and is widespread (> 50 acres) treatments are reduced to just the areas with the heaviest growth. Multiple treatments over large areas are not warranted due to excessive costs and ecological damage.

7. Estimated annual costs associated with the application and monitoring are up $20,000 for a containment treatment, dependent on the treatment dimensions and frequency of treatments.

Management Options

After reviewing SSW treatment results in Michigan, Wisconsin, and Minnesota, the most cost effective treatment has been the use of **copper sulfate or an algaecide such as endothall.** Hand pulling can be considered for very limited infestations, but then a follow-up copper sulfate application should be considered. Other methods that have been attempted, but have been less effective include dredging, DASH (diver assisted suction harvesting), and drawdown. After a treatment, a post-treatment evaluation is necessary to determine the effectiveness of a containment treatment. This protocol is available from the DNR. Components will likely include a thorough search of the treatment area, and a post treatment survey of the treatment area and surrounding area. A flow chart showing a sequence of steps is shown in Figure 1.

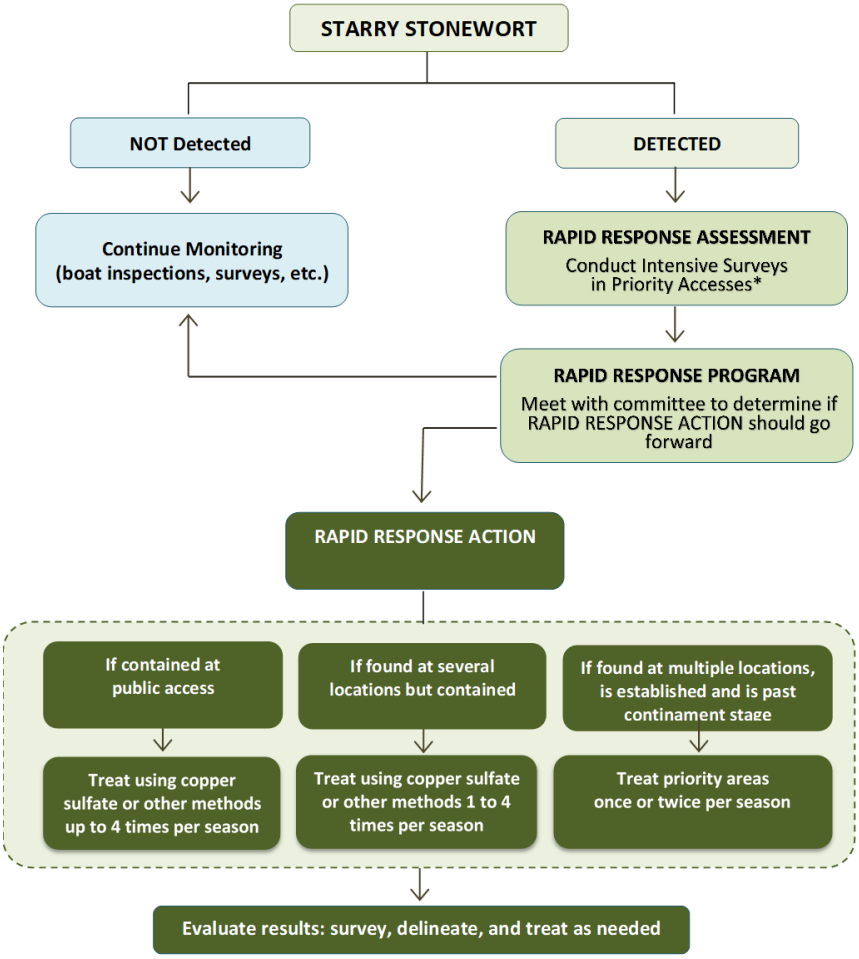


Figure 1. Starry Stonewort Rapid Response Plan Flow Chart.

technical memo

Subject |	AIS Strategy	**Date** |	11/15/2019
To / Contact info |	Vickie Schleuning, Executive Director; Bill Cook, Board Director		
Cc / Contact info |			
From / Contact info |	Jason Naber, Camilla Correll, Steve McComas, Joe Pallardy		
Regarding |	11/21/19 TAG Meeting Discussion Topic		

Background

The LMCD and its project consultants have been documenting comments received throughout the Lake Minnetonka Vegetation Management and AIS Master Plan (Plan) development process. Not only have these comments served to inform the content of the Plan, they have served to shape the plan development process by highlighting local and regional AIS management needs that are currently undocumented. Comments were received in a variety of formats including:

- Project Kickoff (Public) Meeting
- Comments posted on Social Pinpoint
- Survey results
- Technical Advisory Group Meeting
- AIS Task Force Meetings
- Board Workshop
- Input from LMA Executive Director
- Meetings held with residents/businesses
- Comments provided during draft document review (e.g. LMA, MNDNR, Tonka Bay Marina, MCWD, City of Orono, City of Greenwood, and others)

All comments have been recorded in a searchable database to facilitate sorting and organizing by type and source. While most of the comments inform plan content or are specific to draft sections of the plan, there are a number of process-related comments that need to be addressed with other entities involved in AIS management at the local and regional scale. One of the process-related concerns expressed by the Technical Advisory Group and member communities is that the LMCD has not articulated their goal for the Lake Minnetonka Vegetation Management and AIS Master Plan. Embedded in this goal setting exercise is the definition of the LMCD's role in AIS management. As part of the development of the master plan, the LMCD seeks to identify areas of need with regard to lake vegetation and AIS management, determine the role that the LMCD can fill in meeting that need, and assess the resources required to fill that need.

The purpose of this memorandum is to propose a framework for a vegetation and AIS strategy that will help identify gaps (in more cost-effective management) and facilitate future discussions with entities involved in vegetation and AIS management on or affecting Lake Minnetonka.

AIS Strategy

As is common in AIS Management, the AIS strategy for Lake Minnetonka should focus its efforts on:

1. **Prevention** - Work collaboratively to implement procedures and practices to prevent new introductions or dispersal of aquatic invasive species within the District.
2. **Containment** - Develop and implement management strategies to limit the spread of established invasive species to and from the lake. Work to detect new invasive species infestations and support the infrastructure necessary to rapidly eradicate, or suppress, and contain high priority infestations.
3. **Control/Management** - Abate (reduce impacts), and where possible, eliminate harmful ecological, economic, social, recreational, and public health impacts resulting from the infestation of aquatic invasive species in Lake Minnetonka.
4. **Leadership and Coordination** - Collaborate with local, intrastate, interstate, and international partners to help coordinate invasive species related efforts.

Discussion Item: The LMCD is looking for feedback on this AIS strategy. This item is on the agenda for the November 21, 2019 Technical Advisory Committee meeting.

LMCD's Role in AIS Management

The LMCD's vision for AIS management on Lake Minnetonka is to best utilize the strengths and skills of all parties currently participating in AIS management activities. The LMCD recognizes there are many entities involved in the prevention, containment and control/management of AIS on Lake Minnetonka. Given the size, the amount of traffic, and the pace at which new species are being introduced to Minnesota's waterbodies, it is imperative that everyone who potentially plays a role in the prevention, containment and control of AIS continue to play a role in AIS management. As roles of various agencies may change over time, it is important to understand what, if any, impact it will have on Lake Minnetonka.

Given the AIS strategy framework presented above, the LMCD is assessing its role in vegetation and AIS management as described in the following table. Gaps in the table identify those areas and potential management roles that could or need to be filled if not performed by other agencies.

AIS Strategy	Past or Current LMCD Roles & Potential Roles
Prevention & Early Detection	
Conduct monthly targeted searches (May-Oct)	Complaint basis
Watercraft Inspections	Provide funding for inspections
CD3 Cleaning Stations/Public Launch Tools	
Press release if AIS are found	Provide on website, eblast, social media, etc.
Rapid Response Assessment/Action (Containment)	
Conduct an initial exploratory search after the first report of an AIS observation	
Organize and train lake searchers for a full search effort & conduct expanded targeted search	
Meet to determine treatment options	Attend meetings
Close public access, if necessary	
Set-up containment area & treat	
Evaluate treatment & Report findings	
Control/Management	
Mechanical AIS control (Harvesting/hand pulling)	Manage Lake Aquatic Plant Mechanical Harvesting Program
Chemical AIS control (pesticides)	
Biological AIS control	
AIS Permits (Issuing?)	
Leadership & Coordination	
Plan Development	Develop Lake Minnetonka Vegetation & AIS Plan
Overall AIS Management Plan Coordination	Potential
Training (e.g. Early Detection)	Participated Starry Trek, staff, public
AIS Monitoring/surveys/Research	Vegetation delineation, harvesting program, support research
Enforcement	As needed
Funding Resource	Potential funding source for AIS Projects

Appendix B: Community Engagement

Table 1-2. Summary of Issues/Concerns Expressed During Plan Development Process

Issue/Concerns Expressed	Source	Where is the Issue/Concern Addressed in the Plan?
Excessive AIS		
EWM	- Survey - Social Pinpoint - LMCD Complaint & Violation Log	Section 3, EWM Module
CLP		Section 3, CLP Module
Many residents noted aquatic vegetation is the worst due to lack of harvesting in 2019	- Survey - Social Pinpoint	Section 3, Harvesting program review and recommendations
ZM		ZM Module
SSW		Section 2, SSW Plan & Module
Improper Treatment Strategies		
Harvesting		
Impacts of watercraft on cutting and spreading aquatic vegetation	- Survey - Social Pinpoint	Section 3, Harvesting program review and recommendations
Concerns with spreading aquatic vegetation as a result of harvesting	- Survey - Social Pinpoint	Section 3, Harvesting program review and recommendations
Concerns with spreading aquatic vegetation as a result of recreational watercraft	- Survey	Section 3, Harvesting program review and recommendations
Impacts to fisheries	- Survey	Section 3, Harvesting program review and recommendations
Attitude towards harvesting split among lakeshore residents: many are in favor of harvesting and many are not.	- Survey - Social Pinpoint	Section 3, Harvesting program review and recommendations
If LMCD not harvesting, private entities conducting their own AIS management (harvesting and chemical treatment).	- Survey - Social Pinpoint - LMCD Complaint & Violation Log	Section 3, Harvesting program review and recommendations
Recommendations of Harvesting Program Review are not based on science or performance	- City of Orono Comment Letter	Section 3, Harvesting program review and recommendations
Chemicals		
Private/service use of chemical treatments	- Survey	Section 3 of Master Plan

Issue/Concerns Expressed	Source	Where is the Issue/Concern Addressed in the Plan?
Respondents would like to see a range of management methods used (harvesting + chemical + biological); "There is not a one size fits all solution for a lake as diverse as Lake Minnetonka".	- Survey	Section 3 of Master Plan
Need for Data Collection		
There is a need for good lake-wide data. There are gaps in the data. There is a need to prioritize data collection and fill in the gaps.	- Project Kick-Off Meeting	Section 4 of Master Plan
Impacts of Adjacent Land Uses		
Runoff affects weed growth- need to coordinate with MCWD and Cities to control fertilizer and other nutrients entering the lake	- Project Kick-Off Meeting	Section 4 of Master Plan
Disruption of Recreation & Safety		
AIS is a safety concerns for swimming, watersports, etc.	- Survey - Social Pinpoint - LMCD Complaint & Violation Log	Section 4 of Master Plan
AIS decreases enjoyment and social use of the Lake; Weeds make it difficult to get kayaks, paddle boards, jet skis and boats out into the water.	- Survey - Social Pinpoint - LMCD Complaint & Violation Log	Section 4 of Master Plan
Weeds make boat navigation difficult	- Survey - Social Pinpoint - LMCD Complaint & Violation Log	Section 4 of Master Plan
Need for Watercraft Inspections		
Impact of water inside the water pump impeller and fairings which can house aquatic invasive species	- Survey	Master Plan, SSW Plans & Modules
Personal Damage Costs (to boats/equipment)		
AIS causes damage to or breakdown of watercraft or equipment	- Survey	Section 4 of Master Plan
Spent a lot of money and time removing the lake weeds from our shore for swimming and to get our jet skis out without getting plugged up with weeds. Would like to see the bay being harvested and restored to a usable boating and swimming lake.	- Social Pinpoint	Harvesting Program Review & Section 3 of Master Plan

Issue/Concerns Expressed	Source	Where is the Issue/Concern Addressed in the Plan?
Funding		
Feels LMCD is being wasteful of huge annual budget	- Project Kick-Off Meeting	Harvesting Program Review and Section 4 of Master Plan
Lakeshore owners don't want to pay if they don't receive the services they expect	- LMCD Complaint & Violation Log	Section 4 of Master Plan
Need for Research		
Concerned with climate change impacts to AIS management	- Project Kick-Off Meeting	Master Plan & AIS Modules
Leadership/Responsibilities		
Lack of clarity regarding LMCD's overarching goals with regards to its Lake Minnetonka Vegetation and AIS Management Plan, the process being used to develop the Plan, the role of the TAG, and the lack of coordination with agencies	- City of Orono Comment Letter - MCWD Comment Letter (10/25/2019)	Section 4 of Master Plan
LMCD cannot do all of the work and needs to leverage partnerships to realize better outcomes	- Project Kick-Off Meeting	Section 4 of Master Plan
The LMCD needs to define its involvement in AIS management	- MCWD Comment Letter (10/25/2019)	Section 4 of Master Plan

Minnetonka AIS/Lake Management Plan - Comments as of November 20, 2019

Compiled by EOR

					COMMENTS RELATED TO PROCESS							COMMENTS RELATED TO PROCESS					COMMENTS RELATED TO TECHINCAL CONTENT		
Source	Date	Comment	Commenter	Recreation	Watercraft Inspection	Chemical Treatment	Harvesting	Lack of Harvesting 2019	SSW	Funding	LMCD Role	Partner Roles	Data Collection/ Analysis	Stakeholder Engagement	Process	Harvesting Plan	SSW Plan	AIS Master Plan
Public Meeting 1	6/19/2019	Phelps Bay does not treat with herbicide any more				X												
Public Meeting 1	6/19/2019	Consider contacting lake service providers to collect information on vegetation and herbicide management. Lake Service Providers report to MNDNR. They have delineation reports and issue permits. Contact Adam at Premier Harvesting per Nicole Stone- LMCD				X							X					
Public Meeting 1	6/19/2019	Questions about the timing of information presented on the map of historic harvesting locations. EOR clarified that the map presented information from 2010 through 2018 and was based upon the information provided from LMCD.					X						X					
Public Meeting 1	6/19/2019	Consider contacting Dr. Neumann to collect his information about Eurasian Watermilfoil in Lake Minnetonka.																
Public Meeting 1	6/19/2019	People concerned that there will not be opportunity for debate/discussion.												X				
Public Meeting 1	6/19/2019	Recommend publishing an article in the local papers on engagement and the social pinpoint site. Information in articles and social media should frame the feedback we are looking for and be educational to help readers identify invasive species we are concerned about.												X				
Public Meeting 1	6/19/2019	Press releases should be scientific.												X				
Public Meeting 1	6/19/2019	Create a list serve to let people know when new information is available for input.												X				
Public Meeting 1	6/19/2019	How will public-provided input be handled. Evaluate options for providing information using social pinpoint to target feedback. All information will be reviewed by the Administrator.												X				
Public Meeting 1	6/19/2019	Pictures of AIS species of concern should be on Social Pinpoint											X	X	X			
Public Meeting 1	6/19/2019	Political nature of the subject is going to consume a lot of time and energy over the course of the plan development process. There will be many policy discussions that need to be held as part of the plan development process.													X			
Public Meeting 1	6/19/2019	Using existing information, existing programs and research to evaluate the different management options the LMCD should consider. Not science from Lake Minnetonka specifically.											X					
Public Meeting 1	6/19/2019	It would be good to present trends in aquatic vegetation densities and distributions and pairing it with vegetation management to see if there is cause and effect. How to articulate all of the factors that play a role in species representation (richness and diversity) to make the point that isolated management actions may not be a direct influence on these variations.				X	X						X					
Public Meeting 1	6/19/2019	Will this Plan include a survey of aquatic vegetation? No, the consultants will use existing information to characterize past management activities and use social pinpoint to identify where nuisance vegetation is located on the lake. Meeting participant felt a vegetation survey would substantiate the information on social pinpoint (it would verify that what is being recorded is accurate).											X					
Public Meeting 1	6/19/2019	the time consuming part of this effort is not the science- it will be the politics.	Eric Evenson												X			
Public Meeting 1	6/19/2019	Will the Plan address invasive animals? We will build a Master Plan that includes modules for the imminent species (as defined in the scope of services). The Starry Stonewort Protection Plan and Emergency Response Plan is an example of what these modules will look like. The template will be set up so that new species can be added as needed.											X					
Public Meeting 1	6/19/2019	Need good lake-wide data- lots of gaps, need to prioritize data collection, sediment samples are needed where gaps exist											X					
Public Meeting 1	6/19/2019	climate change suitability analysis would be useful to have in MP- note Curly-leaf response to climate change	Eric Evenson										X					
Public Meeting 1	6/19/2019	Meeting participant asked if we were conducting a bay-by-bay assessment. No, the consultants are conducting a risk assessment of species that are not in Lake Minnetonka or in all of the bays yet. This will give the LMCD an idea of what to really be worried about.											X					
Public Meeting 1	6/19/2019	Again, meeting participants asked how the consultant will come to a conclusion (develop recommendations) without a trend line. Suitability analysis is going to give us a good indication. There are a lot of factors that play a role in the proliferation of aquatic vegetation including climate change, sediments in the bays.													X			
Public Meeting 1	6/19/2019	Runoff affects weed growth- need to coordinate with MCWD and Cities to control fertilizer and other nutrients entering the lake													X			
Public Meeting 1	6/19/2019	Need to understand effect of wastewater discharge points- excessive N will cause rapid growth of EWM											X					
Public Meeting 1	6/19/2019	Large support for lake-wide LID model.											X					
Public Meeting 1	6/19/2019	adopt a shoreline. Break shoreline into manageable units. He thinks LMCD is being wasteful of a huge annual budget. Rod and Gregg Thomas debated this for some time.	Ron Kern							X	X							
Public Meeting 1	6/19/2019	Participants questioned the motivation for getting the Plan done in the next 6 months. Vickie clarified that the timeline was established by the desire to develop a Starry Stonewort Emergency Response Plan.							X						X			
Public Meeting 1	6/19/2019	It was also noted that the Plan would not address all comments. During the plan development process gaps me be identified that preclude the ability to address all comments. Comments that cannot be addressed may be reflected as next steps in an on-going lake vegetation and AIS Management process. If priorities shift over the course of the project, this may also influence plan content. In the end the LMCD will have more information and will be better informed in making future decisions.													X			
Public Meeting 1	6/19/2019	It has always been LMCD's intent to leverage partnerships in conducting lake vegetation and AIS management. LMCD cannot do all the work and the outcome will be better if more people are involved.									X			X				
Public Meeting 1	6/19/2019	Will the harvesting review effort as part of this project be used to make decisions about 2020?					X								X			
Public Meeting 1	6/19/2019	No preconceived notions on harvesting. He is confident there will be holes identified in the program. The harvesters are already paid for, the capital is already spent, it does not make sense to say we have to keep using them because we already paid for them. That just means more money spent.	Gregg Thomas - LMCD				X			X								
Public Meeting 1	6/19/2019	no harvesting needed in channels- boat traffic takes care of that by chopping it up.	Michael Mason				X											
Public Meeting 1	6/19/2019	weeds are a big problem this year. In past years harvesting in August is too late. He made the analogy of a snow plow clearing your street a week after a blizzard; by that time you have dealt with it too long. Transient users of the lake need to pay.	Martin Sundquist	X			X	X										

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Social Pinpoint		The weeds along the north shore of Cooks Bay are the worst we've ever seen. Is there a way we can address this next year. It is not possible to get our jet skis out and very difficult to get the boat out. I believe there was a treatment on Carmens Bay that was effective. Could this be considered for Cooks Bay		X			X											
Social Pinpoint		The LMCD was informed years ago harvesting is a poor choice. Think about it. Plants you have pulled apart intentionally or not likely became multiple plants. Harvesters are similar. Broken pieces equal potential plants. The surface looks clean, until floaters, but there are now millions of pieces floating below. Unless your aquatic weed eater collects every piece you are contributing to the problem. Harvesting and shore cutting is a mistake. Benefits only shoreowners temporarily, Not The Lake.					X				X							
Social Pinpoint		lots of milfoil											X					
Social Pinpoint		milfoil way to much and to thick											X					
Social Pinpoint		The lake was weedy and didn't catch many fish.		X									X					
Social Pinpoint		Is there going to be harvesting? Black Lake is really bad. The kayaks can't move.		X			X	X					X					
Social Pinpoint		Will there be harvesting this year? The weeds are really bad in this area.		X			X	X					X					
Social Pinpoint		Weeds are so bad. Difficult to navigate.		X									X					
Social Pinpoint		I do not want any harvesting, not even private contracts, to be allowed.					X											
Social Pinpoint		A significant amount of vegetation, both long strands and cut pieces, floating into dock area several times past couple weeks.											X					
Social Pinpoint		Vegetation growth is thick this year.											X					
Social Pinpoint		We find the lake weeds an increasing problem in Smiths Bay. We have a mix of emersed weeds on the inside of our dock area near shore, submersed weeds all around our dock, and increasing amount of floating weeds, which I believe are submersed weeds cut by boat props in the shallow bay that float towards us and get caught up all around our dock. It's really becoming a mess...		X									X					
Social Pinpoint		Looks like they've harvested! What a difference! Thank you! We are able to enjoy the lake again!					X											
Social Pinpoint		I Like LMCD									X							
Social Pinpoint		Much more milfoil than I remember running parallel to enchanted island.											X					
Social Pinpoint		Vegetation thick in the west side of Phelps Bay. Also noted vegetation growing dense in other areas as well.											X					
Social Pinpoint		Significant amounts of primarily two weed types, assumed to be milfoil and curly pondweed											X					
Social Pinpoint		a lot of vegetation in the bay											X					
Social Pinpoint		As of last weekend, there is a large tree branch that hangs over the Coffee channel. When boats are going towards Crystal Bay they try to avoid hitting the tree branch and drive too close to the center of the channel. I am not sure if the homeowner on the channel is responsible for trimming this tree. This has been a problem before 4th of July. The branch needs to be trimmed and unsure if the LMCD can help. Thank you!		X							X		X					
Social Pinpoint		Dense algal growth. 6/6/2019											X					
Social Pinpoint		The weeds this year are worse than I've ever seen them! #1-It looks terrible! #2-It has ruined our recreational water sports for the summer. We can't get our jet skis through the weeds without getting them clogged up with weeds, having to jump out into the weedy water and pull them out from underneath.â¨Kayaking and paddle boarding are equally as difficult. Forget about swimming! The kids don't even want to tube or ski. Even the boat propeller gets all tangled up with weeds. It's a nightmare!		X									X					
Social Pinpoint		Channel off Lafayette Bay to West Point nearly impassable											X					
Social Pinpoint		Thick line of vegetation including millfoil											X					
Social Pinpoint		Thick vegetation along entire ridge across this entire bay making access to Upper Minnetonka Yacht Club and adjacent properties difficult.		X									X					
Social Pinpoint		Looks like a gator swamp											X					
Social Pinpoint		Vegetation growth is heavy- can you harvest											X					
Social Pinpoint		Eurasian Watermilfoil											X					
Social Pinpoint		Water is abnormal color and has no weeds. Is this due to chemical treatment.				X							X					
Social Pinpoint		So many weeds that my standup paddleboard rudder was getting caught		X									X					
Social Pinpoint		Worst year of weeds. We believe the decision not to harvest weeds in 2019 was a huge mistake and trust that you will consider and reverse that decision for the 2020 season.					X	X					X					
Social Pinpoint		We've spent a lot of money and time removing the lake weeds from our shore for swimming and to get our jet skis out without getting plugged up with weeds. Would like to see the bay being harvested and restored to a usable boating and swimming lake.		X			X											
Social Pinpoint		A lot of vegetation floating into shore this year.											X					
Social Pinpoint		Milfoil is bad in this area.											X					
Social Pinpoint		Football field sized weeds for 2 or 3 days. LMCD should harvest again.					X	X			X		X					
Social Pinpoint		Weeds are really bad this summer. Already removed five truckloads this past week. Not harvesting seems to have made things worse.					X	X					X					
Social Pinpoint		The weeds are usually bad in Cooks bat, but this is the worst year ever.											X					
Social Pinpoint		Harvesting this year? Vegetation is so bad that I can't get my boat out.		X			X	X					X					
Social Pinpoint		It is impossible to keep up with the floating weeds the boats produce. Lived here over 30 years and have never seen such a mess. In the past years harvesters would cut at least one time in the summer which would take care of the weeds growing above the surface in front of the docks.					X	X					X					
Social Pinpoint		Weeds should be harvested along southeastern side of Crane Island. It is a high usage area.		X			X											
Social Pinpoint		The LMCD did such a beautiful job in past years. My neighborhood and I are disappointed LMCD is not harvesting this year. I don't feel like I can even swim because it's dangerous with the weeds.					X	X			X							
Social Pinpoint		I am in favor of harvesting in Harrsions Bay					X											
Social Pinpoint		Milfoil											X					
Social Pinpoint		Milfoil yuck											X					

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Social Pinpoint		Lived here 22 years. This year was the worst build up and accumulation of floating weeds by far. I've always thought it was the water current along the point that kept weeds moving, but this summer I realized what a significant benefit LMCD harvesting provided. Please bring back the harvesters.					X	X			X							
Social Pinpoint		Weeds floating after private harvester went through.					X						X					
Meeting with LMA	6/14/2019	Starry stonewort inspections should be all public & private boat launches	Eric Evenson		X				X									
Meeting with LMA	6/14/2019	Need a list of all private accesses- these could be at some multiple dock permit areas	Eric Evenson		X													
Meeting with LMA	6/14/2019	Who should take lead on AIS- MCWD makes sense but not interested, DNR is other option	Eric Evenson									X			X			
Meeting with LMA	6/14/2019	Flowering Rush- harvesting spreads it, as evidenced in Detroit Lakes.	Eric Evenson				X											
Meeting with LMA	6/14/2019	Need a way to have lake wide treatment of EWM	Eric Evenson			X	X											
Meeting with LMA	6/14/2019	Need to identify where weeds are being treated and what species- plan for long term	Eric Evenson										X					
Meeting with LMA	6/14/2019	MCWD had a good plan for AIS- but no longer has interest in AIS	Eric Evenson									X			X			
Meeting with LMA	6/14/2019	Federal CWA- does/should classify ZM as a pollutant. Since there are no native mussels left in the lake the ZM meets the definition as a toxic pollutant.	Eric Evenson										X					
Meeting with LMA	6/14/2019	State Law MN Rule 6820 states that all harvested plants must be removed- need clarification directly from DNR on this. Eric thinks harvesting is illegal. https://www.revisor.mn.gov/rules/6280.0250/	Eric Evenson										X					
Meeting with LMA	6/14/2019	https://www.revisor.mn.gov/rules/6280.0350/	Eric Evenson										X					
Meeting with LMA	6/14/2019	Channels do not need harvesting- need a definition of channel	Eric Evenson				X											
Meeting with LMA	6/14/2019	Residents are the biggest beneficiary of harvesting- most boaters just go to open water and not mess with weedy shorelines	Eric Evenson	X			X											
Meeting with LMA	6/14/2019	A great role for LMCD is to collect cut and senesced plants. They need a collector, not a harvester	Eric Evenson								X							
Meeting with LMA	6/14/2019	Minnetonka needs a Lake Manager- LMCD not currently in position to manage the lake, however it could be an LMCD staff person with the right expertise, scientific background, etc.	Eric Evenson								X	X						
Meeting with LMA	6/14/2019	Lake Minnetonka is an huge economic engine	Eric Evenson							X								
Meeting with LMA	6/14/2019	See Dick Osgood's paper on watershed activities.	Eric Evenson										X		X			
Meeting with LMA	6/14/2019	Funding base	Eric Evenson							X								
Meeting with LMA	6/14/2019	Legislation to ask for more money	Eric Evenson							X								
Meeting with LMA	6/14/2019	Reorganize as a JPA under 103B, 14 cities as a JPA	Eric Evenson							X								
Meeting with LMA	6/14/2019	Lakewide LID- 2 more now 2 more coming. Is it fair for owners to pay for all lake users?	Eric Evenson							X								
Meeting with LMA	6/14/2019	Petition projects to WD- LMCD does not need to bond- if WD says no they can just go to legislature	Eric Evenson							X								
Meeting with LMA	6/14/2019	Is AIS control worth it? If EWM is cut the beetle cannot do its work. Bluegills also eat the beetles.	Eric Evenson												X			
Meeting with LMA	6/14/2019	Should we try to control invasive natives?	Eric Evenson												X			
Meeting with LMA	6/14/2019	The West Pioneer History Museum in Maple Plain has an incredible history of Lake Minnetonka. Everyone should go there.	Eric Evenson											X				
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Eurasian watermilfoil (EWM) was discovered in Lake Minnetonka in the late-1980s. This was a call to action for the community and its first and most enduring effort was the harvesting program. At the time, there were no feasible alternatives	Gabriel Jabbour													X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Harvesting is more commonly employed around the nation for invasive plant nuisances other than EWM (such as hydrilla and water hyacinth). Harvesting for EWM control is more common in the Midwest states, but only in a small percentage of EWM-infested lakes, and mostly small-to-mid-sized lakes. In this context, Lake Minnetonka stands out, so guidance based on other harvesting programs is either lacking or not applicable. A logical remedy would be to use the decades of observations and experience of Lake Minnetonka's harvesting program to focus its future program. Unfortunately, very little useful information or program metrics have been collected. Specifically, we have little or no systematic, objective information or data regarding: • How EWM or other matting plants interfere with navigation, safety, etc. • What plant species contribute to navigation problems	Gabriel Jabbour				X						X			X			
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	* Missed Opportunity – The LMCD suspended the harvesting program in 2019, which presented an opportunity to systematically evaluate how nuisance vegetation in Lake Minnetonka, especially in historically harvested areas, interfered with navigation or posed other nuisances, so an objective evaluation could have been made. The LMCD did create an 'express your concern' tool on their website. However, this largely anecdotal and, as of this writing, had received only: • One idea/suggestion concerning a fallen tree branch • Three suspected AIS sightings – all regarding EWM in known EWM areas • About 25 'excessive plant growth' notes • About 7 comments, and • One 'Something I like' – "I like LMCD" posted over the LMCD office location	Gabriel Jabbour				X	X			X					X			
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	The stated purpose of the EVALUATION includes defining aspects of a successful harvesting program, identifying the program's strengths and weaknesses, and recommend aspects of the program that should continue or be improved. As well, the EVALUATION will also identify short- and long-term quantifiable goals for the program. The EVALUATION falls far short in these regards. It is more of a program summary than an evaluation. Strengths, weaknesses and improvements are simple listings of harvesting in general rather than specific to the future needs in Lake Minnetonka. And the recommended goals are descriptive, vague and not quantifiable.	Gabriel Jabbour				X						X			X			
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	** Should the LMCD consider continuing a harvesting program with program costs projected to increase to $358,000 per year (double current costs),	Gabriel Jabbour				X			X						X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	1. The LMCD's harvesting program has been in existence for three decades and this is the most substantial program evaluation to-date.	Gabriel Jabbour				X									X		

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Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	2. This program evaluation presumes that the harvesting program will remain in place and be substantially unchanged in scope. This is ill-advised because a) other techniques, technologies and strategies that were not practical or feasible in the early-1990s (when the harvesting program was initiated) are now available and should be evaluated for comparison, b) other nuisance plant management activities are occurring on Lake Minnetonka, so a more comprehensive management plan (which is being developed and harvesting could be an element) ought to include coordination with the harvesting program and c) in light of 'a' and 'b' above, it is likely that the harvesting program may need modifications in scope or scale.	Gabriel Jabbour				X									X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	3. The existing program's goals are to a) ensure safe navigation, b) retard the spread of AIS to other lakes (from Lake Minnetonka), c) reduce the biomass in the lake and d) provide an alternative to other AIS management methods (page 3). There are serious shortcomings with respect to evaluating the program. They are: • Except for perhaps reducing biomass, the harvesting program has collected no data or provide no metrics to evaluate these goals. • There are confusing and conflicting references to whether the program focuses on milfoil, AIS-plants or nuisance native plants (or some combination). • Milfoil and other mat-forming plants are generally not unsafe for navigation, although they can and often are inconvenient. • Neither this program nor any other has evaluated whether or to what extent the harvesting program has reduced the spread of AIS (milfoil, AIS plants, AIS in general, ???) to other lakes. • If this program is providing alternatives, there is no evaluation of what alternatives are available, in what situations they are feasible, who they are available to, etc	Gabriel Jabbour	X			X							X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	4. If it is intended that this evaluation is to be an element of a larger lake vegetation plan, it should be included in an evaluation of alternatives and a description of coordination with other programs. Pending that, this evaluation is incomplete or premature	Gabriel Jabbour													X		X
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	5. I assume this evaluation is intended to support a future program to manage nuisance plants (the Vegetation and AIS Master Plan). A serious flaw in the existing program as well as in this evaluation is the lack of measurable program objectives	Gabriel Jabbour													X		X
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	6. Navigation appears to be the main program goal, yet no efforts have been made to objectively or systematically evaluate whether, when, where or how nuisance plants are problematic or whether or to what extent the harvesting program has mitigated those impacts. How well has the harvesting program met a real need?	Gabriel Jabbour	X												X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	7. The existing program has been operated by non-professionals. Given the size, significance and visibility of Lake Minnetonka as well as the complexity of managing nuisance plants for multiple objectives, the future program must include a professional lake manager with day-to-day responsibility for evaluating plant populations, coordinating with permitting agencies, directing operational activities and evaluating program efficacy. The LMCD has had advisory committees, but they have had no specific authorities or critical, consistent oversight. This position should be a critical element of the future management program.	Gabriel Jabbour								X					X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Purpose 1 – talks about aspects of a 'successful' harvesting program. It is more proper to refer to an 'effective' program and program efficacy ought to be keyed to clear goals and measurable objectives.	Gabriel Jabbour				X									X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Purpose 2 – identify strengths and weaknesses – as with the comment above, strengths and weaknesses ought to be keyed to clear goals and measurable objectives as opposed to generally.	Gabriel Jabbour													X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Purpose 3 – refers to recommendations for sustaining or improving the harvesting program. I understand the Aquatic Vegetation Harvesting Program Evaluation, is to be an element of the more comprehensive Lake Minnetonka Vegetation & AIS Master Plan. As such, an evaluation of harvesting as a tool for the overall management of AIS (plants) could include the possibility of suspending harvesting should other techniques and strategies be found to more effective at achieving the lake's overall AIS management objectives.	Gabriel Jabbour				X									X		X
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Stated program goals. Are to 'ensure safe navigation for lakeshore owners and the general public, reduce the amount of aquatic invasive species (AIS) available to spread by boaters and other means throughout the busy season, reduce biomass in the lake, and provide an alternative to other AIS management methods where they are not feasible or desired.' These goals are not evaluated.	Gabriel Jabbour	X		X	X						X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Section 3.3 Staffing. Nowhere in this section describes or refers to operational staff identifying EWM, curlyleaf pondweed (CLP) or nuisance native plants at or near matting conditions and thus in need of mitigation. In addition, nowhere is there reference to identifying protected plants or other AIS plants that could be spread by the harvesting.	Gabriel Jabbour				X				X					X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	The section describes staffing matters, such as equipment, training and safety. Numerous concerns have been raised – these are summarized in the appendix.	Gabriel Jabbour								X					X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Financial summary. This section provides and average cost of the harvesting program based on total acreages as provided in table 7 ($514/acre). However, the total acreages include second cuts, thus these are double counted for a given season. For example, in 2010, 126 acres (33%) of the total 384 acres were second cuts – but the total acreage harvesting that year was 258 acres. On this basis, the average seasonal cost increases to $765/acre.	Gabriel Jabbour				X			X						X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	The comparison between tables 7 and 8 estimates that continuing the LMCD's existing program with no changes will result in a doubling of the annual program budget. One would expect this would entail an explanation and justification, yet none are provided.	Gabriel Jabbour							X						X		

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Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Cost comparison. This assessment presumes that using a private contractor for harvesting operations will entail harvesting the same acreage as the LMCD's historical program. This assumption should also be evaluated in the cost comparison. This also presumes that LMCD's historical averages represent the totality of the navigation problems on Lake Minnetonka. Due to the limited harvesting season (mid-June through mid-August) it is likely there are nuisance areas where the large-sized harvesters cannot reach or there are areas where nuisances develop later in the season. Thus, this cost comparison is of limited value when expanding considerations to overall efficacy of nuisance control on Lake Minnetonka.	Gabriel Jabbour				X			X	X					X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	(Table 8) – The EVALUATION projects substantial program cost increases for the next 20 years, due largely to the need for equipment replacement. The projections assume no change in program operations. According to these projections, the average annual program cost will double to $358,000 per year compared to current program costs (from table 7). On a per acre basis and adjusted for second cuts, the annual average projected costs will be over $1,500/acre!	Gabriel Jabbour							X						X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	This section, Existing Program Evaluation, lists numerous program shortcomings, including: • The program is 'reactionary' • "The LMCD does not have a clear plan …" • The program does not us GPS – resulting in poor, imprecise operational data • The is no evaluation of post-harvesting efficacy • The is reference to areas where herbicides are prohibited, but neither the areas nor the prohibitions are detailed • It mentions that areas of frequent re-harvesting may be candidates for herbicide treatments, yet does not consider or evaluate herbicides This paints a damning portrait of a slipshod program. Worse yet, none of these shortcomings are proposed to be remedied in a meaningful, substantial manner in the EVAUATION. Instead, it is recommended the harvesting program be continued.	Gabriel Jabbour			X	X				X		X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Aspects of a successful harvesting program. This section lists 7 bullets: • Defining realistic goals – but no meaningful program goals are included in recommendations. • Efficacy of harvesting equipment – it is unclear what this means. • Seasonality, frequency and duration of harvesting – Now much of this is keyed to seasonal staffing availability. This is not evaluated nor are recommendations included. • Distribution and abundance of plant species being harvested – This knowledge would require systematic surveys using qualified experts. No recommendations included. • Funding and community support – Agreed, but not evaluated here. • Public relations – No comment. • Accurate data on harvesting timing and location. No comment. This section as well as follow-up sections are weak and mostly lacking on specifics.	Gabriel Jabbour				X			X			X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Second advantage. States that herbicides allow plants to decompose in place and lowers oxygen. With the baywide herbicide program, there is an abundance of data refuting this – early treatments involve small, pre-emergent plants (so there is little biomass to decompose) and oxygen conditions are unaffected.	Gabriel Jabbour			X										X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Third advantage – For the reasons stated as well as LMCD-cited studies, nutrient removal is insignificant. So, this is not an advantage.	Gabriel Jabbour				X						X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Sixth advantage – Refers to 'perceived' environmental neutrality of harvesting and 'concerns' of toxicity. However, evidence supporting or refuting either is lacking, so this is an irrelevant, misleading comparison.	Gabriel Jabbour				X						X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Disadvantage four – Refers to by-catch, but rationalizes that a small harvested area poses minimal concern. More critically, other advantages/disadvantages make comparisons to herbicides. If herbicides have perceived impacts, the small area would be similarly of minimal concern. I am aware of no evidence of non-target impacts using herbicides.	Gabriel Jabbour			X										X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Disadvantages 7 & 8 – I am not sure these are disadvantages, rather a cost of the overall program.	Gabriel Jabbour							X						X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Effectiveness of control (#2) – The baywide herbicide program has practically immediate efficacy, as treatments are done before the plants have grown, so they are not problematic to start with.	Gabriel Jabbour			X										X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Effectiveness of control (#5) – This is accurate. However, we do not know what percentage of the harvesting program involves channels. This is a significant shortcoming of the program	Gabriel Jabbour				X									X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Effects on non-target organisms or ecosystems (#5) – States the potential for effects with herbicides. However, as herbicides are registered with the EPA and permitted by the DNR, it should be noted that any 'potential' effects are deemed acceptable by regulatory agencies.	Gabriel Jabbour				X									X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Case Studies (Positive Outcomes) Olson et al. 1998 – This study evaluated the impact of harvesting on the growth rates of bluegill and largemouth based following mechanical weed harvesting and found a temporary increase in the growth rate of some age classes. However, it should be noted: • These increases were temporary. • The harvesting involved 20% of the lakes' littoral area in an aggressive and unusual pattern not used in Lake Minnetonka (see photos from the paper). This case is of limited applicability to Lake Minnetonka.	Gabriel Jabbour				X						X			X		

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Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Phosphorus removal by plant harvesting on Lake Minnetonka (2004) – This study found that harvested (and removed) plants accounted for 2-4% of the total phosphorus inputs to Lake Minnetonka. The study found "in the short term, removal of phosphorus through plant harvesting is not a viable water quality improvement technique" and "the long-term effect of annual plant removal on a large scale on water column phosphorus concentrations has not been determined." Here too, a comparison with the baywide herbicide program would be illustrative. As noted above, because the baywide herbicide program aims at pre-emergent plants, they would not have had a chance to take up phosphorus and therefore do not present a potential contribution to the lake water. The study notes that phosphorus 'mining' from the lake sediments is a theoretical possibility, but which has not been evaluated.	Gabriel Jabbour				X						X				X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Bartodzeil et al. (2017) – This study evaluated phosphorus removal contained in plants in a small (12-acres), shallow (max depth = 3.6-feet) lake containing no EWM or CLP. This case has minimal applicability to Lake Minnetonka.	Gabriel Jabbour										X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Lake Noquebay Rehabilitation District (2009) – This is a section of a management plan's goals, but it contains no evaluation of outcomes.	Gabriel Jabbour										X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	EWM as a Fisheries Management Tool (1995) – The link is to an abstract of an article in the Journal, Fisheries. The gist of the article is that EWM can be beneficial to fisheries in some lakes lacking abundant or diverse native plants. The article refers to cases where EWM infestations could be beneficial to fisheries and has no reference to or evaluation of harvesting or any other EWM controls.	Gabriel Jabbour										X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Overall – the positive case studies provide poor support for possible positive outcomes as applicable to lake Minnetonka.	Gabriel Jabbour										X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Case Studies (Negative Outcomes) Three cases are listed. Overall, they provide documentation of possible negative impacts of harvesting. On balance, while credible, these cases and concerns do not tip the scale against harvesting in Lake Minnetonka Three cases are listed. Overall, they provide documentation of possible negative impacts of harvesting. On balance, while credible, these cases and concerns do not tip the scale against harvesting in Lake Minnetonka.	Gabriel Jabbour										X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Check the math – 346 of 5,850 acres is about 6% of the littoral area of Lake Minnetonka. The paragraph on this page also recommends identifying and protecting critical areas from harvesting. Areas with Flowering rush should also be included (see additional comments below).	Gabriel Jabbour				X						X			X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	The intro paragraphs recommend the harvesting program should continue and be evaluated as part of a comprehensive integrated management approach. This is self-contradictory. A future-oriented evaluation of an integrated plant management program should include, consider and evaluate all control elements first, then it can evaluate the aptness, efficacy and feasibility of individual elements next. For example, I can think of feasible and effective alternatives to controlling nuisance plants in 346 acres of Lake Minnetonka using contact herbicides, just as many lakeshore owners now do. At about $150-200/acre per season, this is far cheaper (total cost: $51,900 - 69,200 vs. $173,430 – 2008-2018 average; or $358,114 – projected 20-year average), has season-long control (vs. partial season), has minimal off target impacts (in the same way as possible negative impacts of harvesting), and involves no staff or capital equipment. This possibility has even been presented to LMCD staff by MN DNR staff.	Gabriel Jabbour				X			X						X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	On a more practical note, why would the LMCD consider retaining the harvesting program, including a planned purchase of a replacement harvester in 2020, when the projected annual costs will double (20-year projection from Table 8) but funding commitments to support this program do not appear to have been secured? This is especially noteworthy as the actual program costs have steadily fallen for the past 20 years or so. Goal 1 – Increase Transparency – I have no criticism of transparency, however this does not address the EVALUATION's purpose and is not quantifiable. Goal 2 – Define and prioritize harvesting priorities – this makes sense. Let's see them.	Gabriel Jabbour				X			X						X		

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Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Targeted areas for harvesting, comments keyed to each of the 7 bullets in the plan: • Areas where vegetation impeded navigation – ought to have a quantifiable metric to objectively determine. [Side note: there is confusion throughout regarding whether harvesting targets nuisance vegetation, EWM or ???] • Areas where herbicides are not effective. This requires additional evaluation into the underlying assumptions. There also may be alternatives other than herbicides (for example, hand-pulling or bottom barriers for which variances can be granted). • Areas where herbicides may be undesirable – again, re-check underlying assumptions. Herbicides are allowed and can be effective in swimming areas. Also, there may be other alternatives. • Areas with dense natives (plants) – Makes sense. Where are these areas? • Areas where there may be EWM hybridity and herbicide resistance – This would be more applicable to 'selective' as opposed to 'contact' herbicide. See previous comments on contact herbicides. • Areas where plants accumulate and can be collected – Makes sense, although there may be other feasible options. The final paragraph of the section on short-term goals recommends an individual with aquatic plant experience should supervise the harvesting operations. Further, it suggests that AIS detector training is sufficient to meet this qualification. I disagree. AIS detector training is not adequate training for this task.	Gabriel Jabbour			X	X									X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Native Plant Community Restoration is offered as the sole long-term goal. Again, this is descriptive and not quantifiable. While the sentiment is laudable, if it only applies to harvested areas (6% of the littoral area) its positive impact is 'minimal' in the same way as possible negative impacts of harvesting. To be meaningful, this goal should be applicable to the entire lake and weed management program (with quantifiable, measurable objectives).	Gabriel Jabbour													X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Flowering Rush Flowering rush (FR) has been in lake Minnetonka for a decade or so. It appears to be relatively slow spreading, but it is spreading nonetheless. There are two concerns with FR: 1) the possibility that mechanical harvesting can facility its spread and 2) an imprecise or incomplete knowledge of its locations. Regarding its spread, FR is a perennial plant that grows largely submersed until later in the season. While it reproduces by a number of mechanisms, dislodging and fragmentation of its rhizomes can occur due to mechanical actions, such as harvester cutter bars or paddlewheels. FR is practically impossible to identify in its submersed form, which exists at the time harvesting operations are occurring. It should be noted that other mechanical agitation (such as boat props) may also facilitate the spreading of FR. It is prudent to avoid known areas of FR in all cases. Precisely identifying areas where FR is growing requires intensive monitoring. As a recent example illustrates, a broad-scale survey is likely to miss what a more intensive survey picks up. The two illustrations below provide a useful comparison. The first figure is a screen shot from LMCD's website of FR occurrences around Big Island based on "all documented locations (FR locations are indicated with pink stars)." Compare this with a more detailed survey conducted on September 26, 2019. Here FR, indicated by green dots, is seen to be distributed in additional areas around Big Island. Future harvesting operations, to most effectively avoid FR areas, should conduct comprehensive, more intensive pre-season surveys to have the best knowledge of FR locations and avoid harvesting in these areas (plus a reasonable buffer). There is evidence that harvested areas have overlapped with known FR areas. FR maps , copied from 2009, 2012, 2015 & 2016 are shown below: Here is the LMCD harvesting map from 2018: By comparing these maps, there are areas of overlap between the harvesting and areas of known FR, especially in Browns, Crystal, Lafayette and Smith Bays and around Big Island (harvesting maps from several earlier years show similar overlaps with FR). As noted in the 2018 harvesting map legend, areas with FR were not harvested. However	Gabriel Jabbour													X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Fragments Floating plant fragments are generated by the harvesting operations. To my knowledge, no systematic study has been done to accurately know how or how effectively various mitigation efforts have been. Such an assessment should be included in future harvesting operations, and if found to remain problematic, effective mitigations methods should be identified and implemented.	Gabriel Jabbour													X		

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Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Short Season The harvesting program has historically operated from mid-June through mid-August, sometimes with holiday breaks. However, EWM (and other mat-forming weeds) continue to grow and be problematic for navigation through September. Thus, harvesting operations miss about 40% of the boating season while navigation impediments are still occurring. In addition, due to the sequential nature of the harvesting operation, approximately half the seasonal treatment areas are unharvested until midsummer (about mid-July). In addition, curlyleaf pondweed (CLP), an identified nuisance within the harvesting program, often forms mats as early as late-April. So, it is possible that CLP matting and therefore navigational impediments occur for significant parts of the boating season prior to the initiation of harvesting.	Gabriel Jabbour													X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Large Scale Inefficiencies Due to the large size and complexity of Lake Minnetonka, logistics of harvesting are inefficient compared to other programs. For comparison, Lake Minnetonka's harvesting program cuts and average of 346 acres per season, including about 1/3 as second cuts. Thus, total acreage treated is about 231-acres. This represents and intensity of 77 acres per harvester per season. For comparison, the Minneapolis Park Board harvests about 180-acres in 4 lakes (Bde Maka Ska, Cedar, Harriet and Isles) using 2 harvesters, representing an intensity of 90 acres per harvester per season. However, the Minneapolis program operates from late-May through August and performs second and third (sometimes) cuts per season (compared to LMCD's 1.3 cuts per season), so they are achieving about 50- to 230% more control. Lake Minnetonka's size and complexity, which obviously will not change, renders the harvesting program inefficient compared to other programs on smaller lakes.	Gabriel Jabbour									X					X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	New Invasive Plants and Spreading The Minnesota Aquatic Invasive Species Research Center lists 9 species of invasive plants not yet in most Minnesota waters in two categories: Species localized in MN but that have spread and caused high impacts nearby: • Brittle naiad • European common reed • Flowering rush (now in Lake Minnetonka) • Starry stonewort Species not yet in MN but arrival is likely imminent and impacts likely to be very high: • Hydrilla Species not likely to be in MN but have spread and caused impacts in inland waters of other cold- temperate regions (likelihood of establishment in MN uncertain): • Water chestnut • Yellow-floating heart • Cabomba • European frog-bit If/when any of these (or perhaps others not now on the radar) should be introduced and become established in Lake Minnetonka, there is a possibility for harvesting to facilitate or accelerate their spread. This 'disadvantage' should be recognized in the EVALUATION as well as in future harvesting operations.	Gabriel Jabbour													X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	Program Inflexibility The harvesting program has, and proposes to continue, with three harvesters operating on a truncated season over a large lake. This situation is not necessarily a critical limitation, assuming the harvesting needs are relative constant from year-to-year and these needs have been met over the years. However, neither has been objectively evaluated, so harvesting is done to the limits of the equipment within the prescribed season. Unless the program is evaluated and found to be a near-perfect match to the needs or if the needs change, the program will risk being inefficient, insufficient or not be well able to accommodate future needs.	Gabriel Jabbour				X									X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	1) Your title "AIS Master plan" is misleading. The average uninformed person would think the only problems we have confronting us are milfoil and possibly starry stonewort. Equally as disturbing is the total lack of addressing prevention in the master plan.	Gabriel Jabbour															X
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	2)The vast knowledge available to the LMCD from other agencies was not used, either to input, or in formulating this report. Having so-called committees such as TAG that met only once without any chance to assist the consultant in formulating their opinions.	Gabriel Jabbour											X		X		
Letter to LMCD (Aquatic Vegetation Harvesting Program Evaluation)	10/18/2019	3) The issue of implementing the program and the qualification of the staff was to be addressed. There was not even an attempt to do so. As a matter of fact, that has a profound effect on the financial projection. Thus, making the financial projection greatly underestimated if the LMCD decides, as former Chair Green indicated, to run a professional program.	Gabriel Jabbour													X		

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Letter from LMA	10/25/2019	The Lake Minnetonka Association (LMA) feels the Aquatic Vegetation Harvesting Program Evaluation lacks any useful information or meaningful guidance on how to implement a "professionally run" harvesting program.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	The most glaring omissions of the evaluation include its failure to: - Define how it fits within the "Lake Minnetonka Vegetation and AIS Master Plan," - Provide measureable goals and objectives of the harvesting program, - Address the role that harvesting has on the spread of invasive plants, - Include an quantifiable assessment of the impact that almost 40 years of harvesting has had on navigation, - Define the parameters of where, how often, and when harvesting should be done, and - Explain why significantly less costly options are not recommended.	Eric Evenson				X								X	X		X
Letter from LMA	10/25/2019	The plan is lacking in specifics and thoughtful analysis of the existing program and is absent of any useful recommendations on how to improve the program. As such, we are lead to the conclusion that this was simply a multi thousand dollar effort by the LMCD to justify an existing, poorly conceived, and badly operated harvesting program.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	The planning process excluded any meaningful opportunities for experts in AIS and lake management, stakeholders, the LMA, or agency staff to deliberate recommendations or to share insights or concerns about the LMCD's harvesting program. As a result, the LMCD has lost an opportunity to create a program with broad stakeholder and community support and which addresses concerns of lake residents and resource managers.	Eric Evenson				X							X	X	X		
Letter from LMA	10/25/2019	The LMA believes the Aquatic Vegetation Harvesting Program Evaluation recommendations are not in the best interest of the Lake Minnetonka, its users, or its residents and should not be accepted until the enclosed concerns are adequately addressed.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	The plan fails to demonstrate how the harvesting plan fits within an overall AIS management strategy for Lake Minnetonka. As noted at the beginning of this process by stakeholders, aquatic plant specialists, and LMCD Board members, the overall AIS management plan should drive the harvesting plan. Without first knowing the LMCD goals and strategies to control the spread of AIS it is unclear if the harvesting program would complement or confound those goals. This is clearly the cart in front of the horse.	Eric Evenson				X							X		X		X
Letter from LMA	10/25/2019	The plan fails to contain any guidance on where, why, and when the LMCD should harvest Eurasian water milfoil (EWM). Without this information the cost analysis, operations, and program effectiveness cannot be determined. It is unclear why the LMCD ignored the very basis of why this program was originally proposed. Neither does the plan evaluate where, or if harvesting has made a measurable positive impact on navigation on Lake Minnetonka.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	The plan fails to address the impact the LMCD's harvesting program has on the spread of AIS and what steps are needed to prevent this from continuing. Early in this process, stakeholders and agencies expressed concern of the potential for the LMCD's harvesting program to spread AIS such as starry stonewort and flowering rush. The plan does not have any recommendations for harvester training or operational changes needed to prevent the spread of AIS.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	The plan fails to identify lower cost and more effective options to harvesting. The plan states that harvesting is often higher than herbicides treatment. This has been confirmed by MnDNR and industry experts. The cost of treatment is half of the cost of harvesting and decreases over time. Additionally, MAISRC researchers and others have found that native plants are being restored in areas that have been treated.	Eric Evenson			X	X			X						X		
Letter from LMA	10/25/2019	The plan fails to give any guidance on ways to reduce the amount of Eurasian water milfoil and other plant fragments that are left behind after harvesting. It is acknowledged by LMCD staff, professional harvesters, and others that it is not possible to pick up all of the fragmentation caused by harvesting. It is well documented that fragmentation is the primary way of EWM and other AIS are spread. There is also good evidence showing the harvesting program contributed to the spread of flowering rush in Lake Minnetonka and concern that harvesting has a high risk of spreading starry stonewort across Lake Minnetonka.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	The plans fails to provide any direction on how harvesting areas will be determined from one year to the next. It is unclear why the costs and procedures to evaluate program performance and to determine where EWM should be harvested from year to year are not included in this plan.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	The plan fails to provide an adequate discussion of personnel qualifications and cost, training, safety procedures, and equipment needs as requested by the LMCD Board in their 12/12/2018 resolution. The LMCD was provided an operations manual of the Minneapolis Park and Recreation Board's (MPRB) harvesting program. Given that this is likely the only comprehensive harvesting plan available in the state, it is unclear why it was not referenced in the LMCD's plan.	Eric Evenson				X					X				X		
Letter from LMA	10/25/2019	The plan fails to include any recommendations on staffing needs. It is unclear if the LMCD feels the program is understaffed or overstaffed or if staff has adequate training. It is surprising the LMCD feels experience with watercraft and watercraft operator permits are "preferred" rather than "required" job qualifications. The plan indicates the harvesting supervisor and seasonal help have "lake service provider permits." There is no evidence that harvesting staff have ever been permitted. While the aquatic plant specialists recommend harvesting be done later in the season when EWM is closer to the surface, the plan seems to support the practice of hiring seasonal help early in the season and ending the program in mid-summer. The LMCD has expressed interest in hiring AIS expertise. The plan gives the board an opportunity evaluate if the current staffing structure has the skills they need in AIS.	Eric Evenson				X				X					X		
Letter from LMA	10/25/2019	The plan fails to provide an evaluation of the strengths and weaknesses of the current LMCD harvesting program. Rather, the majority of the material provided is a summary of the existing harvesting program or citations of research with limited applicability for Lake Minnetonka.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	The plan fails to justify the expenditure of $690,000 for new harvesting equipment when much less expensive, science based options are available that provide better short term and long term results.	Eric Evenson				X			X						X		

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Letter from LMA	10/25/2019	The Aquatic Vegetation Harvesting Program Evaluation references studies that show the effects of harvesting lasts somewhere between 3-6 weeks and have found later season harvesting may have more beneficial long-term effects. It is unclear why the program evaluation does not develop recommendations based on this research.	Eric Evenson				X						X			X		
Letter from LMA	10/25/2019	The financial analysis of the harvesting program is based an average of 346 acres harvested per year at a cost of $512/acre. However, because the plan fails to address where or how much should be harvested, it is not possible to determine if it is cost effective to continue the program in house. Further, these costs assume the LMCD will continue to hire untrained, seasonal help. By first determining how many acres will be harvested and how often, the LMCD could more easily staff time and trucking and operational costs. A better understanding of the amount of acreage that will be harvested.	Eric Evenson				X			X						X		
Letter from LMA	10/25/2019	The cost comparison does not consider other options nor if it continues to make sense for harvesters to cut in the same areas as in the past or at all. As written, the plan is defining a problem to fit a solution.	Eric Evenson				X			X						X		
Letter from LMA	10/25/2019	It is unclear why the plan does not recommend herbicide treatment. The cost of herbicide treatment is $150-200 per acre – ½-2/3rd less than what the LMCD is currently spending. It would also reduce the amount of day-to-day management needed.	Eric Evenson			X	X			X						X		
Letter from LMA	10/25/2019	The plan referenced "boater safety" as a reason to continue harvesting. While EWM can hinder boating, it is unclear what safety issues are resolved by cutting. Concerns about harvesting spreading AIS, operator safety, and homeowner costs association with clean-up after harvesting were raised by several stakeholders. They should be added to this last and further discussed in this plan.	Eric Evenson	X			X									X		
Letter from LMA	10/25/2019	Defining realistic goals So what are the goals? A thoughtful planning process should describe the goals, strategies, and costs for program implementation – this document does none of these.	Eric Evenson				X								X	X		
Letter from LMA	10/25/2019	Efficacy of harvesting equipment The plan recognizes all of the equipment with the exception on one harvester needs to be replaced. It seems it is an ideal time for the LMCD to redefine program goals and determine if such a large public expenditure is warranted. Equipment is only as good as its operators. It is unclear why the LMCD does not list trained, professional operators as an aspect of a successful harvesting program.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	Seasonality, frequency and duration of harvesting Agreed, but the LMCD schedule of harvesting is related to when seasonal help are available rather than when harvesting makes the most sense.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	Distribution and abundance of plant species being harvested How often will this be done and at what cost	Eric Evenson				X									X		
Letter from LMA	10/25/2019	Funding and community support This should be done as part of the evaluation of the program. The LMCD has called stakeholders "bullies" and have been adversarial rather than working with those critical of the harvesting.	Eric Evenson				X							X		X		
Letter from LMA	10/25/2019	The following statements are misleading: "Harvesting takes the plant material out of the water so the plants do not decompose slowly in the water column as they do with herbicide treatment." Herbicide treatment will kill plants, preventing regrowth. Cutting encourages regrowth, leaving as much (or more) plant material to "slowly decompose in the water column." Arguably, treatments prevent plants from growing or returning the following year – so plant decomposition is moot. "Mechanical harvesting is perceived to be environmentally neutral by the public whereas concerns over the safety and long-term toxicology of herbicide applications remain despite widespread research and registration requirements that are enforced by regulatory agencies." So an uninformed public is cited as an advantage to the harvesting program? There are also public who feel the relative risk and benefits associated with herbicide treatments outweigh perceived concerns. There are also public who view the harvesting program very negatively. It's not clear why this statement is included in the plan.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	The following should be added to the list of disadvantages of harvesting: - Potential to spread AIS. - Significantly higher cost as compared to herbicide treatment. - Fragmentation of EWM will continue to spread new plants in beaches and other into areas where homeowners are spending thousands of dollars to control plants though hand weeding or herbicide treatment.	Eric Evenson			X	X									X		
Letter from LMA	10/25/2019	The plan recommends that the LMCD continue its harvesting program. Yet, the plan does not specify in what form. Without an understanding of why, where and when harvesting should be done, it is not possible to determine if this should be done in-house, contracted, or if done at all.	Eric Evenson				X									X		
Letter from LMA	10/25/2019	The plan itself makes a better argument for a very limited harvesting program and makes a strong case that herbicide treatments have longer positive impacts and are more cost effective.	Eric Evenson				X									X		
Letter from MCWD	10/25/2019	The Minnehaha Creek Watershed District (MCWD or District) supports the LMCD's intention, as outlined in the agency's May 24, 2019 press release, to cultivate a "holistic and scientific approach to effectively address the current and future health of Lake Minnetonka", by developing "a dynamic and comprehensive plan."	James Wisker													X		
Letter from MCWD	10/25/2019	The MCWD wishes to again express significant concerns with the lack of clarity regarding LMCD's overarching goals with egards to its Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Master Plan (Plan), the process being used to develop the Plan, the role of the Technical Advisory Group TAG), and the lack of coordination with agencies such as CWD that the LMCD has now written into its draft documents.	James Wisker											X	X	X	X	X
Letter from MCWD	10/25/2019	During the only TAG meeting, kicking-off this process on July 15, 2019, the LMCD received universal feedback from the members of the advisory group regarding the ambiguity and nconsistencies surrounding the Plan goals and process. This eedback was subsequently echoed in writing, by multiple members of the TAG.	James Wisker											X		X	X	

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Letter from MCWD	10/25/2019	In response, the LMCD committed to providing clarity on these tems at a subsequent meeting of the TAG. However, leading up to the October 11, 2019 distribution of the Harvesting Evaluation and Starry Stonewort Plan, no additional meetings were held to provide the overarching clarity needed to effectively and eaningfully engage the LMCD's Technical Advisory Group. Moreover, the LMCD did not effectively communicate its intent to develop and release the Harvesting Evaluation or Starry Stonewort Plan prior to meeting again with the TAG.	James Wisker											X	X	X	X	
Letter from MCWD	10/25/2019	The LMCD has been encouraged by the TAG to take a strategic planning approach to successfully map its involvement in AIS, by: ⍰ Clearly stating its vision and mission related to AIS ⍰ Gathering and analyzing all available information ⍰ Framing a range of strategic options ⍰ Objectively evaluating those options with clearly established criteria ⍰ Transparently confronting the tradeoffs associated with the available strategic choices ⍰ Making a decision ⍰ Measuring, evaluating, and adjusting in a mode of continuous improvement	James Wisker											X	X	X	X	
Letter from MCWD	10/25/2019	Both documents would be strengthened by the LMCD first clarifying its overarching strategic approach to AIS, clearly defining its objectives, and then using data and scientific method to evaluate options, before determining how individual elements might actually align within a "Master Plan".	James Wisker												X	X	X	
Letter from MCWD	10/25/2019	For example, the Harvesting Evaluation notes that, "mechanical harvesting should be evaluated as one component of a comprehensive, integrated aquatic plant management approach." However, the document does not clearly outline how the LMCD's evaluation of harvesting fits within such an integrated framework.	James Wisker				X									X		
Letter from MCWD	10/25/2019	More specifically, it is unclear how information was analyzed to support the resulting conclusions. Page 16 of 30 of the Harvesting Evaluation acknowledges that "the LMCD does not have a clear plan in place that clearly defines where and when harvesting should take place on a bay by bay basis", that, "previous harvesting efforts by the LMCD have not used GPS technology to map the path of harvesters", and that, "this has resulted in a lack of data showing acreage harvested in comparison with expended effort."	James Wisker				X						X			X		
Letter from MCWD	10/25/2019	The document also outlines a compilation of issues with current harvesting as identified by stakeholders and the LMCD, which the report does not address, and notes that the contracted consultant has not reviewed or verified the issues.	James Wisker				X									X		
Letter from MCWD	10/25/2019	Despite these statements the Harvesting Evaluation subsequently concludes that, "based on LMCD harvesting data, literature review, and financial analysis and comparison of the existing harvesting program, it is recommended harvesting continue on Lake Minnetonka." It is unclear how this conclusion was drawn, and no clear action plan is presented outlining how a forward facing harvesting program will address historic issues.	James Wisker				X									X		
Letter from MCWD	10/25/2019	MCWD has no preconceived position on whether the LMCD should continue harvesting. However, this evaluation appears incomplete and lacks a broader strategic context.	James Wisker				X									X		
Letter from MCWD	10/25/2019	While the District supports the overall intention of the LMCD in using a holistic and science based approach to developing a Lake Minnetonka Vegetation and AIS Master Plan, significant concerns have been repeatedly raised by the TAG regarding the ambiguity surrounding LMCD's overarching goals and the process it is running. These concerns have not been adequately addressed.	James Wisker												X			X
Letter from MCWD	10/25/2019	With that said it was a surprise, and of significant concern, to see that the LMCD has prescribed roles for the MCWD without meeting with the District or the TAG to discuss.	James Wisker									X		X		X		
Letter from MCWD	10/25/2019	The MCWD urges the Lake Minnetonka Conservation District to take immediate steps to more directly address the feedback raised by the TAG, and to engage with the TAG to clarify its process moving forward. The District also requests that, due to the concerns raised in this letter, the LMCD remove reference to MCWD from the draft documents.	James Wisker											X		X		
Public survery to LMCD	10/12/2019	I am glad to hear that the LMCD plans to resume to harvesting in 2020. This year, when no harvesting was done, I saw the most cut weeds blown to shore, ever, and I have lived on the lake 30 years. By harvesting channels parallel to shore the LMCD will drastically reduce the AIS cut by boats, thereby improving boat navigation and reducing the biomas left to rot in the lake. I recommend that cutting be done twice during the season. I live on the lake at 4601 Island View. This is a busy boating area that spans from the outlet of Spring Park Bay to phelps bay. This area must be on the list to be harvested. It is heavily used by boats. I am retired, so if you need someone to report on vegitation growth in this area, I could be trained to do that.	Roger Stephanson	X			X	X								X			
Public survery to LMCD	10/23/2019	The draft Harvesting Program Evaluation includes very helpful comparisons of harvesting versus chemical controls and financial data for the harvester operations. The report states and its comparisons show that there is not a one size fits all solution for a lake as diverse as Lake Minnetonka.	Tom Fletcher			X	X									X		

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Public survery to LMCD	10/23/2019	The Final Harvesting Program Evaluation should include a discounted cash flow analysis and use this as the basis for its per acre costs throughout the report. In its introduction the harvesting report incorrectly compares LMCD operated harvester costs of $514 per acre to $787 per acre based on a quote from one contractor. This is based on a historical analysis of 10 years of data with the only equipment expenditure being in 2012 for the noninsured portion of the replacement cost of a harvester that flipped over on the lake. The projected financial analysis notes that major equipment investments will be required in 2020 and provides projected and estimated costs for 5, 10, and 20 year periods. It is not appropriate to simply add cash flows in a scenario such as this. A discounted cash flow or Net Present Value analysis should be used instead to compare in house and contracted harvesting costs. For example over 10 years, which is most likely the appropriate time period for this analysis, the 2020 discounted expense using a 3% annual rate of return shows a nominal 2% savings at $2,606,579 ($753 cost per acre on a net present value basis) for LMCD operated harvesters as compared to $2,654,361 ($767 per acre) for contracted harvesters assuming the same harvest volumes. Over 20 years the discounted expense using LMCD operated harvesters is $5,190,124 or $750 per acre as compared to $5,575,088 or $806 per acre for contracted harvesters. Having a financially accurate comparison is important because the contracted option will clearly have relatively lower costs if the harvested acres are reduced significantly and provides much greater flexibility for prioritizing future uses of LMCD funds.	Tom Fletcher				X										X		
Public survery to LMCD	10/23/2019	The draft Harvesting Program Evaluation includes a Long-Term Goal of Native Aquatic Plant Community Restoration on pages 26 and 27 including discussions strategies to achieve this goal. It is suggested that this section of the final report include information on the experience on St Albans Bay where the substitution of chemical treatments for harvesting since 2011 has resulted in significant native plant restoration without any of the interventions that are discussed in the report.	Tom Fletcher			X							X			X		
TRPD response to LMCD	11/6/2019	Three Rivers Park District (TRPD) agrees that there is a need for developing these two draft plans. However, we are concerned with the lack of transparency and clarity throughout this process of the development of the draft plans. At the Technical Advisory Group (TAG) meeting on July 15, 2019, the LMCD received overwhelming feedback from the TAG members regarding the la<:k of planning and partner engagement. LMCD committed to clarify and improve cornmunication, which was never completed prior to these draft plans going out for public review and comment.	Boe R. Carlson											X	X	X		
TRPD response to LMCD	11/6/2019	The ambiguity surrounding the goals and the lack of process makes it difficult for TRPD to provide meaningful comments. We are concerned the . TRPD is mentioned as a public partner to "collaborate ... to protect land and water for current and future generations" without our involvement ever having been discussed between our organizations. TRPD is committed to partner collaboration and the protection of our natural resources, but meaningful dialog must occur between partners to develop coordinated goals, effective processes, and to achieve success now and into the future.	Boe R. Carlson									X		X		X		
TRPD response to LMCD	11/6/2019	TRPD supports the overall intention of LMCD to use a science-based approach in developing a holistic Lake Minnetonka Vegetation and AIS Master Plan. However, TRPD leadership and staff have significant concerns regarding the direction and ambiguity surrounding LMCD's process, goals and strategies. The concerns raised by the TAG members have not been adequately addressed and TRPD is uncomfortable with the "Roles and Responsibilities" that LMCD has developed for TRPD without meeting to discuss further.	Boe R. Carlson									X			X	X		
TRPD response to LMCD	11/6/2019	TRPD urges LMCD to address the feedback raised by the TAG members and to better clarify its process moving forward. TRPD also requests that, due to the concerns raised in this letter, LMCD remove reference to TRPD from the draft documents until further dialog can occur.	Boe R. Carlson									X			X	X		
Greenwood Letter to the LMCD	11/6/2019	The Draft Harvesting Program Evaluation includes very helpful comparisons of harvesting versus chemical controls and financial data for the harvester operations. The report states and its comparisons show that there is not a one-size-fits-all solution for a lake as diverse as Lake Minnetonka.	Mayor Debra J. Kind			X	X									X		
Greenwood Letter to the LMCD	11/6/2019	The Final Harvesting Program Evaluation should include a discounted cash-flow analysis and use this as the basis for its peracre costs throughout the report. In its introduction, the harvesting report incorrectly compares LMCD operated harvester costs of $514 per acre to $787 per acre based on a quote from one contractor. This is based on a historical analysis of 10 years of data with the only equipment expenditure being in 2012 for the noninsured portion of the replacement cost of a harvester that flipped over on the lake. The projected financial analysis notes that major equipment investments will be required in 2020 and provides projected and estimated costs for 5-, 10-, and 20-year periods. It is not appropriate to simply add cash-flows in a scenario such as this. A discounted cash-flow or Net Present Value analysis should be used instead to compare in-house and contracted harvesting costs. For example, over 10 years (which is most likely the appropriate time period for this analysis), the 2020 discounted expense using a 3% annual rate of return shows a nominal 2% savings at $2,606,579 ($753 cost per acre on a net present value basis) for LMCD operated harvesters compared to $2,654,361 ($767 per acre) for contracted harvesters assuming the same harvest volumes. Over 20 years the discounted expense using LMCD operated harvesters is $5,190,124 or $750 per acre as compared to $5,575,088 or $806 per acre for contracted harvesters. Having a financially accurate comparison is important because the contracted option will clearly have relatively lower costs if the harvested acres are reduced significantly and provides much greater flexibility for prioritizing future uses of LMCD funds.'	Mayor Debra J. Kind				X			X							X		
Greenwood Letter to the LMCD	11/6/2019	The Draft Harvesting Program Evaluation includes a Long-Term Goal of Native Aquatic Plant Community Restoration on pages 26 and 27 and includes discussions and strategies to achieve this goal. Greenwood suggests that this section of the Final report include information on the experience on St. Alban's Bay where the substitution of chemical treatments for harvesting since 2011 has resulted in significant native plant restoration without any of the interventions that are discussed in the report.	Mayor Debra J. Kind				X									X		
Greenwood Letter to the LMCD	11/6/2019	If the LMCD elects to support milfoil and curly leaf pondweed control at its current level, it should not continue to make harvesting its exclusive strategy, since many portions of the lake are more suited to chemical controls.	Mayor Debra J. Kind			X	X									X		

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Greenwood Letter to the LMCD	11/6/2019	The LMCD should be focusing its limited dollars on long-term strategies that have the potential for greater general lake-wide benefit. For example, page 5-10 of the Draft Starry Stonewort Report shows high probabilities of preventing starry stonewort introduction on Lake Minnetonka with a Preemptive Pilot Study and Bi-Weekly Surveys at priority boat accesses.	Mayor Debra J. Kind						X	X						X		
Greenwood Letter to the LMCD	11/6/2019	If the LMCD continues a mechanical harvesting program, it should be done in the most cost-effective, safe, and efficient manner possible. Evaluation of in-house vs contracted services should include all of the costs. And harvesting should only be done where necessary.	Mayor Debra J. Kind				X			X						X		
Greenwood Letter to the LMCD	11/6/2019	The LMCD should consider that operating its own harvesters with the associated supervision and staffing makes them into a substantial fixed cost each season with the tendency to operate them as much as possible regardless of whether they are the most effective option or best use of LMCD funds.	Mayor Debra J. Kind				X			X						X		
Greenwood Letter to the LMCD	11/6/2019	On page 13 of the Draft Harvester Program Evaluation it states that, "the cost for the LMCD to continue the existing weed harvesting program will incur substantial expenses in year 2020 due to the need to replace most of the existing harvesting equipment." Therefore, the LMCD should make a decision regarding in-house vs contracting for harvesting before the start of the 2020 harvesting season.	Mayor Debra J. Kind				X			X						X		
Greenwood Letter to the LMCD	11/6/2019	The LMCD should support and fund scientific understanding of Lake Minnetonka and everything that happens on and in the lake – including any AIS prevention / management program.	Mayor Debra J. Kind										X			X		
Letter from Orono LMCD	10/23/2019	The City of Orono recently reviwed the "Aquatic Vegetation Harvesting Program Evaluation Report," and disagrees with the recommendation of continuing harvesting. The report lacks scope related to how effective the mechanical harvesting has been at limiting or eliminating AIS weeds. The City of Orono's understanding of the reasons for harvesting are to reduce/eliminate invasive weed species, however this study focused on the effectiveness of organizational operations and LMCD Harvesting Program expenditures. The report has shown nothing related to scientific data surrounding actual quantities of AIS weeds pre and post treatment and from year to year, or whether or not there has been expansion or contraction of the AIS issues in Lake Minnetonka. Your priorities are clearly organizational focused and not mission focused. Even your LMCD strategic plan 2019-2020 is organizational and image focused with little emphasis on mission. The City of Orono is requesting a continuation of the harvesting moratorium.	Mayor Dennis Walsh				X								X	X			
Letter from DNR to LMCD	11/13/2019	1. Identify LMCD's current organizational goals pertaining to AIS management on Lake Minnetonka.	Keegan Lund												X	X		
Letter from DNR to LMCD	11/13/2019	2. Engage relevant stakeholders and identify their roles concerning AIS prevention and management.	Keegan Lund											X		X		
Letter from DNR to LMCD	11/13/2019	3. Review the existing AIS management plan that DNR helped draft with other LMCD AIS Task Force members in 2012 and identify the benefits and shortcomings of the previous plan, implementation problems and how it aligns with current AIS goals for stakeholders.	Keegan Lund										X			X		
Letter from DNR to LMCD	11/13/2019	4. Identify gaps in AIS prevention and management and resources currently available. Engage stakeholders in a more collaborative planning process to achieve agreed upon future goals.	Keegan Lund											X		X		
Letter from DNR to LMCD	11/13/2019	5. With clear and continued feedback from the Technical Advisory Group - plan, evaluate and refine your AIS Master Plan through an adaptive management framework.	Keegan Lund										X	X		X		
Letter from DNR to LMCD	11/13/2019	Strong relationships, clear understanding of roles and responsibilities, and excellent communication will be needed to produce an acceptable, long lasting and effective AIS Master Plan for Lake Minnetonka.	Keegan Lund											X	X			X
Letter from DNR to LMCD	11/13/2019	DNR would like to host a meeting to clarify the above concerns in relation to the creation of an AIS Master Plan. We would be happy to meet with the LMCD to provide a number of suggestions to support a coordinated and collaborative process and look forward to your response.	Keegan Lund											X				X
Letter from DNR to LMCD	11/13/2019	Concerning the Harvesting Evaluation and the Starry Stonewort Plan, we view these plans as complimentary to a broad set of lakewide AIS prevention and management goals. Therefore, we recommend pausing these supporting plans until the AIS Master Plan is developed. We feel there has also been limited transparency and coordination in the development of the aforementioned plans, causing potential weaknesses or gaps moving forward. DNR strongly suggests you engage stakeholders more effectively to share resources and responsibilities in both plan development and execution.	Keegan Lund											X	X	X		
Letter to LMCD (Lake minnetonka Starry Stonewort Protection & Emergency Action Plan)	10/18/2019	No one wants Starry stonewort (SSW) or any other aquatic invasive species (AIS). Unfortunately, the experience in Minnesota and elsewhere has been, despite the collective best efforts, AIS continue to spread. Sadly, the most practical management questions boil down to not 'if' but 'when' will an introduction occur, then what (if anything) can or should be done to eradicate, contain or minimize its spread and impacts?	Gabriel Jabbour						X								X	
Letter to LMCD (Lake minnetonka Starry Stonewort Protection & Emergency Action Plan)	10/18/2019	The PLAN is peppered with qualifying words and phrases, like 'speculative,' 'uncertainty,' 'difficult to predict,' 'unknown,' 'experimental,' 'theoretically,' – diminishing confidence in the assessment.	Gabriel Jabbour														X	
Letter to LMCD (Lake minnetonka Starry Stonewort Protection & Emergency Action Plan)	10/18/2019	In the introduction, the PLAN states, "However, it is important to recognize that these practices are based on limited information and experience on how SSW might spread in Lake Minnetonka's aquatic community."	Gabriel Jabbour														X	

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Letter to LMCD (Lake minnetonka Starry Stonewort Protection & Emergency Action Plan)	10/18/2019	The two-prong prevention plan relies on: 1. Exit inspections on lakes with known SSW infestations 2. Incoming inspections on Lake Minnetonka Serious and significant shortcomings include: o The PLAN assumes knowledge of all SSW infested lakes – it is likely there are some lakes where infestations have not yet been discovered and it is likely more will be infested. o What about SSW-infested lakes in nearby Wisconsin? o The PLAN assumes inspections lower the risk of SSW (and other AIS) movement, yet we lack knowledge of how much lower is the risk (if any). Perhaps more troubling, data are presented in the PLAN showing Eurasian watermilfoil, zebra mussel and SSW infested lakes in MN and WI continue increasing despite increasing boat inspections. o The PLAN states a 'likelihood' of SSW being introduced into Lake Minnetonka and proposes an enhanced inspection schedule that still leaves many holes (in addition to the demonstrated lack of efficacy of boat inspections in the first place).	Gabriel Jabbour		X				X									X	
Letter to LMCD (Lake minnetonka Starry Stonewort Protection & Emergency Action Plan)	10/18/2019	Pre-emptive and Early Detection Options This section starts out by stating there are numerous prevention strategies available, but "few are practical and implementable." Thus, to enhance the prevention steps from the prevention strategy, the PLAN proposes pre-emptive copper sulfate treatments at public access sites (2-4 times per season) at the 13 known SSW lakes. Serious and significant shortcomings include: o The PLAN assumes knowledge of all SSW infested lakes – it is likely there are some lakes where infestations have not yet been discovered and it is likely more will be infested. o What about SSW-infested lakes in nearby Wisconsin? o 11 copper sulfate treatments over 3 years have not eradicated SSW in Lake Sylvia, so will the proposed pre-emptive treatments eradicate SSW in the public access areas of the known SSW lakes? o AND – who will be responsible for and fund these treatments? The PLAN offers two additional methods – chemical/mechanical decontamination for incoming (to Lake Minnetonka) and outgoing (from SSW lakes) – but does not endorse either. Finally, this section presents a table (table 5) of various prevention methods and ranks their respective probably of preventing a SSW introduction as high, moderate or low, but provides no method or rationale as to how these probabilities are determined.	Gabriel Jabbour						X	X								X	
Letter to LMCD (Lake minnetonka Starry Stonewort Protection & Emergency Action Plan)	10/18/2019	Rapid Response This element describes a generic approach and offers few critical specifics relative to Lake Minnetonka.	Gabriel Jabbour														X	
Letter to LMCD (Lake minnetonka Starry Stonewort Protection & Emergency Action Plan)	10/18/2019	A single table with not description, analysis or supporting documentation is presented. The PLAN lacks an implementation element.	Gabriel Jabbour														X	
Letter to LMCD (Lake minnetonka Starry Stonewort Protection & Emergency Action Plan)	10/18/2019	Again, a table with a descriptive paragraph that includes the statement – "Funding a comprehensive incoming boat inspection program will be challenging." It contains neither provisions for nor funding estimates, authorities, responsible parties, etc. for funding amounts and sources for proposed programs on SSW infested lakes, a major program element.	Gabriel Jabbour		X				X	X							X	
Letter to LMCD (Lake minnetonka Starry Stonewort Protection & Emergency Action Plan)	10/18/2019	This is not a plan that can be implement or will be effective.	Gabriel Jabbour														X	
Letter from MCWD	10/25/2019	Similarly, the Starry Stonewort Plan contains a number of apparent contradictions that create ambiguity surrounding the objectives, and how this Plan fits into the LMCD's broader strategic approach to AIS.	James Wisker						X								X	
Letter from MCWD	10/25/2019	For example, the Starry Stonewort Plan identifies a primary goal of "preventing the introduction of SSW into Lake Minnetonka", and identifies watercraft inspections as a significant strategy. However, the document then proceeds to outline that "inspection and prevention programs have not demonstrated a capacity to prevent the spread of AIS", and that "watercraft inspections have to be effective to delay a potential new introduction."	James Wisker		X				X								X	
Letter from MCWD	10/25/2019	In parallel, the Starry Stonewort Plan notes that preemptive copper sulfate dosing at select Lake Minnetonka accesses is not a prevention strategy. Then Table 5, with minimal evidence or analysis, concludes that preemptive copper sulfate dosing at select Lake Minnetonka accesses provides a high probability of preventing Starry Stonewort introduction. It is unclear what data was analyzed to support this conclusion.	James Wisker			X			X								X	
Letter from MCWD	10/25/2019	Again, understanding the broader strategic approach of the LMCD, and clarifying its goals, would help strengthen this document. Determining if the objective is prevention, delay, control, or public education, will drive what an effective strategic approach looks like and will guide tactical methods and resource allocation.	James Wisker						X								X	
Letter from MCWD	10/25/2019	Most concerning with the Starry Stonewort Plan is that, without discussing with the MCWD first, the LMCD has defined MCWD's role with regards to technical assistance, management and funding.	James Wisker						X			X					X	
Letter from MCWD	10/25/2019	While the District supports the overall intention of the LMCD in using a holistic and science based approach to developing a Lake Minnetonka Vegetation and AIS Master Plan, significant concerns have been repeatedly raised by the TAG regarding the ambiguity surrounding LMCD's overarching goals and the process it is running. These concerns have not been adequately addressed.	James Wisker											X	X			X
Letter from MCWD	10/25/2019	With that said it was a surprise, and of significant concern, to see that the LMCD has prescribed roles for the MCWD without meeting with the District or the TAG to discuss.	James Wisker									X		X			X	

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Letter from MCWD	10/25/2019	The MCWD urges the Lake Minnetonka Conservation District to take immediate steps to more directly address the feedback raised by the TAG, and to engage with the TAG to clarify its process moving forward. The District also requests that, due to the concerns raised in this letter, the LMCD remove reference to MCWD from the draft documents.	James Wisker									X		X	X		X	
TRPD response to LMCD	11/6/2019	Three Rivers Park District (TRPD) agrees that there is a need for developing these two draft plans. However, we are concerned with the lack of transparency and clarity throughout this process of the development of the draft plans. At the Technical Advisory Group (TAG) meeting on July 15, 2019, the LMCD received overwhelming feedback from the TAG members regarding the la<:k of planning and partner engagement. LMCD committed to clarify and improve cornmunication, which was never completed prior to these draft plans going out for public review and comment.	Boe R. Carlson									X		X	X		X	
TRPD response to LMCD	11/6/2019	The ambiguity surrounding the goals and the lack of process makes it difficult for TRPD to provide meaningful comments. We are concerned the. TRPD is mentioned as a public partner to "collaborate ... to protect land and water for current and future generations" without our involvement ever having been discussed between our organizations. TRPD is committed to partner collaboration and the protection of our natural resources, but meaningful dialog must occur between partners to develop coordinated goals, effective processes, and to achieve success now and into the future.	Boe R. Carlson									X		X			X	
TRPD response to LMCD	11/6/2019	TRPD supports the overall intention of LMCD to use a science-based approach in developing a holistic Lake Minnetonka Vegetation and AIS Master Plan. However, TRPD leadership and staff have significant concerns regarding the direction and ambiguity surrounding LMCD's process, goals and strategies. The concerns raised by the TAG members have not been adequately addressed and TRPD is uncomfortable with the "Roles and Responsibilities" that LMCD has developed for TRPD without meeting to discuss further.	Boe R. Carlson									X		X			X	
TRPD response to LMCD	11/6/2019	TRPD urges LMCD to address the feedback raised by the TAG members and to better clarify its process moving forward. TRPD also requests that, due to the concerns raised in this letter, LMCD remove reference to TRPD from the draft documents until further dialog can occur.	Boe R. Carlson									X		X			X	
TRPD response to LMCD	11/6/2019	We would be happy to reengage with LMCD in the near term to discuss future opportunities and develop a more holistic approach to this process. Staff have reviewed the draft plans and have specific co"mments on both and believe it would be better served to reengage the TAG to discuss these concerns and opportunities in more depth.	Boe R. Carlson											X			X	
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey		Q5 The Lake Minnetonka Conservation District (LMCD) has historically harvested (cut and removed) aquatic vegetation for navigation and safety. How would you rate the past harvesting?					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	9/23/2019	2019 is a disaster. Horrible decision to not harvest this year!					X	X					X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	9/16/2019	2019 has been the worst					X	X					X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/31/2019	This year Phelps Bay was not harvested and difficult near our home on Tuxedo,					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/6/2019	2019 no harvesting. Prior years very good.					X	X					X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/5/2019	Detrimental to the fishery					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Seems like they harvest to much					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	A joke. Very poor job. Ineffective because of the way they carried the weed to a truck. A lake barge would have been more effective incurring the weeds.					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Waste of time					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Making the weeds worse year after year!!!!!					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Ineffective at best, detrimental by creating more plants at worst					X						X					

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Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/3/2019	Don't need to cut or spray. Horrible for the eco system				X	X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/3/2019	Haven't seen them in Black Lake this year					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey		Q6 How could the harvesting be improved?					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	9/26/2019	Use more effective harvesting machines. Current effort leaves & distributes 30%-40% (?) of wat they harvest					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	9/26/2019	do not do it!!!					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	9/2/2019	Root removal, cutting is making it spread!					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/12/2019	end it					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/5/2019	Less frequent					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/5/2019	Minimal benefits, spreads floaters)					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Utilize herbicides				X	X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Harvesters are terrible tat picking up what they cut. Instead the vast majority of what they cut washes up on homeowners shorelines for them to deal with.					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Don't use the weed harvesters.					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	More bays					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Dont do it at all . Just spreads the weeds that float to shore.					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	You could stop ruining the lake by over harvesting					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Remove and not just cut milfoil.					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Use a barge we're the weeds are cut to take large volumes from the lake vs driving small amounts of weeds to the truck					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Stop the harvesting. You are killing fish and their habitat.					X						X					

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Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Quit					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Find a better method!! Stop DESTROYING our fisherys!!!					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	combine with chemical treatments				X	X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	After watching hundreds of juvinile fish go up the ramp in the harvester and no one sort them out and put them back there should not be any more harvesting!					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	By being combined with a herbicide or something similar to eradicate the invasive plants				X	X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/3/2019	Less.					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/3/2019	Pull weeds at the root					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/3/2019	Better clean up					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/3/2019	Keep channels open but I believe cutting machine spread invasive species and send uncollected weeds to shoreline.					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	7/16/2019	Pick up the plants you harvest					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	7/14/2019	Only harvest in channels if necessary it spreads the weeds and makes shorelines a mess					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	7/11/2019	Use all means available to manage beyond just mechanical harvesting					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	7/11/2019	use machines that actually PULL weeds from the bottom					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey		Q7 Are you aware that the Lake Minnetonka Conservation District (LMCD) has suspended the aquatic vegetation harvesting program for 2019?					X	X					X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	It seems this organization has ruined the biodiversity of the lake by over harvest of aquatic vegetation					X	X					X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Good					X	X					X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/3/2019	Yes. But have still seen harvesters					X	X					X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey		Q8 What type of lake vegetation control method would you prefer?				X	X						X					

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Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	9/16/2019	Harvesting with follow-up.					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	9/2/2019	Prohibition of motorized boats would decrease further risk of destroying this ecosystem.		X			X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/5/2019	Diving/vacuum					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Magic					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Combo of chemical and mechanical				X	X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Get smarter					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	7/16/2019	Use of harvesters with herbicide treatments				X	X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	7/11/2019	Harvesting, biological, and lake depth manipulation (dam)					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	7/11/2019	mechanical, but by pulling roots from bottom					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	10/12/2019	Just to give a thank you to all those of you who not only recognize the extraordinary gift of our beautiful Lake Minnetonka but work to preserve it.											X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	9/26/2019	We really need a plan that works for AIS! Harvesting isn't the answer. It actually spreads it more.					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	9/23/2019	As noted above, the decision to not harvest this year was a big mistake, not only because of unsightly above surface emergent weeds in places where they've never been before, but also because of the time and expense associated with cleaning up floating weeds chopped up by boat traffic on our shoreline.					X	X					X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	9/2/2019	Please consider how good it would be for the ecosystem of Lake Minnetonka if we prohibited use of gas powered motorboats. Not only would it slow the spread of invasive species, it would also slow the pollution going into the lake. With less boats on the lake we can give the ecosystem a fighting chance to return to its natural balance. Thank you.		X									X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/5/2019	I am concerned with the private/service use of chemicals.				X							X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	I live in st alban's bay and the water has gone from an "A" to "C" this summer. Rumor is your are doing zebra mussel management testing. Is this true?											X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	The weeds on the lake are getting out of control. They get stuck in motors. I support safe chemicals to eliminate the weeds.		X		X							X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Too many wasted labor hours with 2 or more workers sitting at landings during non peak hours (call in help if needed). Wastfull spending on oververeach programs against homeowners. Don't for who pays the bills!					X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Wake board boat ballast tanks & Ducks and geese. Do not ruin this lake with poison sprays. Your harvesters do enough damage.		X		X	X						X					

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Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Thanks for doing this important work											X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	All the poisoning and cutting has not done anything the lake is still full of weeds they are just different kinds of weed species Quit poisoning and cutting it is a waste of money The huge pleasure boats cut up tons of weeds when they are cruzin close to shore through the weed beds then they float which ever way the wind blows spreading weeds randomly based on the wind Ducks geese and other birds than eat weeds spread them naturally So many factors that can not be controlled				X	X						X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Allowing marinas to have unlimited boats in dry dock storage is a bad idea. Don't let Gabe bring you down!		X									X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	DNR has been TERRIBLE for Minnesota lakes!!! Blaming boaters for years!!! Chemicals, fertilizers and birds transporting from lake to lake make WAY more sense!!!!!!! PLEASE FIND A BETTER WAY!!!!				X							X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	8/4/2019	Lake Minnetonka has always had weeds in it. Before it was dammed it had wild rice. The massive dumping of chemicals into a natural water supply is shameful and in the long run will have more negative effects than invasive species.				X							X					
Lake Minnetonka Vegetation and Aquatic Invasive Species (AIS) Survey	7/11/2019	I've always wondered why there's so much emphasis on boat inspections at launches when water inside the water pump impeller and fairings can house aquatic invasive species. There's no quick way to inspect those elements at a launch so I don't see how those inspections can be completely effective.			X								X					
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	TAG Structure TAG's active members should be identified and have the authority to represent their organization.	Gabriel Jabbour									X		X				
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Jabbour noted that the data was incomplete, as many boaters – especially fisherman – avoided inspections.	Gabriel Jabbour										X					
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Data should be characterized to identify what types of lake users are typically represented by the MN DNR watercraft inspection data.	Bill Cook										X					
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Lakes with a constant inspector presence can still become infested with SSW	Keegan Lund						X									
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	In the early 2000s LMCD analyzed the different pathways of AIS transportation	Tony Brough										X					
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Starry Stonewort Plan should clarify whether all possible pathways of SSW transport are being considered, or primarily the pathway of boats entering via public launches.	Tony Brough						X									
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Plan should look at more kinds of AIS than just SSW.	Tom Frahm						X									X
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Periodic early detection surveys for SSW would still be needed.	Eric Evenson						X									
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Agencies pool money and invite private contributions to the fund to raise money for research on algaecides for SSW	Tony Brough						X	X								
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Include an analysis of the risks and potential impact of a SSW infestation in Lake Minnetonka, and compare those findings with LMCD goals for the Lake.	James Wisker						X								X	
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Once the table of roles and responsibilities was filled out, the LMCD could review where any gaps lay and what future roles an organization might take to address said gaps.	James Wisker								X							
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	LMCD should define the purpose for the program prior to review.	Eric Evenson								X					X		
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	If the LMCD hires harvesting operators, the LMCD should raise its standards for employee training.	Gabriel Jabbour				X									X		
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Training standards for maintenance personnel should be included	Eric Evenson				X									X		
Lake Mtka Veg AIS Master Plan TAG 1 mtg minutes	7/15/2019	Funding opportunities should be identified	Eric Evenson							X						X		
LMCD-Harvesting Program Review (LMCD)	11/18/2019	1. I was surprised to find out that we need to replace two harvesters, one transport barge, one trailer and the shore conveyor. Total amount about $676K. I believe these replacement dates are based on the manufacture's desire to sell new equipment. I doubt our equipment needs to be replaced based on the small amount of maintenance required to get them running each year. But with these replacement dates provided in an independent report, this probably is the death knell of the harvesting program. Since we have about $120K in our equipment replacement fund, we need to fund $556K to replace and about $50K per year for replacement. Report strongly suggests that when all costs are included, contracting harvesting is the way to go.	Bill Cook				X			X						X			
LMCD-Harvesting Program Review (LMCD)	11/19/2019	2. There is little in the report to help the Board decide on future program direction.	Bill Cook													X		
LMCD-Harvesting Program Review (LMCD)	11/20/2019	1. Is harvesting more effective at short term milfoil management than just letting boats traffic through and cut up the weeds? The LMCD harvesting program complaints suggest that harvesting cuts and fragments lots of weeds and then transports those weeds to remote unloading sites. this narrative suggests that harvesting is not as effective as the do nothing alternative	Bill Cook				X									X		
LMCD-Harvesting Program Review (LMCD)	11/21/2019	2. Harvesting removes some nutrients from the lake system, however the report dismisses this number without any calculations or science.	Bill Cook				X									X		
LMCD-Harvesting Program Review (LMCD)	11/22/2019	3. The anacedotal reports from the lake suggest that milfoil has reached equillibrium in a number of bays.	Bill Cook													X		

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Source	**Date**	**Comment**	**Commenter**	**Recreation**	**Watercraft Inspection**	**Chemical Treatment**	**Harvesting**	**Lack of Harvesting 2019**	**SSW**	**Funding**	**LMCD Role**	**Partner Roles**	**Data Collection/ Analysis**	**Stakeholder Engagement**	**Process**	**Harvesting Plan**	**SSW Plan**	**AIS Master Plan**
LMCD-Harvesting Program Review (LMCD)	11/23/2019	4. Have the chemical treatments affected the milfoil in down current bays?	Bill Cook			X										X		
LMCD-Harvesting Program Review (LMCD)	11/24/2019	5. A successful program should include the committment of resources to provide about a level of 1/2 time manager/lake scientist role to manage the lake program and provide future direction	Bill Cook													X		
Meeting with Gabe Jabbour	6/4/2019	LMCD is not qualified for harvesting	Gabriel Jabbour								X							
LMCD AIS Task Force Meeting	5/11/2019	Waste of time and money, should leverage partnerships to get endorsements from locals	Gabriel Jabbour							X		X						
LMCD AIS Task Force Meeting	5/12/2019	Private contributions are key	Gabriel Jabbour							X								
LMCD AIS Task Force Meeting	2/8/2019	Others have said that LMCD needs its own AIS expert	Bill Cook								X							
LMCD AIS Task Force Meeting	2/8/2019	Concern is that LMCD lacks crucial information. The LMCD has deceloped an AIS management plan before, with the assistance of staff from the US Army Corps of Engineers (USACE) and the USGS, among other organizations. Suggest LMCD seek the assistance of these organizations in developing the RFP and Master Plan	Gabriel Jabbour								X	X			X			
LMCD AIS Task Force Meeting	2/8/2019	Lund stated that he believed the MnDNR and the MCWD and other agencies lack the capacity to manage an AIS master plan for Lake Minnetonka. He underscored that the LMCD should hire a permanent staff person to fill this role.	Keegan Lund								X	X			X			
LMCD AIS Task Force Meeting	2/8/2019	Lund said that he was concerned that the consultant the LMCD hires will lack crucial background on Lake Minnetonka. He added that he was worried the LMCD would spend on an unneccessary plan.	Keegan Lund												X			
LMCD AIS Task Force Meeting	2/8/2019	Frahm noted that the exoerts for management of AIS and prevention of AIS introduction may well be mutually exclusive He said that prevention efforts without total control of private and public lake acess would likely not succeed.	Tom Frahm												X			
LMCD AIS Task Force Meeting	2/8/2019	Lund stated that the LMCD needs to secure permanent capacity to coordinate AIS maangement efforts around the lake. He said that the LMCD should look at how other organizations fill this capacity. Lund added that it may not have to be a full-time position, but a long-term permanent position is necessary.	Keegan Lund							X								
LMCD AIS Task Force Meeting	2/8/2019	Jabbour stated that LMCD is short-staffed, and needs long-term capacity to coordinate implementation of an AIS master plan.	Keegan Lund							X								
LMCD AIS Task Force Meeting	2/9/2019	Evenson stated that the LMA has submitted applications to Hennepin County for a grant to fund starry stonewort inspections at boat ramps on Lake Minnetonka. He added that even if the grant is not awarded, the LMA board has already pledged to fund the inspections in full.	Eric Evenson						X	X								

memo

Project Name |	Lake Minnetonka Lake Vegetation & AIS Master Plan	**Date** |	11/21/19
To / Contact info |	Technical Advisory Group		
Cc / Contact info |	Vickie Schleuning- Executive Director; Bill Cook		
From / Contact info |	Jason Naber, Steve McComas, Camilla Correll		
Regarding |	Technical Advisory Group Meeting #2- Agenda		

Meeting Agenda

Meeting Location: LMCD Office

Meeting Date: November 21, 2019

Meeting Time: 1:30 to 3:30

1. **Introductions**
2. **Opening Remarks**
3. **Goal of Meeting**
    a. Feedback on memos
    b. Establish decision points to bring to LMCD Board
4. **Comments received to date**
5. **Harvesting Program** 15 min
    a. Review and discuss recommendations
    b. Next Steps
6. **Starry Stonewort Plan** 10 min
    a. Review and discuss recommendations
        i. Prevention (practical/political)
        ii. Early Detection
        iii. Rapid Response
    b. Next Steps
7. **AIS Strategy** (Printed Roles-poster board)
    a. Review and agree on AIS Strategy
    b. Review Roles – Identify missing items
    c. Feedback on LMCD roles
    d. Agree on next steps for filling gaps
8. **Next Steps**

November 21, 2019
Lake Minnetonka Vegetation & AIS Master Plan (Plan)
Technical Advisory Group (TAG)- 2nd Meeting Notes

Present:
James Wisker-Minnehaha Creek Watershed District, Tom Langer-MCWD, Gary Hughes-LMCD, Gregg Thomas-LMCD, Ann Hoelscher-LMCD, Rob Dodd-MNDNR, Kent Norby-Carsons Bay, Ben Brandt-LMCD, Angie Smith-TRPD, Brian Vlach-TRPD, Rich Anderson-LMCD, Denny Newell-LMCD, Tom Frahm-LMA, Bill Cook-LMCD, Steve McComas-BWS, Dennis Klohs-LMCD, Keegan Lund-MNDNR, Vickie Schleuning-LMCD, Jason Naber-EOR, Camilla Correll-EOR, Eric Evenson-LMA, Rod Kern-LMA, Gabriel Jabbour (via phone)-Tonka Bay Marina, Joe Pallardy (via phone)-EOR Adam McLain, Premier Lake Harvesting: Bill Cook, LMCD; Brian Vlach, Three Rivers Park District (TRPD); Eric Evenson, Lake Minnetonka Association (LMA); Gabriel Jabbour, Tonka Bay Marina; Gregg Thomas, LMCD; (MCWD); Jason Naber, Emmons & Olivier Resources, Inc. (EOR);

Name	Org	comment
Gregg Thomas	LMCD	Opening remarks thanking participation and noting we are in a process
Bill Cook	LMCD	LMCD committed to coordinate and sponsor and annual AIS coordination event
Bill Cook	LMCD	LMCD members committed to conduct annual vegetation survey (outside of permitted surveys).
Gabriel Jabbour	Tonka Bay Marina	Is this a Master Plan? Allocation of resources is a priority. Watch out for "last year" effect, don't just do it because it was done previously
Gabriel Jabbour	Tonka Bay Marina	$60K in AIS management for Minnetonka does not go far, need sustainable funding path going forward.
Keegan Lund	DNR	Context for AIS management is needed, need to set broader goals
Gabriel Jabbour	Tonka Bay Marina	Should focus on cutting major thoroughfares, not just mowing of lake weeds
Gabriel Jabbour	Tonka Bay Marina	The grant has gone away. Need LMCD Board policy on AIS
Eric Evenson	LMA	Need context for AIS strategy
Rich Anderson	LMCD Board	Floating mats are not a problem, need a market driven process. If weeds were a problem, people would pay and private businesses would do the work

James Wisker	MCWD	Is harvesting part of the Master Plan? New data is needed
Steve McComas	BWS	An AIS strategy is needed at this point.
Gabriel Jabbour	Tonka Bay Marina	The 150' recommendation for harvesting should be from stationary objects, not the shoreline
Bill Cook	LMCD	LMCD is considering extending the harvesting program as they are doing it now, which is on hold
Eric Evenson	LMA	Some need for harvesting may be needed, LMCD should get quotes ASAP
Eric Evenson	LMA	If the new harvesting program is a Pilot- success needs to be defined
Keegan Lund	DNR	Suggested we stop the harvesting discussion because harvesting is just one part of the AIS strategy that is not currently defined
Bill Cook	LMCD	Likes the discussion that refers to the harvesting program as a transition from the old program to a new coordinated management approach
Keegan Lund	DNR	Why not just use diquat to control weeds instead of harvesting? He likes the broader AIS strategy
Gabriel Jabbour	Tonka Bay Marina	The 2012 LMCD veg management plan was adopted but never implemented
Bill Cook	LMCD	AIS Strategy- LMCD has limited resources, cannot duplicate past effort, an annual conference is needed to review new data/activities
Rich Anderson	LMCD	2012 plan related to EWM and CLP- other entities should do this work
Gabriel Jabbour	Tonka Bay Marina	Should LMCD be involved? Noted that conflict is part of this process.
James Wisker	MCWD	If goal is managing AIS weeds, then that needs to be clear
Denny Newell	Pending LMCD Rep	Lots going on, is there any coordination?
Dennis Klohs	LMCD	Who is willing to lead? LMCD is trying to lead! Is there anyone else willing to lead?
Eric Evenson	LMA	LMA is willing to lead AIS effort. (no response from group)
Keegan Lund	DNR	Who is best to lead the AIS coordination effort?
Denny Newell	Pending LMCD Rep	Fine with having LMCD Lead, DNR & MCWD also ok with that approach
Brian Vlach	TRPD	From the LMCD RFP it was not clear what LMCD was trying to do
Tom Frahm	LMA	We do not just need coordination, we need to do something. What we are doing now is not effective, AIS keeps getting into the lake
Keegan Lund	DNR	LMA is doing EWM herbicide management & Starry Stonewort / AIS surveys
Keegan Lund	DNR	Need to have meeting so everyone knowns what is being done.

Gabriel Jabbour	Tonka Bay Marina	We need a Lake Manager, not an administrator- someone with the science background. A board resolution is needed to hire the right person to do the work. We need a "Lake Czar".
Denny Newell	Pending LMCD Rep	It would be best to coordinate efforts
Rich Anderson	LMCD	Does not agree the LMCD should support biologists, LMA could do it
Ann Hoelscher	LMCD	LMCD can coordinate efforts, LMCD needs to own this role
Bill Cook	LMCD	LMCD will take over this role
James Wisker	MCWD	Need an LMCD Board resolution to assume this role
Angie Smith	TRPD	A collective goal must be established
Eric Evenson	LMA	He is fine having LMCD lead this AIS Coordination effort- LMCD has not been inclusive to date. Let's get this done.
Bill Cook	LMCD	LMCD focus has previously been on harvesting, need a change
Keegan Lund	DNR	A new AIS Coordinator role for LMCD must be clearly acknowledged
Bill Cook	LMCD	The LMCD Board will have a motion to start the coordination focus & hire a lake manager
Gabriel Jabbour	Tonka Bay Marina	Hennepin County has our money for lake management- we need access to it
Eric Evenson	LMA	LMCD should ask Hennepin County for $100K- there is a two month timeframe
Gabriel Jabbour	Tonka Bay Marina	Need to get going now to get the money, should not rely on grants, we need permanent funding
Denny Newell	Pending LMCD Rep	Can we get $ from our partners- no volunteers…
James Wisker	MCWD	Coordinate the effort, we need a plan of attack
Angie Smith	TRPD	What is the LMCD Mission. A lot going on at TRPD- they could help if mission was clear
Vickie Schleuning	LMCD	Stated mission of LMCD- need to focus on information gathering and prioritization of efforts
Keegan Lund	DNR	Suggested next steps for AIS Strategy is for LMCD to coordinate roles, define most productive next steps
James Wisker	MCWD	A strategic focus is needed from LMCD, requested offline meeting with LMCD to discuss cooperative efforts
Angie Smith	TRPD	Other details can come later such as harvesting, starry, etc. Happy to meet offline to discuss TRPD cooperative efforts
Brian Vlach	TRPD	Has been confused about his role on TAG, at a minimum he will meet with partners. Some activities TRPD is currently doing are not in documents provided-need better coordination

Angie Smith	TRPD	TRPD applauds efforts so far
Eric Evenson	LMA	Timeline to decide on harvesting is coming soon, an adaptive management strategy will be needed.
Eric Evenson	LMA	This is what needs to be done… 1-wrap us this project this year…2-get bids for harvesting….3- get money.
Gabriel Jabbour	Tonka Bay Marina	It is not Hennepin County's money it is our money to get back from them.
Vickie Schleuning	LMCD	Committed to following up on accessing the available funding
Tom Frahm	LMA	We need a Total Lake Management Plan. This is not what we are doing now. Do not say "ultimately" we will do this or that. We need to protect the lake from AIS.
Ann Hoelscher	LMCD	Gaps in the AIS strategy are very important. These need to be identified
Rich Anderson	LMCD	Suggested another meeting get put on the calendar.
Keegan Lund	DNR	LMCD must identify roles from AIS task force & TAG input. He needs to know how is time will be used and needs a timeline for meetings
Rich Anderson	LMCD	Must move now
Gregg Thomas	LMCD	Agree need to move soon but also need to do it right. While member board members represented, we will discuss with full board for approval.
Bill Cook	LMCD	Need to pause harvesting program
Vickie Schleuning	LMCD	Suggested January 16 for next TAG meeting

Preserving and Enhancing the Lake Minnetonka Experience since 1967

Lake Minnetonka Vegetation & AIS Master Plan Update

Harvesting Program Review

LMCD Board Meeting Work Session

December 11, 2019

Presented by: LMCD Board Director Bill Cook

Review Basis of Harvesting

- Effectiveness
- Efficiencies
- Economies
- Recommendations

Status and Findings

- LMCD did not harvest in 2019
- LMCD conducted Lake Vegetation Survey to fill voids from other permit applications
- Lake equilibrium with Eurasian Watermilfoil (EWM) and Curly-leaf pondweed (CLP) is moving target
  - Herbicide treatments seem effective and appear to reduce EWM and CLP on annual basis
  - Weather patterns may have significant impacts on abundance of CLP and other vegetation in Lake Minnetonka.
- Flowering Rush
  - Moves slowly
  - Intermixed with native species
  - Not rapidly spreading in the lake as feared
- Zebra Mussels
  - Water clarity changes
- Additional LIDs being considered

Community Engagement & Feedback

- Outlined Community Engagement Plan at Beginning of Process
  - Significant Time Spent on Communications and Engagement
- Updates
  - Website
  - Social Media
  - Media Releases and Interviews
  - Direct Contact- presentations, phone, emails, walk-ins, and at lake
  - Emails- cities, licensees, lake service providers, bay captains, residents and other sign ups, etc.
- Feedback
  - Interactive Webpage- Everyone
  - Survey- Everyone
  - Technical Advisory Group
  - Cities

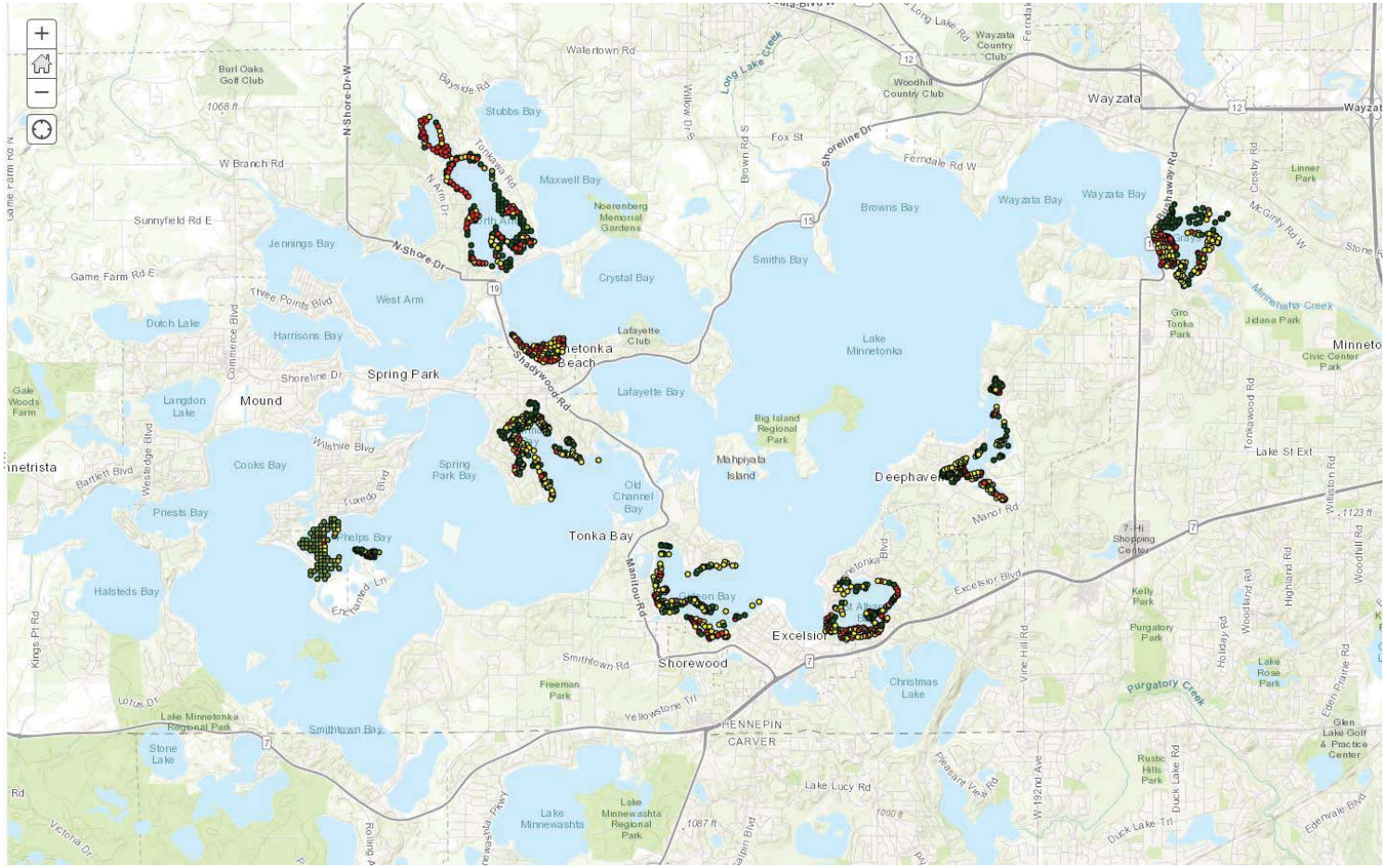
Interactive Mapping & Survey

- Feedback Summarized in Public Comments Document
- Only Highlights of reported problematic vegetation next slides

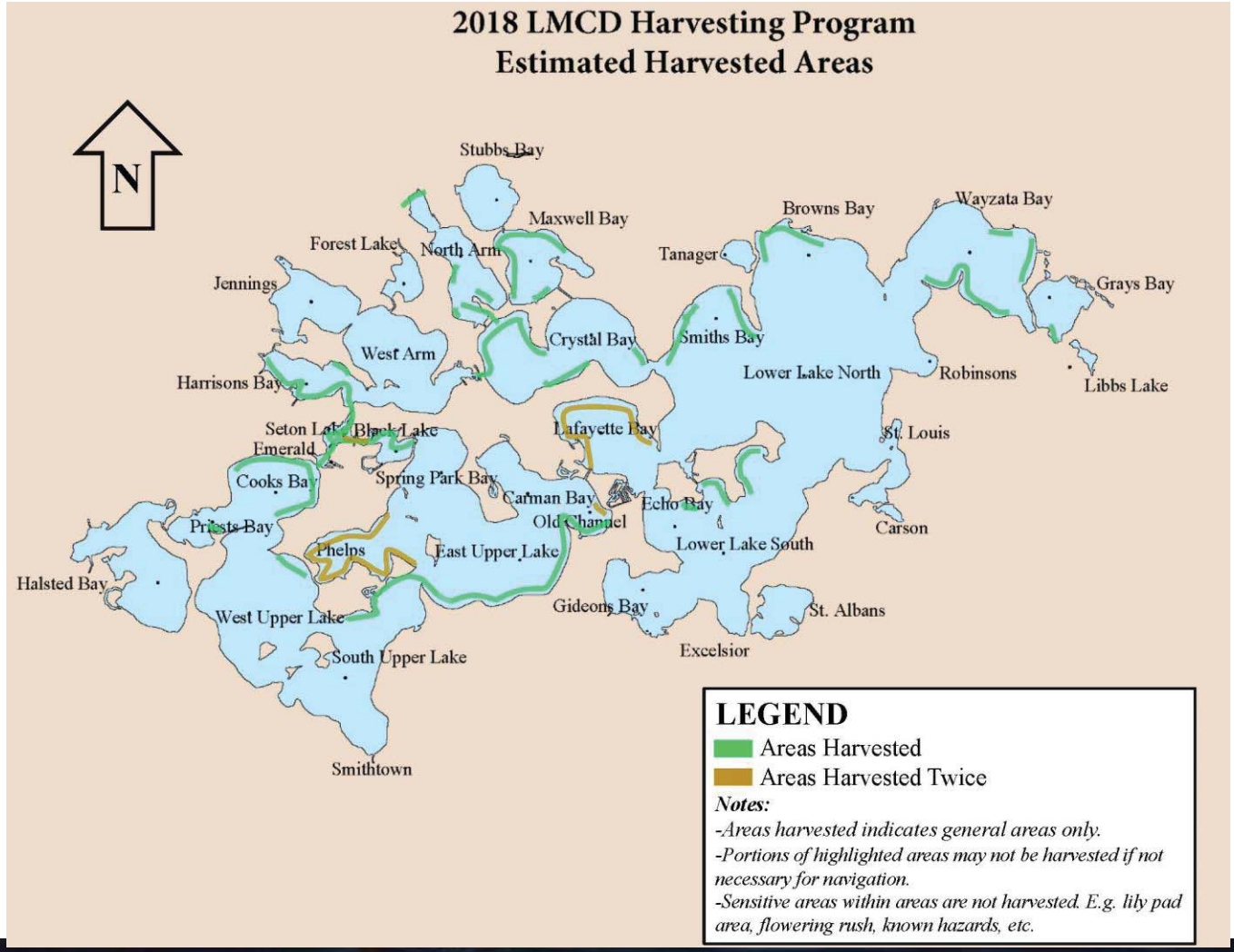
Effectiveness of Harvesting Program

- Effectiveness
  - Less than 6% of the littoral zone
    - Little effect on native species
  - With early harvesting regrowth will occur
    - LMCD constrained to summer harvesting season to match staff availability which limits capacity to address CLP and allows aquatic plants to reach nuisance conditions before management enacted
  - LMCD harvesting operations and boat traffic comparison
    - Weed Cutting and Floating material production
      - Boat propellers cut weeds on each pass and generate continual floating materials
      - Harvesters bulk cut weeds and in some cases generate concentrated floating materials, also pick up floating materials
    - Weed Transportation
      - Harvesters potentially transfer weeds to areas between cutting and hauling
      - Boat traffic transfers weeds at higher concentrations with lake currents, wind and boat hitchhikers
    - Boat propeller cutting of weeds and spread calculated to be greater than LMCD Harvesting operations

Bays with Herbicide Treatment



Harvested Areas 2018



Efficiencies of Harvesting Program

- Operations
  - Limited staffing depends primarily on field staff and needs to further emphasize strategic management and communications elements
  - Supervision of field staff needs to be improved
  - Field surveys of pre and post operation harvesting needs to be made
  - Locations need to be identified based on scientific knowledge of the areas, in addition to observational and customer feedback

Economies of Harvesting

- Equipment does not have to be replaced in 2020
  - Equipment operates well with routine maintenance, review mechanical and technical advancements
  - Shown as needing replacement for simplification of an economic analysis
  - Equipment needs safety upgrades that are routine or suggested if only feasible
- Additional Program Elements would cost the LMCD about $50,000 per year
  - Without consideration of additional harvesting
  - Lake Management Professional (LMP)
  - Additional Training for Harvester operators
    - Safety
    - Mechanical Operations
    - Effective Harvesting Techniques
  - Additional Management and Field Supervision Time
  - Continued and Additional Floating Weed Collection
  - Other value-added services- trash and site cleanup, solar lights, complaints, hazards, and other intellectual lake knowledge
- Budget Impact
  - 10% increase in Municipal Dues on top of cost of living and cost of doing business increases

Recommendations

- Initiate 3-year Pilot Study
  - LMCD does not operate any harvesters
  - Harvesting will be contracted as follows:
    - Scope based on communications with Fisheries, Bay Captains and residents
    - Floating weed removal required for any harvesting operation
    - Harvesting only occur in navigation areas and greater than 150 feet from the shore
  - LMCD to hire a Lake Manager/Lake Scientist (Lake Management Professional)
    - Conduct annual pre-treatment and post treatment vegetation surveys
    - “No cut” areas should be mapped
    - Annual vegetation surveys should be made and updated
    - Annual updates to LMCD Board

Starry Stonewort Protection Plan

- No effective preventive program in Minnesota
- No approvals available through MN DNR Staff for pilots
- Need a new approach
  - Coordinated approach with MN DNR, LMA
  - Stay tuned
- Should have an early detection system in place
- Should have a rapid response ready to go

Questions & Board Direction

- Questions?

- Board Direction
  - 2020 Harvesting Program
  - AIS Strategy Input and Lake Management Professional
  - At formal meeting, requesting motion to approve the recommendations of EOR/Blue Water Science report as identified in the Recommendation Slide in this presentation.

APPENDIX C. STARRY STONEWORT PROTECTION & EMERGENCY ACTION PLAN

Starry Stonewort Protection and Emergency Action Plan for Lake Minnetonka

May, 2020

This report was prepared by :
Emmons & Olivier Resources and Blue Water Science

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SUMMARY

The purpose of the Starry Stonewort (SSW) Protection and Emergency Action Plan is to take steps for

1. preventing the introduction of SSW into Lake Minnetonka,
2. early detection of SSW if it is introduced, and
3. acting quickly to contain SSW if it is detected.

1. Preventing the Introduction of SSW: At the present time based on available technology, economic considerations, and social acceptability, a prevention program lasting for decades for 100% effective SSW introductions is not practical. However, a SSW introduction can be delayed. Two steps include:

1. Extra boat inspection hours at seven priority Lake Minnetonka public accesses.
2. Conduct exit inspections on 100% of the boats on all Minnesota lakes that currently have SSW. Also, apply copper sulfate at public accesses at the 14 SSW lakes to reduce SSW biomass and prevent SSW transport by a boat trailer (funding sources are uncertain at this time).

2. Early Detection if SSW is Introduced: Early detection of SSW presents the best scenario for containing SSW within a small area. Two methods for early detection include:

1. Surveys using rakes and possibly diving every 2 weeks at 7 priority boat accesses. Other accesses should be surveyed about once per month.
2. Boat inspectors spending a minimum of 1 hour per week to search for SSW at Lake Minnetonka public accesses using rakes and wading.

3. Rapid Response to a SSW Introduction: After an SSW introduction in Lake Minnetonka is verified, a sequence of events should be initiated and include:

1. Rapid response assessment: After the verified observation of starry stonewort in a Lake Minnetonka bay, the DNR should conduct a rapid response assessment effort within 2 to 3 days of the observation. Contractors, DNR, and others should conduct an initial search in the most probable locations to determine the distribution of starry stonewort. From 10 - 20 hours of surveying should be conducted for a thorough assessment. All SSW locations should be sited with GPS.
2. Rapid response action: If SSW is found only within a public access area (or an area less than 20-acres) after the rapid response assessment then the rapid response action will be a containment attempt similar to those performed on other Minnesota lakes with a small infestation at the public access. LMCD staff and managers would coordinate in decisions as to what type of a rapid response action should go forward. DNR permits are necessary for treatments and meetings should be conducted prior to any control.
3. Starry stonewort containment: When the management objective is to contain SSW in a small area, aggressive treatments should be considered. Apply a copper sulfate product or a permitted algaecide product to a delineated area, wait 2 weeks and resurvey. If SSW is found, treat with algaecides again. Repeat up to 4 times during the SSW growing season from June-October.

1 INTRODUCTION

The information found in this plan is based on research and results from other AIS projects. However, it is noted that these practices are based on limited information and experience on how SSW might spread in Lake Minnetonka's aquatic community. The management approaches for SSW can change over time with the evolution of the science and management practices. New chemicals, technology, and research can change the way we respond to aquatic invasive species (AIS). Therefore, as science evolves, the plan should be expanded and modified to be consistent with those changes.

2 BACKGROUND

2.1 STARRY STONEWORT

SSW is a freshwater green algae in the Characeae family and is native to Europe and Asia. It is characterized as macro-algae, and has large, bright green branching branchlets. It produces distinctive white star-shaped bulbils that can produce new growth. It grows in a bushy manner underwater and can reach depths up to 9 meters (29.5 feet), but primarily occurs at a depth of 4.8 meters (15.7 feet) or less. Because it is dioecious, meaning that individuals are either male or female, it is capable of reproducing both sexually and asexually. SSW can spread via oocytes, which attach to the fur of animals or moving objects, or via fragmentation. However, only male clones are known in the United States.

2.2 EXPANSION OF STARRY STONEWORT IN THE UPPER MIDWEST

SSW was first documented in the St. Lawrence River in the 1970's, likely via international ballast water. Since then, SSW expanded eastward into Michigan in the mid-2000s before being discovered in Indiana in 2008. Starry stonewort was first found on Little Muskego Lake in Wisconsin in September of 2014, and on Lake Koronis in Minnesota in 2015. Currently, SSW is known to occur in Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Vermont, Wisconsin, and Ontario (Figure 1).

All recorded populations in the United States are male though there may be undiscovered females. The star-shaped bulbils (where the plant gets its name) are the most likely transport mechanism. Bulbils are short-lived (less than 24 hours) and can only be transported over short distances (Larkin et. al., 2018); therefore the most likely method of movement is via human movement of fragments from lake to lake rather than waterfowl movement of zygotes (or oospores) or other natural pathways (MAISRC, 2019). Because the arrival of SSW is so new to the Upper Midwest, there is an information gap with regards to the potential ecological impacts this species will have on the ecology and economics of Upper Midwest Lakes, including Lake Minnetonka. Data collected to date suggests that the impacts of SSW can vary from lake to lake. For example, when SSW was found in Lake Koronis in 2015, it had already occupied an area exceeding 250 acres. Survey efforts conducted three years later in 2018 found that its distribution had increased. However, in Pike Lake (Washington County, Wisconsin), SSW abundance has started to decrease, despite no active management. In general, SSW containment/control efforts can best be described as experimental with most control efforts producing mixed results. Since SSW has not been eliminated from any lakes, the best management strategy currently available is prevention. Secondarily, if SSW is found at a public access, aggressive treatments may contain SSW growth to a small area.

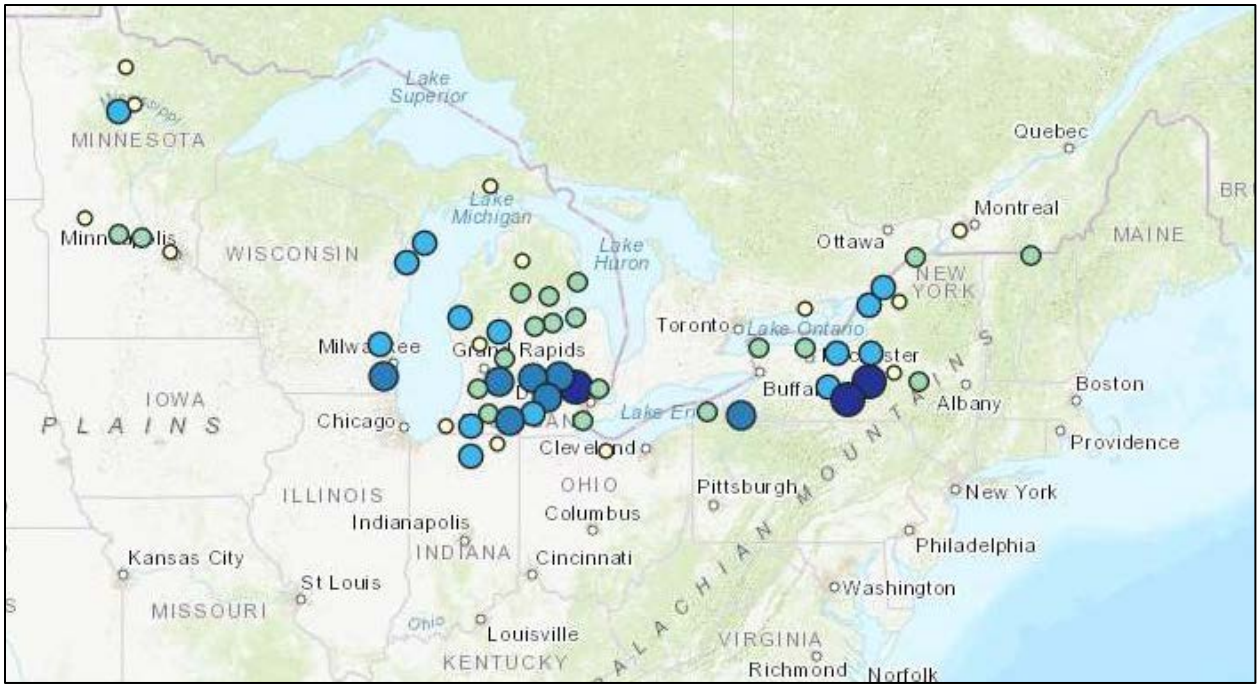

Figure 1. Starry Stonewort Distribution. (Source: USGS 2019)

2.3 OCCURENCES IN MINNESOTA AND LAKE MINNETONKA

At the end of 2019, fourteen lakes in Minnesota were listed for SSW (Figure 2)**.** This is an early stage of lake infestation in Minnesota and theoretically, if SSW was not transported out of these 14 infested lakes, infestations into new lakes including Lake Minnetonka would be minimal.

There are currently no observations of Starry Stonewort in Lake Minnetonka through the end of the summer in 2019.

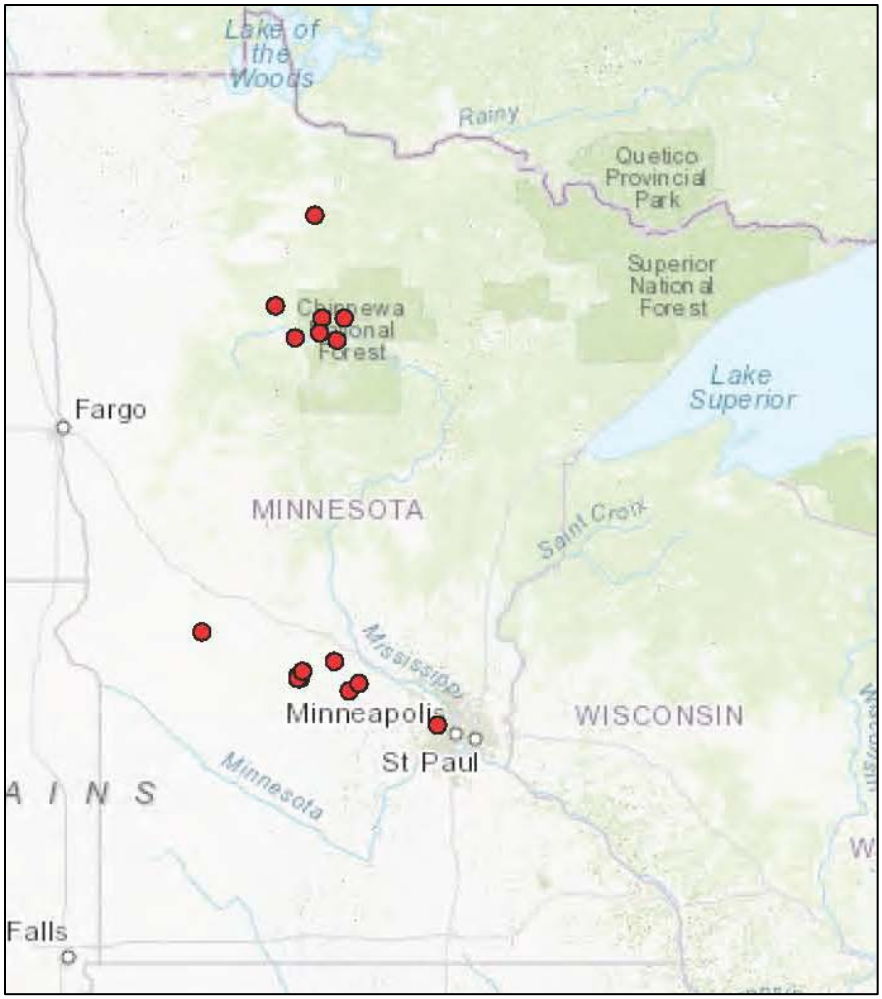

Figure 2. The fourteen known lakes with SSW infestations in Minnesota (source: USGS). Lake Koronis is shown with 2 dots.

3 SUITABILITY OF STARRY STONEWORT IN LAKE MINNETONKA

3.1 PARAMETERS ASSOCIATED WITH SSW GROWTH

Information on the suitability of SSW growth in lakes is increasing, but at the present time, critical growth factors are speculative. Based on available information, oligotrophic and mesotrophic lakes present the most suitable conditions whereas eutrophic lakes may support limited growth. Suitability of water quality parameters for SSW growth in Lake Minnetonka is listed in Table 1. It appears several of the eutrophic Lake Minnetonka bays would not be suitable for SSW growth (Figure 3).

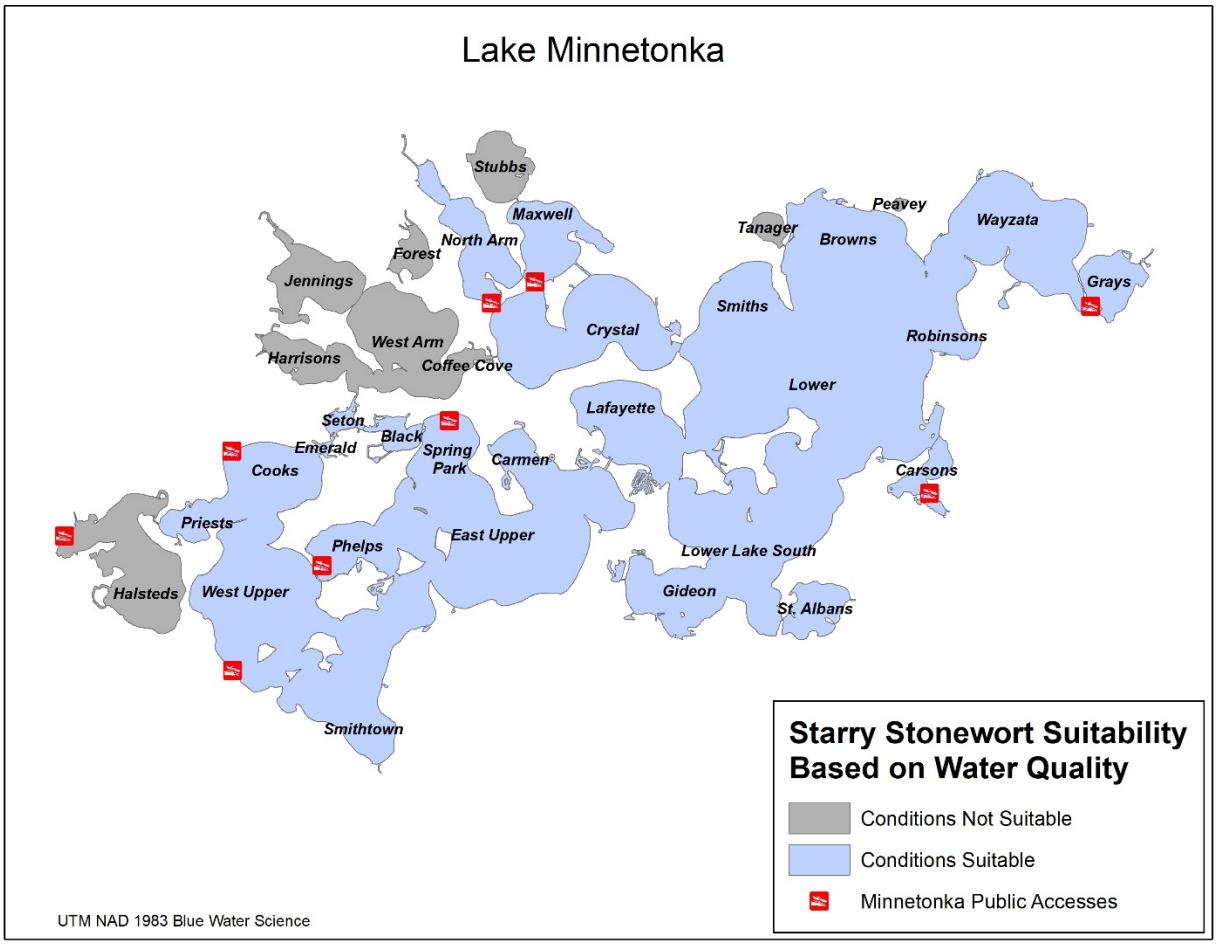

Figure 3. Suitability of starry stonewort growth in Lake Minnetonka based on water quality conditions. Suitability for SSW growth was derived from several sources.

Table 1. Starry stonewort suitability for establishment in Lake Minnetonka based on Lake Minnetonka water quality for each bay. Dark blue shading indicates water chemistry that is out of the range of known SSW established populations. Suitability ranges are from various sources.

	Bay size (Acres)	Year Data Collected	Secchi Disc (Meters)	Total Phosphorus (ug/L)	Chlorophyll a (ug/L)	pH	Alkalinity (mg/L)	Calcium (mg/L)	Conductivity
Median			3.8	23	26	8.5		51	301
(Range)			(1-6)	(3-35)	(0-36)	(7.3-9.2)	(120-184)	(29-107)	(161-499)
Black Lake	97	2015	2.68	32	18	7.9-8.3	130	33-34	405
Browns Bay		2015	5.53	16	3.3				
Carman Bay	413	2018	4.45	15	2.0	7.5-8.1	138	35	415
Carsons Bay	109	2015	5.58	23	2.0	7.8-8.4	123	32-36	420
Coffee Cove Bay		2014	1.15	89	62				
Cooks Bay	355	2018	2.69	25	7.2	7.8-7.1	128	35-36	400
Crystal Bay	805	2018	3.03	22	3.7	7.4-7.7	138	37-38	460
East Upper Bay		2015	5.44	19	2.6				
Forest Lake		2015	1.08	56	46	7.5-8.0	138	32-39	470
Gideon Bay		2015	5.26	18	4.0				
Grays Bay (Dam)	184	2018	3.69	18	2.4	8.0-8.4	135	35-36	420
Halsted Bay	571	2018	0.76	81	46	7.7-8.1	145	40-42	380
Harrisons Bay	255	2018	0.78	52	27	7.8-8.4	141	37-40	430
Jennings Bay	330	2015	0.74	115	56	7.9-8.5	152	43-44	440
Lafayette Bay		2015	5.19	20	3.8	7.7-8.5		35	425
Lower Lake	5909	2015	5.53	16	3.3	7.6-8.2	135	35-36	435
Lower Lake South	930	2018	3.71	19	1.7	7.4-8.0		36	435
Maxwell Bay	301	2015	3.76	27	7.5	7.4-7.8		38	450
North Arm Bay	314	2018	2.05	25	5.8	7.3-7.7	134	35-37	437
Peavey Lake		2015	1.48	86	9.3	6.6-6.7	215	72-80	1,640
Phelps Bay		2015	5.44	18	3.8	7.4-8.4		34	400
Priests Bay	158	2018	1.58	36	14	7.8-8.3	134	35-37	400
Robinsons Bay		2015	5.53	16	3.3				
St. Albans Bay	160	2018	4.03	19	3.8	7.8-8.5	114	28-33	405
St. Louis Bay		2015	5.53	16	3.3				
Smithtown Bay	843	2018	4.19	19	2.9	7.2-8.0		34-35	405
Spring Park Bay		2015	5.44	18	3.8	7.8-8.4	137	34-35	410
Stubbs Bay	197	2015	0.90	48	29	7.7-8.1		41-42	460
Tanager Lake	53	2018	0.74	83	39	7.8-8.4	152	44-46	430
Upper Bay	4229								
Wayzata Bay	720	2018	3.65	18	2.9	8.0-8.3	135	34-36	430
West Arm Bay	808	2018	0.84	56	25	7.8-8.3	146	38-41	440
West Upper Bay	901	2018	3.66	20	3.7	7.2-7.8		34-35	415

No data for Emerald Lake and Seton Lake.
pH, alkalinity, calcium, conductivity collected in 2009.

3.2 PROBABILITY OF SSW INTRODUCTION IN LAKE MINNETONKA

Based on boater movement analyses, there is a strong likelihood of SSW being introduced into Lake Minnetonka by 2025 (Phelps 2018) (Table 2). Therefore, watercraft inspections have to be effective to delay a potential new introduction. Incoming boat traffic to Lake Minnetonka is significant. For example in 2015, a total of 36,133 watercraft were inspected. The number of uninspected boats coming to Lake Minnetonka is unknown but likely significant.

Table 2. Starry stonewort: high-risk lakes by 2025 through boater movements (source: Phelps, N. 2018. Estimating AIS risk for Minnesota lakes. MAISRC Research and Management Showcase).

MN DNR Division of Waters (DOW) Number	Lake Name	Predicted Boater Risk (2025)
11020300	Leech	15.94%
48000200	Mille Lacs	15.88%
2713300	Minnetonka	14.20%
25001700	U.S. Lock & Dam # Pool	13.87%
56014100	Rush	13.77%
45000200	Mud	13.35%
25000100	Pepin	13.30%
19000100	U.S. Lock & Dam #2 Pool	12.98%
69061700	Sand Point	12.95%
3010200	Shell	12.87%
32005700	Heron	12.83%
43011500	Cedar	12.71%
77021500	Osakis	12.63%
18030800	Pelican	12.63%
15024500	Kiwosay Pool	12.62%
40009200	Jefferson	12.61%
37004600	Lac Qui Parle	12.55%
11030500	Gull	12.51%

Inspections of incoming boats have value for educating the boating public and possibly slowing the spread of AIS. Boat inspections by themselves have not stopped the spread of Eurasian watermilfoil or zebra mussels into Minnesota and Wisconsin lakes (Figure 3).

Boat inspections continue to play a role but their ability to stop new introductions of AIS into lakes should be evaluated based on the pattern and spread of other AIS. Starry stonewort is a relatively new invader and it is difficult to predict its future rate of invasion into uninvaded lakes. Zebra mussels and Eurasian watermilfoil have had different rates of invading lakes. In Minnesota the Eurasian watermilfoil infestation rate has been linear (R^2=0.96) and the zebra mussel infestation rate has been exponential (R^2=0.97). It is possible that more efficient boat inspections could likely reduce the rate of new AIS infestations.

Boater visits from Minnesota lakes will be ongoing. In 2018, boat inspectors inspected boats from at least eight Minnesota lakes with SSW (Figure 4). Overall there were visitors from 28 states (Figure 5) with several states to have known SSW occurrences.

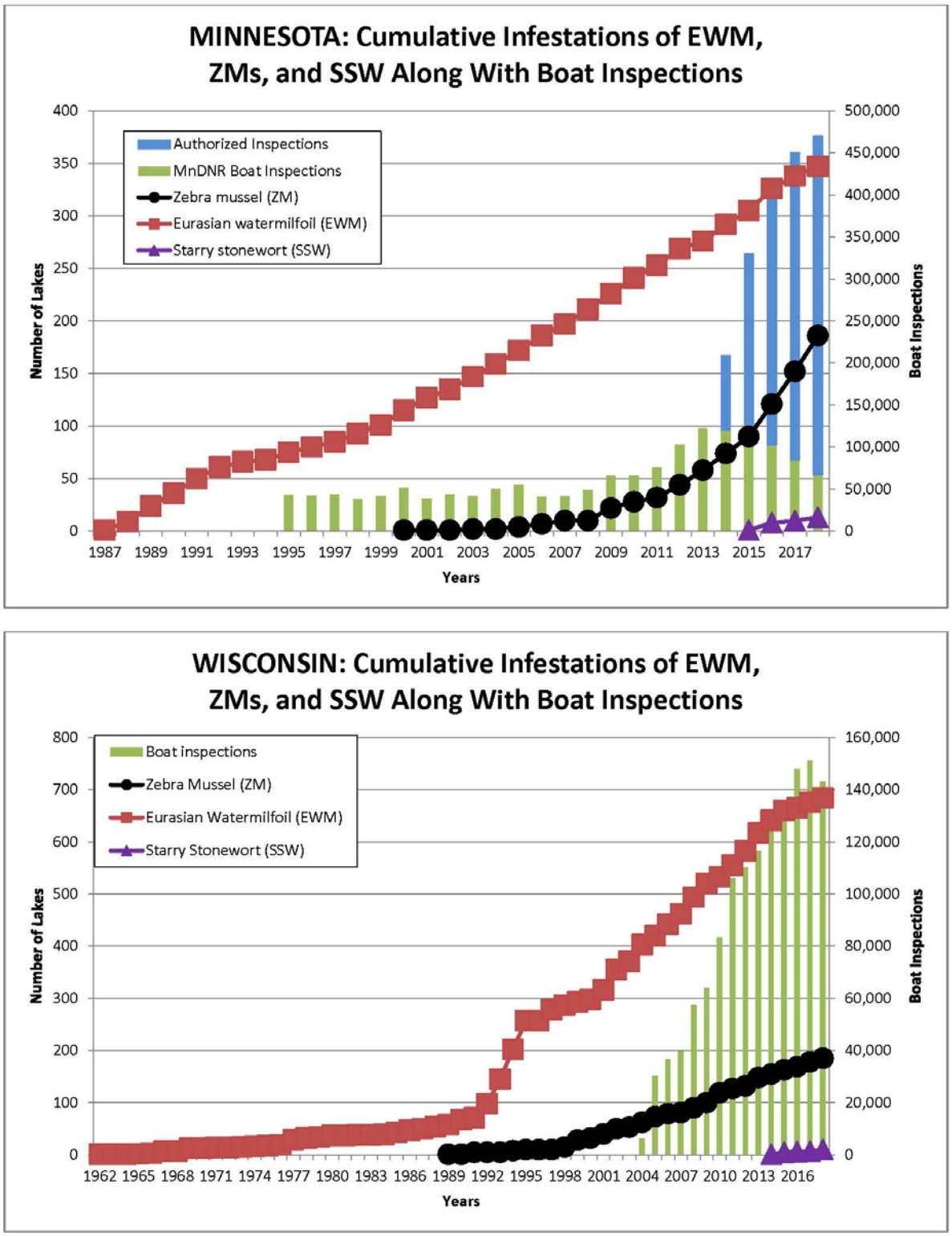

Figure 3. Cumulative number of lake infestations by year for Minnesota and Wisconsin lakes for Eurasian watermilfoil, zebra mussels, and starry stonewort along with annual boat inspections (source: DNR and WDNR AIS lists and boat inspection reports, various years).

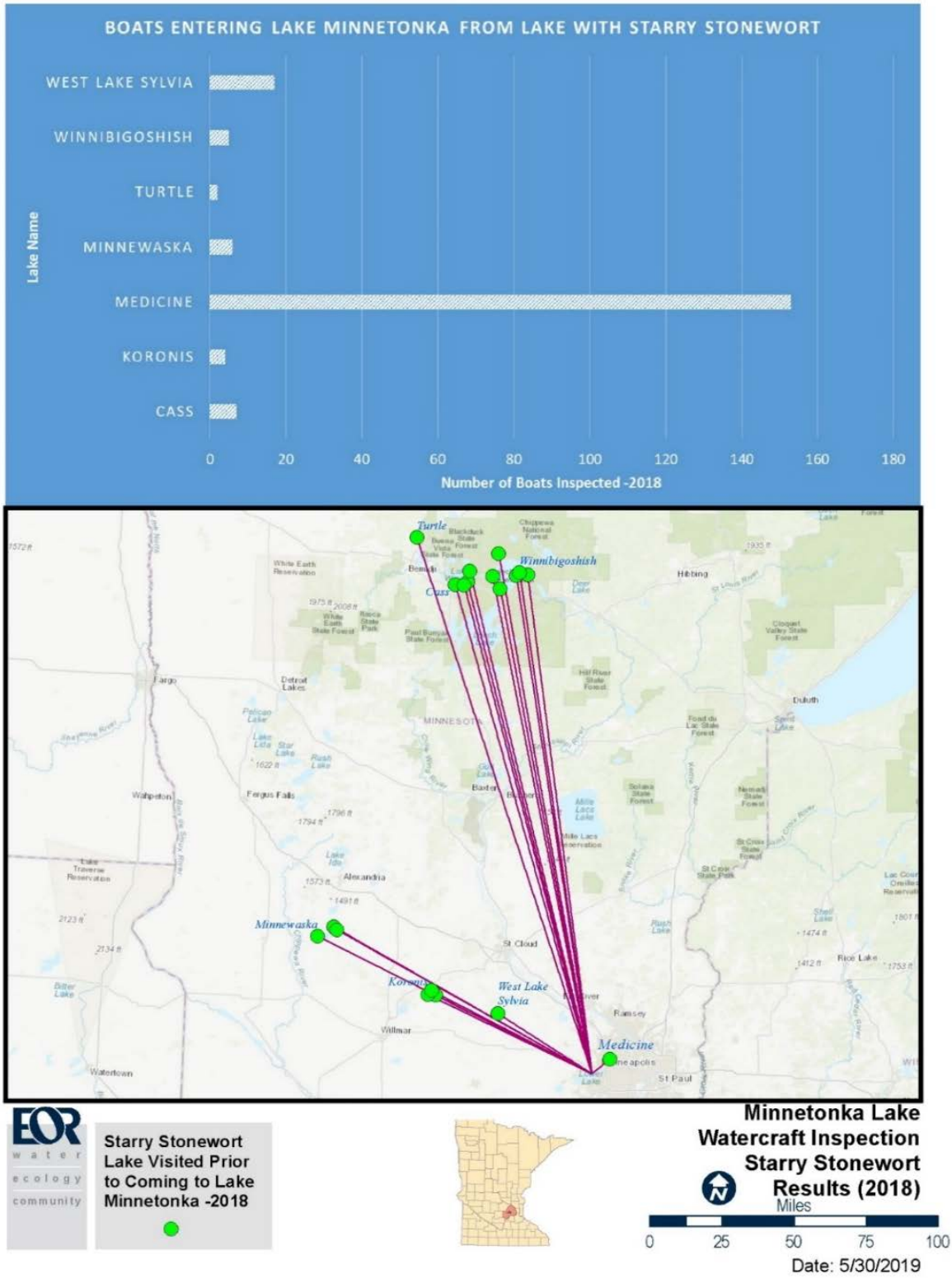

Figure 4. Inspected boats leaving starry stonewort lakes and then launching at Lake Minnetonka in 2018 (source: DNR). Bar graph (top) shows the number of DNR inspected boats in 2018 leaving SSW infested lakes and launching at Lake Minnetonka. Data is based on more than 20,000 watercraft inspections conducted on Lake Minnetonka in 2018. Inspected boats represent a small fraction of the total number of boats launching on Lake Minnetonka.

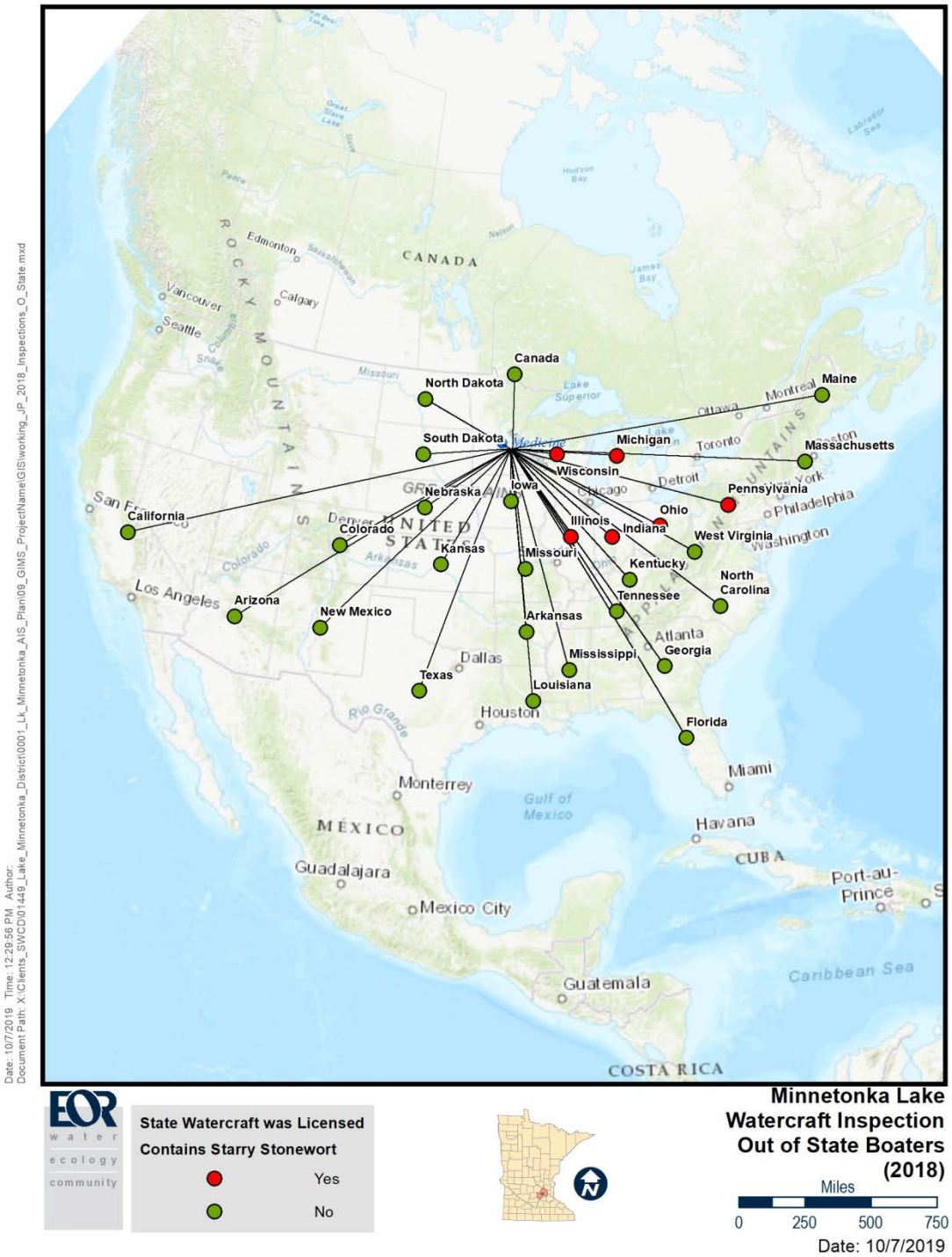

Figure 5. Boaters from 28 states and Canada visited Lake Minnetonka in 2018 including several boaters from states in which Starry Stonewort has been found.

4 STARRY STONEWORT POSSIBLE GROWTH OUTCOMES

If SSW is introduced into Lake Minnetonka, four outcomes are possible using nomenclature from Blackburn et al (2011). Four possible outcomes after an introduction include failure, establishment, naturalization, or invasive growth (Figure 6).

At this time, not enough information of the phenology (life cycle and suitability conditions) of SSW is known to predict what type of SSW growth could be expected in various bays of Lake Minnetonka. A review of Starry Stonewort littoral zone percent frequency data for Wisconsin Lakes with recent SSW infestations suggests that the SSW may increase or decrease in abundance regardless of the management approach used. For example, SSW frequency has declined in Pike Lake in Washington County, Wisconsin despite no management efforts being attempted in this waterbody. In Little Muskego Lake, Waukesha County, Wisconsin, SSW has significantly increased despite aggressive management techniques including lake drawdowns and dredging. In Lake Koronis and other Minnesota lakes with SSW infestations, SSW appears to be displacing native *Chara* spp. Preliminary results from a 2019 survey following a 2018 finding of SSW in Lake Geneva in Walworth County, Wisconsin have found that SSW appears to be intermixed with native species in areas with healthy native plant communities. In other areas that are non-vegetated, SSW was observed to be more aggressive, and was the dominant species observed.

Although prevention of an introduction of SSW is the goal, early detection methods are critical as well. Currently, the sort of impacts this species will have in terms of ecology and economics are speculative. Because of the uncertainty, an emphasis should be placed on prevention with a strong rapid response plan in place as well.

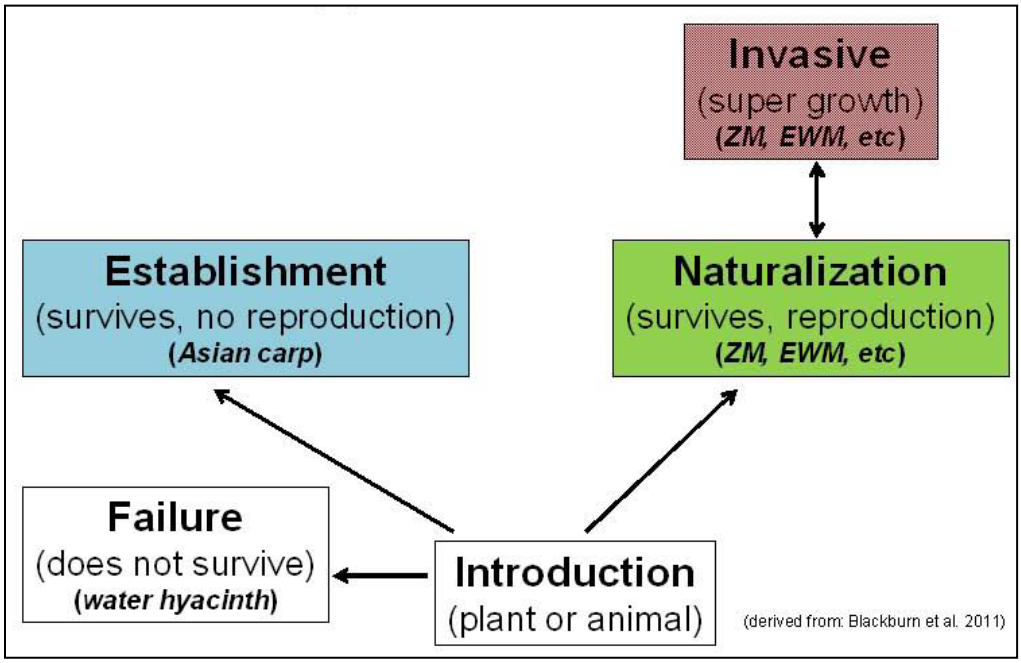

Figure 6. Possible outcomes of SSW introduction into Lake Minnetonka using nomenclature from Blackburn et al 2011.

5 STARRY STONEWORT PREVENTION AND EARLY DETECTION PLAN

The components of an AIS management program include prevention, early detection, rapid response, and management following invasion. The objective of the Starry Stonewort (SSW) Prevention and Early Detection Plan is to first prevent a SSW introduction into Lake Minnetonka and to outline a sequence of events that follow an initial detection of starry stonewort in Lake Minnetonka.

Inspection and prevention programs are the foundation for aquatic invasive species (AIS) comprehensive management programs and represent an important component of an AIS management program. Unfortunately, existing inspection and prevention programs have not demonstrated a capacity to prevent the spread of other AIS such as Eurasian watermilfoil or zebra mussels in Lake Minnetonka as well as other Minnesota lakes. The following sections outline measures that should be taken to enhance the existing prevention and early detection program. These measures include:

1. Optimizing boat inspections:

Two-types of boat inspections are recommended. One type of inspection involves exit inspections at all 14 Minnesota lakes with SSW present. The other type of inspection is for incoming boats to Lake Minnetonka with enhanced inspection for boats that have recently been in any of the 14 SSW lakes. There are seven priority public accesses on Lake Minnetonka that should have extra inspection hours.

2. Conducting Incoming Boat Inspections for Lake Minnetonka:

Using incoming boat inspections to prevent the introduction of SSW is a goal for Lake Minnetonka. Public access inspections have been prioritized based on the probability of SSW introductions on a scale of high, moderate, or low priority (Table 3 and Figure 7). The 5 high priority public accesses would be staffed for 10 hours per day, 7 days a week from June through October. The 2 moderate priority accesses would be staffed for 50 hours per week and the 2 low priority accesses would use existing inspection levels.

Even with this enhanced level of inspections, an unknown percentage of incoming boats would still not be inspected. For a large lake like Lake Minnetonka with multiple access points, 100% inspection of incoming boats is not practical. An enhanced boat inspection program could delay a SSW introduction, but there is no guarantee there would be 100% prevention of a SSW introduction over the next 50 to 100 years.

At this time, only drastic and expensive options could give close to 100% prevention, but cost and accessibility to the lake would not be publically acceptable.

3. Conducting Exit Inspections at Lakes with Starry Stonewort:

Based on available data from boat inspections, it was found that of the lakes with current SSW populations, Medicine Lake has the most inspected boats exiting the lake and then visiting Lake Minnetonka. As part of the exit inspection process, watercraft users are asked where they plan to take their watercraft next, and what county the waterbody is located in. Of the 10,187 respondents, nearly 70% of watercraft inspectors planned to return to waterbodies within Hennepin County. It should be noted that the DNR inspection data represents a fraction of the

boats entering the lake in a given year. Extra hours of inspection for boats leaving Medicine Lake are recommended. Exit inspections at the other 13 lakes are recommended as well. Funding for additional exit inspections is not currently allocated at this time. Furthermore, it should also be noted that out of state boaters frequently visit Lake Minnetonka. Inspection data collected in 2018 found that a portion of these boaters were from States which contain waterbodies that are infested with Starry Stonewort. The most realistic approach to preventing an introduction of SSW into Lake Minnetonka from other Minnesota lakes is a 2-step approach.

First, Conduct exit inspections on 100% of the boats on all Minnesota lakes that currently have SSW. Also apply copper sulfate at public accesses at the 14 SSW lakes to reduce SSW biomass and prevent SSW transport by a boat trailer

Second, Conduct bi-weekly surveys at priority boat accesses.

By keeping the SSW growth to a minimum at infested public accesses, the probability of a boat trailer picking up SSW is greatly reduced. Theoretically, this approach would insure the highest level of protection against transport of SSW into Lake Minnetonka as well as other lakes in Minnesota.

Table 3. Lake Minnetonka public access priority inspection areas

Bay	Percent of Bay in Littoral Zone (Acres)	Public Access Parking Spaces	Multiple Dock Licenses Boat Storage Units (BSUs)	Priority for Inspection at Public Access
Carsons Bay	76% (88)	17 trailer plus additional nearby parking	203	**High**
Cooks Bay	31% (131)	17 vehicle/8trailer	30	Moderate
Grays Bay	71% (127)	20 vehicle/107 trailer	88	**High**
Halsted Bay	59% (322)	14 vehicle	153	Low
Maxwell Bay	58% (174)	15 vehicle/80 trailer	239	**High**
North Arm Bay	58% (186)	10 vehicle/51 trailer/3 accessible	6	**High**
Phelps Bay	79% (272)	1 vehicle/2 trailer	123	Low
Spring Park Bay	37%(141)	2 vehicles/8 trailer plus nearby parking/1 accessible	236	Moderate
West Upper Bay	22% (193)	100 vehicle/53 trailer/ 6 accessible	63	**High**

*Private accesses, and local fire lane accesses are not included. While these accesses are lower risk do to a lower number of boaters, they do represent potential vectors for starry stonewort to become introduced.

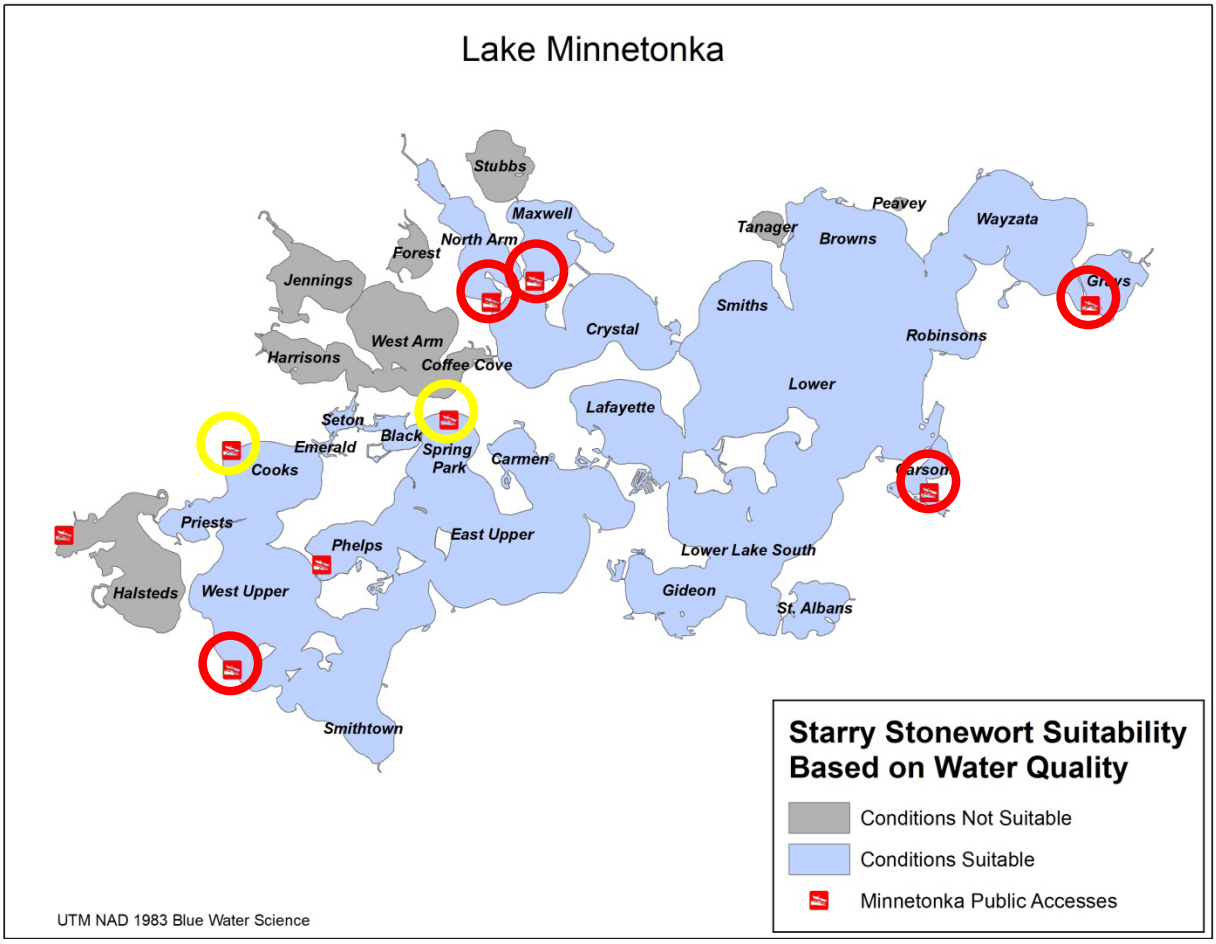

Figure 7. Suitability of starry stonewort survivability in Lake Minnetonka along with 9 public accesses. Public access inspection priorities are shown with red circles (high priority) and yellow circles (moderate priority). Four public accesses without a circle are lower priority for boat inspections.

4. Enhanced starry stonewort early detection search programs:

Contract for bi-weekly searches using scuba diving, snorkeling, wading, and rake sampling from July-October. In addition, boat inspectors at the public access should spend a minimum of 1 hour a week using rake sampling to search for SSW. If starry stonewort is found, verify with DNR, produce a press release, notify lake residents, and implement a control plan.

5. Licensed Multiple Dock Facility Inspections:

The first infestation of SSW in Lake Geneva, Wisconsin came in an area immediately adjacent to a private marina licensed to provide storage for multiple boats. In addition to boat inspections conducted at public accesses, the LMCD should spend a minimum of 1 hour a week using rake sampling to search for SSW at private marinas and licensed boat storage facilities.

A chart listing several prevention and early detection methods for Lake Minnetonka are shown in Table 5. A combination of the first three methods has the best potential for preventing a SSW introduction and detecting an early invasion based on politics, technical aspects, and costs.

Table 5. Evaluated methods for prevention and early detection of SSW in Lake Minnetonka. Methods 1, 2, and 3 would be the most practical and effective for implementing.

Method	Politically Acceptable	Technically Achievable	Economically Feasible	Probability of Preventing a SSW Introduction (points)	Probability of Implementation (points)	Total Score (points)
1. Bi-weekly surveys at priority boat accesses.	Yes	Yes	Yes	**High (4)**	**High (4)**	**8**
2. Extra boat inspections at priority public accesses	Yes	Yes	Yes	**Moderate (3)**	**High (4)**	**7**
3. Conduct exit inspections on 100% of the boats on all Minnesota lakes that currently have SSW. Also apply copper sulfate at public accesses at the 14 SSW lakes to reduce SSW biomass and prevent SSW transport by a boat trailer.	Unlikely – Who is responsible?	Yes	Yes	**High (4)**	**Moderate (3)**	**7**
4. Don't allow any boats to visit Minnetonka, use a boat club approach.	No	Unlikely	Unlikely	**High (4)**	**Very Low (0)**	**4**
5. I-LIDS: Motion detected video surveillance cameras at boat access are a potential option but rate as low priority.	Yes	Yes	Yes	**Very Low (0)**	**High (3)**	**3**
6. Inspect 100% of incoming boats.	No	No	No	**Moderate (3)**	**Very Low (0)**	**3**
7. Put all boats and trailers through a chemical bath before entering Lake Minnetonka.	Unknown	No	No	**Moderate (3)**	**Very Low (0)**	**3**
8. Develop a Preemptive Pilot Study* which incorporates the use of pre-emptive copper sulfate dosing at prioritized Lake Minnetonka public accesses every 2 to 4 weeks during the growing season. Treatments are prioritized on a launch-by-launch basis, but focus will be on higher risk launches.	Unknown	Yes	Yes	**Low (2)**	**Very Low (0)**	**2**
9. Using e-DNA monitoring for detecting SSW (not available at this time): Currently (as of 2019) there are no kits for sampling and identifying the presence of SSW in a lake using e-DNA.	Yes	No	No	**Very Low (0)**	**Low (1)**	**1**

*note this is not an introduction prevention strategy. It assumes that SSW has already been introduced into Lake Minnetonka, but has not yet become fully established Initially, EOR and the LMCD recommended working with the DNR and MAISRC to develop a pilot program to attempt preemptive copper sulfate applications at priority public access points in Lake Minnetonka. Since meeting with the LMCD, EOR and BWS have determined that preemptive copper sulfate treatment at public accesses are not a viable solution for the following two reasons:

6 EMERGENCY ACTION PLAN

6.1 RAPID RESPONSE PROGRAM FOR STARRY STONEWORT INTRODUCTION

1. Rapid response assessment:

After the first verified observation of starry stonewort in a Lake Minnetonka bay, conduct an assessment effort. Contractors, DNR, and others should conduct an initial search in the most probable locations to determine the distribution of starry stonewort. From 10 - 20 hours of surveying should be conducted for a thorough assessment. All SSW locations should be sited with GPS.

2. Rapid response action:

If SSW is found only within a public access area (or an area less than 20-acres) after the rapid response assessment then the rapid response action could be a containment attempt. LMCD staff and managers would coordinate in decisions as to what type of a rapid response action should go forward. DNR permits are necessary for treatments and meetings should be conducted prior to any eradication treatments.

3. Starry stonewort containment:

When the management objective is to contain SSW in a small area, aggressive treatments should be considered. Apply a copper sulfate product to a delineated area, wait 2 weeks and resurvey. If SSW is found, treat with copper sulfate again. Repeat up to 4 times during the SSW growing season from June- October. A step by step description of the recommended rapid response action is provided in section 6.2, located on the next page of this document.

7 MANAGEMENT OPTIONS

After reviewing SSW treatment results in Michigan, Wisconsin, and Minnesota, the most cost effective treatment has been the use of **copper sulfate.** Hand pulling can be considered for very limited infestations, but then a follow-up copper sulfate application should be considered. Other methods that have been attempted, but have been less effective include dredging, DASH (diver assisted suction harvesting), and drawdown. After a treatment, a post-treatment evaluation is necessary to determine the effectiveness of a containment treatment. This protocol is available from the DNR. Components will likely include a thorough search of the treatment area, and a post treatment survey of the treatment area and surrounding area. A flow chart showing a sequence of steps is shown in Figure 8.

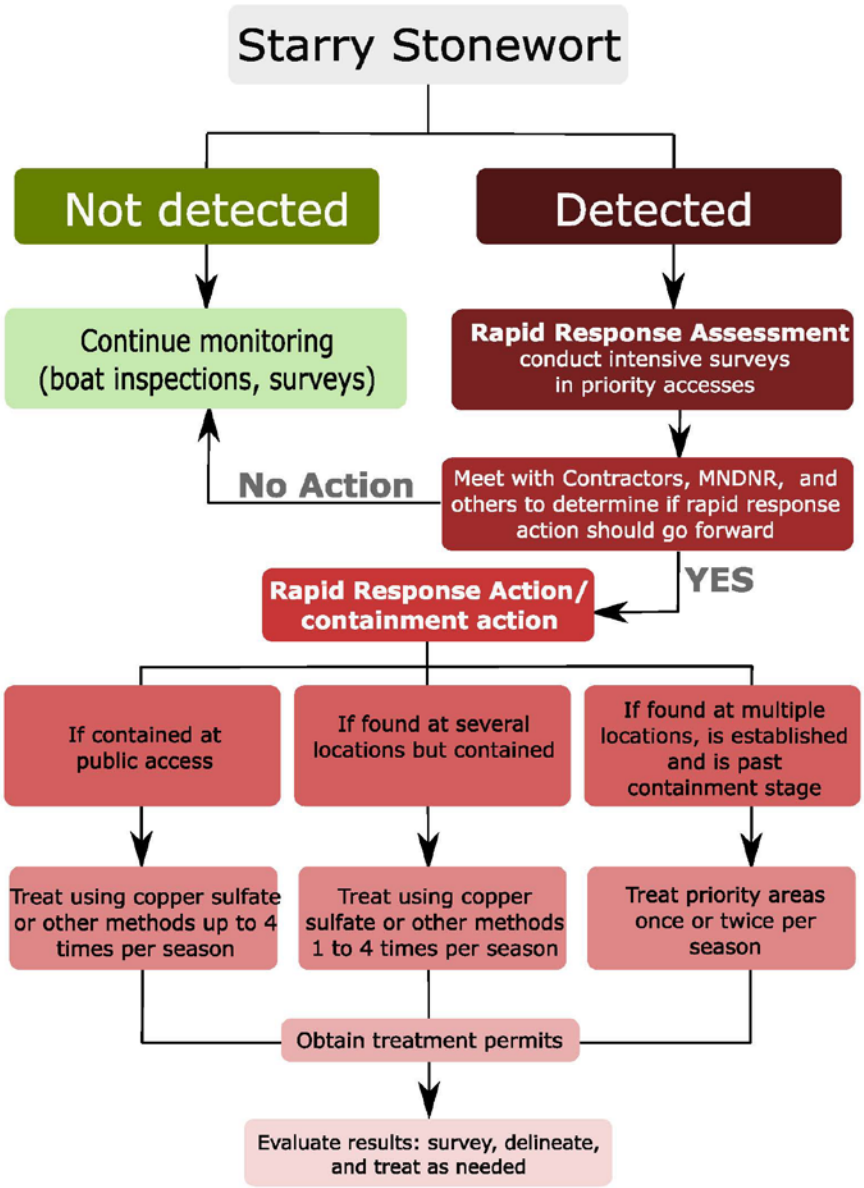

Figure 8. Starry Stonewort Rapid Response Plan Flow Chart.

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