HUBBARD COUNTY COALITION OF LAKE ASSOCIATIONS

Hubbard County COLA's AIS Lake Monitoring Early Detection Program

Aquatic Invasive Species Volunteer Monitoring Guide

5/24/2016

This plan is intended to provide an easy-to-use guide to help citizens become educated in Aquatic Invasive Species identification and monitoring techniques. It is a plan of how, who, where and when to be looking for aquatic invasive species. At the same time, it may help our greater lake community gain a broader appreciation and understanding of the native aquatic plants in our lakes and how they contribute to the health of our lakes.

Contents

ACKNOWLEDGEMENTS

Developed by:

Hubbard County Coalition of Lake Associations
P.O. Box 746
Park Rapids, MN 56470

http://www.hubbardcolamn.org/index.html

A special thanks to the following resources that have provided assistance with the development of the Hubbard COLA AIS Lake Monitoring Guide:

1. "Guidance for Conducting Aquatic Invasive Species Early Detection and Baseline Monitoring in lakes developed by the Minnesota DNR and updated on 7/2015.
2. Mary Blickenderfer, University of Minnesota Extension, Water Resource Educator.
3. Citizen AIS Monitoring Guide, a Guidance Manual for AIS Monitoring developed by Minnesota Waters and Minnesota Department of Natural Resources; 2011 Edition.
4. Volunteer Aquatic Invasive Species (AIS) Monitoring and Inspection Plan for Little Sand Lake (29-0150-00) Hubbard County, Minnesota, September 10, 2010.
5. Aquatic Invasive Species Volunteer Monitoring Manual, Minnesota Department of Natural Resources, September 2, 2010.
6. Stearns County AIS Rapid Response Plan for Aquatic Invasive Species
7. Minnehaha Creek Watershed District
8. Doug Kingsley, DNR, Park Rapids Area Fisheries Office.

2016 Edition

AIS LAKE MONITORING / EARLY DETECTION PLAN HUBBARD COUNTY

INTRODUCTION

In recognition of the AIS threat to Hubbard County lakes, the Hubbard County AIS Task Force, comprised of local county stakeholders, developed the Hubbard County AIS Prevention and Management Plan" in 2014. The Hubbard County AIS Task Force Mission Statement says: "Do everything possible to eliminate all opportunities & pathways for the spread of AIS to Hubbard County area lakes and rivers". The AIS Task Force will do this by engaging the Hubbard County "community" in the following initiatives to achieve their mission:

1. Public Awareness / Education
2. Prevention and Decontamination
3. Early Detection
4. Rapid Response and Containment
5. Mitigation and Management

This volunteer monitoring guide will focus on the AIS Early Detection phase of the Hubbard County AIS Prevention and Management Plan. The AIS Lake monitoring early detection plan will serve as guidance to the lakes in Hubbard County for implementing a successful AIS Lake Monitoring Plan on their lake. The plan can also serve as a template for citizens elsewhere in Minnesota for implementing AIS monitoring programs at other lakes.

SUMMARY

As aquatic invasive species (AIS) continue to spread among Minnesota Lakes and Rivers, it is crucial that AIS Lake Monitoring Early Detection programs be implemented at lakes fortunate enough not to be infested. **Early detection of an AIS infestation in a water body can help prevent spread to other lakes and rivers.**

A variety of actions can be undertaken for citizens to learn about aquatic invasive species and expand the capacity of AIS Lake monitoring in Hubbard County. The Hubbard COLA AIS Lake Monitoring Plan will focus on the following elements:

1. Education in identification of AIS and Sampling and Monitoring Techniques. Citizens will learn how to recognize invasive aquatic plants, invertebrates and their look-alikes.
2. Recruitment of trained leaders and monitoring teams for AIS Lake monitoring and related activities.
3. Elevate the level of concern for AIS Lake monitoring and increase the intensity of the early detection effort in Hubbard County through the following actions:
    - Maintain and expand the **dedicated approaches** to AIS sampling and monitoring that were initiated in 2015.
    - Expand AIS monitoring to focus on **opportunistic approaches** to AIS detection for lake users and citizens and boost our "army of eyes on the water" for the purpose of searching and looking for AIS.
4. Provide each lake association with Hubbard COLA's AIS Lake Monitoring Resource Guide that features various resources that will assist with lake monitoring and early detection of AIS.

5. Advocate for increased AIS Lake monitoring through a comprehensive AIS communication and reporting plan. Documenting our data collection and reporting will help us use our data to assess the quality of our results.
6. Foster community partnerships to further expand the number of "early detectors" that are searching and looking for AIS on Hubbard County lakes.
7. Advocate for appropriate safety precautions, while volunteers are working on the water.

TRAINING IN IDENTIFICATION OF AIS AND MONITORING TECHNIQUES

Some training is essential for enabling citizens to distinguish native from non-native species, find suspect specimens and implement a successful AIS monitoring program. The following are opportunities where citizens can learn about AIS Lake monitoring and Early Detection.

1. HCCOLA sponsored training opportunities where citizens can learn about:
    a. How to identify AIS.
    b. When and where to look for AIS
    c. Tips and tactics on sampling protocols.
2. HCCOLA members and Friends of COLA can learn about AIS identification and sampling protocols at monthly HCCOLA meetings.
3. Lake Associations are encouraged to provide speakers and information on AIS identification and monitoring at association meetings, on websites and in newsletters.

The following materials are available through Hubbard COLA and will be provided for each lake association:

1. Hubbard COLA's AIS Lake Monitoring Early Detection Resource Guide will provide the following resources about AIS Lake monitoring and early detection.
    a. AIS identification fact sheets will be provided as part of HCCOLA's Early Detection Guide and are available on the Hubbard COLA website at: http://www.hubbardcolamn.org/identification-facts--monitoring.html
    b. Tips and tactics about sampling and monitoring protocols.
    c. Communication, recording and reporting strategies.
    d. Directions for assembling a monitoring tool kit will be available for lakes to duplicate and will be included as part of the AIS Lake monitoring guide in Appendix A.
    e. With the new infestation of Starry Stonewort in Minnesota, we have included the following resources to assist lake associations with the identification of Starry Stonewort:
        i. AIS fact sheets on Starry Stonewort, UW – Extension Lakes: https://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/programs/CLMN/AISfactsheets/17StarryStonewort.pdf

            https://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/programs/CLMN/AISfactsheets/Starry%20stonewort%20laminate%20fact%20sheet.pdf

        ii. Starry Stonewort video available on the following link: **https://www.youtube.com/watch?v=te9iF5OTdtg&feature=youtu.be**

2. Additional Aquatic Invasive Species Monitoring References are available for further guidance when planning AIS Lake monitoring activities:

a. MNDNR's "Guidance for Conducting Aquatic Invasive Species Early Detection and Baseline Monitoring in Lakes, Minnesota DNR. Updated on 7/2015. This guide is available at: http://files.dnr.state.mn.us/natural_resources/invasives/prevention/ais_detection-baseline-monitoring.pdf

b. 2015 Itasca County Aquatic Invasive Species Identification Guide. To purchase contact: vjhaack@gmail.com
c. "A Field Guide to Identification of Minnesota Aquatic Plants", Second Edition, University of Minnesota Extension, Mary Blickenderfer, Ph. D _
d. Stearns County AIS Rapid Response Plan http://www.co.stearns.mn.us/Portals/0/docs/Department%20Files/EnvironmentalSvs/AISRapidRespPlan.pdf
e. Minnesota Sea Grant Fact Sheets and AIS Identification Cards. http://www.seagrant.umn.edu/ais/index
f. Wisconsin Citizen Lake Monitoring Training Manual https://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/programs/CLMN/AISmanualFULL2-18-16forWEB.pdf

RECRUITMENT OF TRAINED VOLUNTEERS FOR AIS SURVEYS AND RELATED ACTIVITIES

Lake Associations will identify an AIS Coordinator and AIS Core Team who will design and implement an AIS Lake monitoring program. The AIS Core Team will coordinate the following activities:

1. Promote and implement Dedicated and Opportunistic (casual) searches for aquatic invasive species on their lake.
2. Educating the greater lake association community about the risk of AIS and taking deterrent action.
3. Lake associations are encouraged to identify trained AIS detectors from neighborhoods/beaches on their lake for dedicated and opportunistic searches of AIS.

DEDICATED APPROACHES TO AIS DETECTION

Dedicated (focused) surveys are formal AIS search and collection operations by trained volunteers that follow specific methods and schedules and are repeatable. This effort would consist of focusing on high risk areas for AIS introductions and include monitoring methods for aquatic invasive plants and animals. The following are examples of dedicated (planned) searches for invasive plants and animals (invertebrates).

Zebra/Quagga Mussels

Monitoring for zebra/quagga mussels should include both dedicated and opportunistic approaches. All lake residents should be able to identify zebra mussels and always be on the lookout for them attached to boats, docks, lifts, rocks, aquatic plants, and so on. The following are dedicated tactics to use when searching for zebra mussels:

1. Veliger Sampling – sample for larval zebra mussels in water with a plankton net.
   a. Veliger monitoring is being conducted through Hubbard COLA in conjunction with RMB Laboratories and/or the SWCD.

b. In 2015, 29 lakes in the Park Rapids area were monitored for zebra mussel veligers through water sampling. Hubbard COLA will look to expand our veliger monitoring in 2016.
c. For further information about zebra mussel veliger sampling contact Hubbard COLA at hccolamn@gmail.com

2. Adult/juvenile zebra mussel monitoring.
a. Cinder blocks or Zebra Mussel Settlement Samplers are surfaces on which zebra mussels will settle after they complete their veliger stage and grow into adult-juvenile mussels.
b. Suspend blocks from docks at approximately 8 – 12 high risk areas spaced around the lake. Refer to HCCOLA website for Zebra Mussel monitoring protocols for how and when to monitor for zebra mussels. http://www.hubbardcolamn.org/uploads/3/4/5/6/34563649/protocols_for_ais_blocks.pdf
c. Small cinder blocks are available for distribution to lake associations to use as a monitoring device at monthly COLA meetings.
d. The more lakeshore residents participating in such monitoring activities, the sooner the presence of zebra mussels can be detected.
e. Report zebra mussel sampling findings on HCCOLA survey form via email at hccolamn@gmail.com annually in September. Zebra mussel monitors can review the "Zebra Mussel Monitoring Survey" in Appendix D (sample only).

3. Shoreline Searches
a. Inspect rocks, wood and other solid objects as well as vegetation for attached zebra mussels along your shoreline.
b. Suitable habitat for zebra mussels is commonly hard or rocky bottoms in water 2 – 12 feet deep.
c. Wade or snorkel in shallower water.

4. Monitor for adult/juvenile zebra mussels on lakeshore equipment**.**
a. Visually inspect hard surfaces such as docks, lifts, swimming platforms and other equipment for zebra mussels, when removing equipment at the end of the season.
b. Report your inspection findings annually in September on HCCOLA survey form at hccolamn@gmail.com whether or not you found zebra mussels.

5. When doing the invasive aquatic plant inspections those volunteers should also be on the lookout for zebra mussels attached to aquatic plants or other places they are sampling.

.

Spiny Waterfleas

1. Because spiny waterfleas are open water invertebrates, they are difficult to sample. Inspections for Spiny Waterfleas will again be both Opportunistic and Dedicated approaches.
2. All members of the lake should be able to identify spiny waterfleas and always be on the lookout for a gelatinous mass on fishing line, downrigger cable or anchor rope.
3. Spiny Waterfleas are particularly noticeable on fishing line as they can be found entangled in fishing line that is retrieved back to the reel.
4. Lake volunteers should be on the lookout for Spiny Waterfleas if they are conducting water quality monitoring, secchi disk readings, dissolved oxygen/water temperature monitoring, veliger sampling or any other lake activity.
5. For further information about Spiny Waterfleas identification / monitoring go to: http://www.hubbardcolamn.org/uploads/3/4/5/6/34563649/spinyfishhook_waterflea_id_sheet_4-24-15__hubbard_county.pdf

Faucet Snails:

1. Since it is difficult to distinguish the native snails from the non-native, invasive faucet snail, please report every occurrence of tiny, corkscrew-like snails.
2. Search locations for faucet snails:
    a. On suitable habitat around lakeshore such as on or under rocks, sand, clay or mud.
    b. On aquatic plants during the warmer months
    c. On docks and other objects placed in the water
    d. Shorelines in water up to 5 meter depth
3. For further information about Faucet Snail monitoring and identification go to: http://www.hubbardcolamn.org/uploads/3/4/5/6/34563649/faucet_snail_id_sheet_4-24-15__hubbard_county.pdf

Aquatic Invasive Plants

1. Searches or aquatic invasive plants will include:
    a. Learning the difference between non-native invasive plants and native plants and use of aquatic plant identification materials to better determine what you are looking at.
    b. These searches should be done during the open water season, when plants are large enough to see and in cases with lakes with water clarity issues, before the clarity is limited by algae growth.
    c. The searches should also be conducted on clear calm days to **better see through the water**. A pair of polarized glasses can dramatically increase your visibility into the water and are recommended for use.
2. Focused inspections should include the following steps:
    a. Prioritize inspection sites (high, moderate, lower risk) on a lake map.
    b. Each inspection will include visual **(looking through the water)** and when something out of the ordinary is observed use a plant rake to identify it as native or non-native invasive.
    c. One may also throw the rake at deeper locations or locations in which you may suspect AIS to verify presence or absence.
    d. Use AIS identification fact sheets found in the AIS Lake monitoring guide to better determine what you are looking at or go to **http://www.hubbardcolamn.org/identification-monitoring.html** **facts--**

SURVEY METHODS TO USE WHEN MONITORING FOR AIS

Survey methods below summarize a variety of actions that can be conducted during AIS Lake monitoring and early detection:

1. Monitoring and Mapping
    a. When putting together an AIS monitoring plan it is important to identify areas of your lake that have a higher risk for initial infestation of AIS.
    b. Using a map will help your volunteers decide where they will monitor and allow these areas to be assigned to a volunteer or volunteer team.
    c. On your monitoring map be sure to mark:
        i. Monitoring spots: the locations you will be monitoring.
        ii. Lake name
        iii. Volunteer group
    d. Lakes can identify neighborhood areas or beaches that can be a focal point to assign specific locations for AIS Lake monitoring.
2. **Search public water access sites.**

a. **Conduct search along 100 feet of shoreline on either side of each public water access** (200 feet total).
b. Search out to maximum rooting plant depth (<15 feet water depth) or 100 feet from shore, whichever is closest) where a rake is used to collect and inspect plants.
c. Shoreline areas should be examined for invasive plants and invertebrates (e.g. under rocks, attached to hard substrates or aquatic plants).
d. Underwater camera can be used to help with AIS searches.
e. Complete field data sheets and report presence/absence of AIS.
f. **Be aware of your surroundings – do not trespass on private shore land property**.

3. **Search high risk target sites.**
    a. Search a minimum of 3 scattered sites within a lake that are vulnerable to invasion such as:
        i. Inlets/outlets
        ii. Highly developed shorelines
        iii. Private water accesses
        iv. Rock bars/points
    b. Utilize plant rakes and underwater cameras to assist with searches if necessary.
    c. Complete field data sheets and report presence/absence of AIS.
    d. Be aware of your surroundings – do not trespass and remain in your watercraft when conducting this portion of the survey.
4. **Meandering boat search** (lake wide survey via boat)
    a. Conduct search by driving a boat in a meandering pattern between the shoreline and the maximum rooting depth of 15 feet.
    b. Conduct **visual scans** across a range of shallow depths (up to 10 feet) to locate suspicious looking plants.
    c. Boat speed should be slow enough for spotters to scan submerged rooted vegetation and identify AIS.
    d. Select 20 random points (select number based on size of lake) along your route to collect plant samples with rake.
    e. Cruise the entire shoreline during July and August looking for blooming purple loosestrife or flowering rush.
    f. Conduct search when wind/waves are low.
5. Wading Searches (optional)
    a. Follow standard safety procedures.
    b. Do not trespass on private property
    c. Use net or rake samples.
    d. Shoreline areas should be examined for invasive plants or invertebrates attached to rocks, plants or hard substrates.
6. Safety Issues
    a. Always take the appropriate safety precautions when conducting your monitoring activities.
    b. Using the "buddy system" when conducting monitoring activities is not only more fun, it can also reduce danger in case of an emergency.
    c. Know and follow all boating rules.
    d. Wear personal flotation device (life jacket) at all times.

OPPORTUNISTIC APPROACHES TO AIS EARLY DETECTION

Opportunistic searches are casual, non-structured efforts to look for AIS as time permits. They can be conducted at any time by anyone on the lake with general knowledge of what to look for and where to look for it. Those living or recreating on the lake can casually turn over a few rocks, check plants that have washed up on their beach or access, or just check your boat and dock for AIS, when they are removed from the water. By being educated in AIS and knowing what they look like, individuals can easily identify AIS and report them to local authorities.

Why Consider Employing Opportunistic Searches For Aquatic Invasive Species:

While Hubbard COLA's 2015 AIS lake monitoring program was successful in increasing the number of participating lake associations and lake residents in early detection, it was very challenging to engage certain lakes and to employ the sufficient number of early detectors that are necessary to truly find early introductions of AIS. Therefore, to increase our capacity for early detection of AIS, COLA will work to expand opportunistic (casual) approaches to further engage more lake users looking for AIS. −

The following points emphasize why Opportunistic Searches for AIS are an important component of Hubbard COLA's Lake monitoring program:

1. Review of current research and professional literature tells us that early introductions of AIS, especially zebra mussels, are very difficult to detect. The Stearns County Rapid Response Plan for Aquatic Invasive Species (Molloy & Osgood) suggests that only frequent, ongoing visual inspections of hard underwater surfaces and aquatic plants where zebra mussels typically attach will reveal a truly early introduction. The more frequently and more intense AIS monitoring occurs, the more likely a new AIS introduction will be detected.
2. Consequently, to be effective we need to engage more citizens to be "actively" searching and looking for new infestations of AIS. Simply, we need to further expand our "army of eyes on the water" for the purpose of early detection of AIS and a rapid response to control or contain any new AIS infestation.
3. Therefore, HCCOLA will augment our AIS Lake monitoring efforts to include Opportunistic approaches to AIS detection.

Further review of literature (newspapers and other media outlets) reveals that most zebra mussel introductions are discovered casually by lake users or people enjoying the lake. The following points summarize how numerous zebra mussel infestations have been discovered in Minnesota.

1. On 9 July 2012, a faucet snail was reported as being found amongst some leeches for use as fishing bait that were purchased from a local bait shop.
2. On August 15, 2014 a citizen volunteer checking water levels found a zebra mussel on floating vegetation near the public access at Lake Virginia.
3. Zebra mussels discovered in two Crow Wing County Lakes. The initial discovery was reported by the parents of two young boys who retrieved a plastic container with attached zebra mussels, while snorkeling in Gilbert Lake. A few days later, children swimming in North Long Lake found zebra mussels and their parents reported this discovery to the DNR. These young people and their parents saw something that looked out of place and reported it.
4. Closer to home on Cass Lake, someone found zebra mussels while collecting shells on the beach on Cedar Island.
5. An adult zebra mussel was discovered in July along the eastern shore of Ruth Lake by a 15-year old

vacationer.

6. On Fish Trap lake near Motley, a lake user reported that a zebra mussel was found adhered to a drenched tree branch close to shore of the lake.

These discoveries suggest that opportunistic / casual searches for AIS can be effective. In light of the nature of these discoveries, Hubbard County lakes are encouraged to promote opportunistic searches for AIS to increase our capacity to find new introductions of AIS on Hubbard County lakes.

A more comprehensive summary of how early introductions of AIS have been discovered in Minnesota are included in Appendix E.

The following points summarize HCCOLA's strategies to expand opportunistic searches for invasive plants and animals.

1. Promote education of lake residents about how they can watch for AIS through Opportunistic Searches.
    a. Provide information about opportunistic searches for AIS at lake association meetings through newsletters and on websites.
    b. Lake associations are encouraged to have AIS specialists talk to their members at their annual meeting about the zebra mussel problem and how to look for them.
    c. Use AIS identification factsheets to help residents become familiar with various aquatic invasive species.
    d. In general, non-trained people will not be able to identify invasive plants with certainty. However, if someone encounters an unfamiliar submerged aquatic plant or flowering plant on the shoreline that appears suspicious, we encourage them to bring samples to trained individuals for positive identification.
2. How untrained people can help with AIS detection
    a. Turn over a few rocks looking for zebra mussels.
    b. Check docks, lifts, etc.
    c. Check fishing line for evidence of Spiny Water fleas.
    d. Check washed up plants on your shoreline or vegetation growing near your shoreline.
    e. Cruise your shoreline looking for suspicious plants like flowering rush..
3. Develop innovative strategies to more effectively engage lake residents to participate in Opportunistic Searches for AIS.
    a. Develop educated lake leaders who can help out.
    b. Initiate an "Adopt Your Shoreline" or "Beachcomber" program.
    c. Get kids searching for snails and clams.
    d. Involve other lake users and the greater community in searching for AIS
4. **A fact sheet is available to help citizens become an AIS observer** entitled – Tips and Tactics for Opportunistic Searches for Aquatic Invasive Species on Park Rapids Area Lakes: "The Casual Observer" and can be found in Appendix B.

COMMUNICATION, DATA MANAGEMENT AND REPORTING

HCCOLA will advocate for AIS Lake monitoring with the implementation of a countywide communication network that includes the following tools and strategies:

1. Develop new tools and strategies for communication that may include:
    a. Constant contact Email/Goggle groups will include:
        i. **Lake association members and citizens who have participated in Hubbard COLA's lake monitoring and aquatic plant training classes since 2008 can play a key role in our AIS Lake monitoring early detection plan.** Class participants are encouraged to join in our adult/juvenile zebra mussel monitoring actions and opportunistic searches for AIS.
        ii. Communicate with network of lake association AIS Core leaders and teams.
    b. **Zebra Mussel Monitoring Survey**: Lake Association members and citizens will have an opportunity to participate in a new survey that will measure the effectiveness of our Zebra Mussel monitoring program. A sample of the survey can be found in Appendix D.
    c. COLA/lake association websites.
    d. Social media.
    e. Investigate novel approaches and use of technology:
        i. Smart phone apps
        ii. QR codes
        iii. GIS and other mapping applications.
    f. Engage community members and lake users that have an interest in protecting our lakes to be watchful for AIS.

2. Accurate record keeping and timely reporting are crucial components of the AIS monitoring plan.
    a. A simple Aquatic Invasive Species Field Survey Form usable by all trained volunteers can be found in the attachments of this Guide. This form can be modified for your lake association.
    b. These forms can be completed and filed with the AIS Task Force Coordinator.
    c. Additional reporting forms will be available as needed.
    d. Report results to the lake association board and to the COLA AIS Task Force. This can be done on an annual basis, or immediately in the case of an AIS or unknown species being discovered.
    e. Any detection of AIS should be reported to the DNR Invasive Species Specialist located in Park Rapids.
        i. Contact information for local experts that can assist with the identification of any AIS or suspect specimens include the following:
            1. Nicole Kovar, AIS Specialist, Park Rapids, 218-732-8960
            2. Park Rapids Area Fisheries Office, 218-732-4153
            3. Environmental Services Office, Hubbard County, 218-732-3890

FOSTERING COMMUNITY PARTNERSHIPS TO EXPAND EARLY DETECTION OF AIS IN HUBBARD COUNTY

In 2015, to accomplish our early detection goals and engage our local citizens, HC COLA worked in coordination with the Hubbard County AIS Task Force, Hubbard County Extension, Soil & Water Conservation District (SWCD), DNR, RMB Environmental Laboratories and local lake associations. HC COLA was

successful at fostering these partnerships to implement on-the-ground AIS prevention, detection and monitoring actions and further expands an "army of eyes on the water" for the purpose of searching and looking for the AIS.

To continue the expansion of our AIS Lake monitoring efforts within Hubbard County requires participation and engagement of a broad grassroots base. To increase our capacity to discover new introductions of AIS, the following actions are critical for success:

1. Further engage interested organizations or other stakeholders to increase our success of early detection.
2. Foster the formation of new lake associations to assist with lake monitoring actions.
3. Expand AIS Lake monitoring activities beyond COLA lakes in Hubbard County that do not have a lake association.
4. Communication, reporting and education are crucial elements for early detection of AIS.

AQUATIC HABITAT SAMPLING

By Doug Kingsley

The Park Rapids Department of Natural Resources (DNR) Area Fisheries office evaluates aquatic habitat on area lakes on a regular basis. Unfortunately, with so many lakes in their work area they are only able to collect that type of information about once every ten years on even the most heavily used and most popular lakes, and less frequently on smaller, less heavily used, or lakes without public access. More frequent information might help detect improving or declining trends sooner. Individuals or groups like Lake Associations are already helping collect valuable information on some lakes. Others who are willing to commit some time and effort can consider helping with:

Lake Level monitoring: DNR Ecological and Water Resources (EWR) Division has a network of volunteers who monitor lake levels during the open water season. EWR installs lake gages in a designated location and a volunteer periodically records lake levels from the gage. EWR has limited manpower and funding to install all the gages and compile all the data, so they need to focus efforts on select lakes. You can check whether someone is monitoring levels on your lake on the DNR's website at: www.mndnr.gov . Select *LakeFinder* under *Popular Links* on the left side of the web page. Type in your *Lake Name* and *County* and select *Get lake data*. On the *Search Results* page select your lake name. The next page shows what information is available on the left. Selecting *Water Levels* will take you to a *Lake water level report*. The last date in the Period of record, the graph on the right, or downloading the data will give an idea how frequently levels are being recorded. If levels haven't been recorded frequently you might contact Area Hydrologist Darrin Hoverson. Darrin can advise whether someone is monitoring levels on your lake or whether EWR would like someone to help with that.

Water Clarity: Many individuals are already helping monitor water clarity on their lakes by measuring water transparency with a secchi disk for the Minnesota Pollution Control Agency (MPCA) as part of their Citizen Lake Monitoring Program (CLMP). Water clarity can help provide some basic information about water quality or trends that might trigger more intensive water quality monitoring. Information about MPCA's citizen water monitoring programs is available at: https://www.pca.state.mn.us/water/citizen-water-monitoring . You can find out if someone is already monitoring water clarity on your lake or sign up as a volunteer at this location.

Water Quality: Many Lake Associations are helping monitor water quality by measuring water clarity and collecting monthly water samples as part of Hubbard COLA's water quality monitoring program. The samples are analyzed at RMB Labs in Detroit Lakes for Total Phosphorus and Chlorophyll-*a*. Those three parameters can provide valuable information about the lake's water quality and if done over a period of time can detect improving or declining trends. RMB's web site http://rmbel.info/lakes can provide summaries of testing that has been done through their labs, and can analyze that data for trends. DNR Fisheries uses this information and MPCA has used the data to assess the health of individual lakes as well as larger watersheds and devise strategies to either protect resources that are doing well or restore resources that may not be faring as well. You can check with Hubbard COLA to see whether your Lake Association is already collecting water samples, what the costs are, or sign up if you are interested in participating.

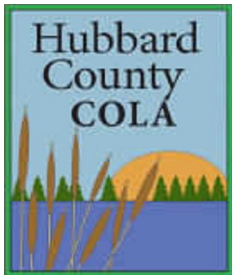
Score Your Shore is a tool offered by the DNR to evaluate habitat conditions of your lakeshore property. A description of the Score Your Shore tool, a Quick Guide, a more detailed manual, and a training PowerPoint presentation are all available on the DNR's website at http://www.dnr.state.mn.us/scoreyourshore/index.html . The site also has various resources that describe the importance of shoreland habitat and can help with shoreland management.

Score The Shore is a similar tool that can be used to evaluate shoreland habitat at randomly selected locations around a lake to come up with an overall habitat rating for the lake. If a Lake Association or group is interested in assessing riparian and aquatic habitat of their entire lake they should contact Park Rapids Area Fisheries for more detailed information or instructions.

Aquatic Vegetation sampling and mapping can be used to assess aquatic habitat and if repeated over time can be used to look for improving or declining trends. If a group or Lake Association is interested in sampling aquatic vegetation they should first consider some training in aquatic plant identification and then work with Park Rapids Area Fisheries to come up with a sample design and instructions. Alternately, they could contract with a qualified private company.

Emergent and Floating Leaf Aquatic Vegetation are the plants growing up out of the water (cattails, wild rice, bulrush) or floating on the water surface (water lilies, water shield, some life stages of pondweeds). A survey requires the ability to identify the various plants, a boat, and a Garmin GPS recording device that can be downloaded.

Submerged Aquatic Vegetation are the plants growing beneath the water surface (pondweeds, coontail, milfoil, water celery, chara). A survey requires the ability to identify the various plants, a boat, a Garmin GPS recording device that can be downloaded, and a plant hook made up of two rake heads.



ABOUT HUBBARD COUNTY COALITION OF LAKE ASSOCIATIONS (HCCOLA)

Vision
HCCOLA is the Leader in Protecting Hubbard County Lakes and Rivers.

Mission
HCCOLA's mission is to protect and enhance the quality of our lakes and rivers, preserve the economic, recreational and natural environmental values of our shorelands and promote the responsible use of our waters and related habitats. COLA's mission enhances, promotes and protects the interests of lakeshore property owners, lake associations, local government, the general public and future generations.

Are you concerned about the future of Minnesota's lakes and rivers? Join Hubbard COLA today!
Visit our website at http://www.hubbardcolamn.org/index.html or email hubbardcolamn@gmail.com for more information.

APPENDIX A
MONITORING TOOL KIT

1. **Assembling a monitoring kit:**
    a. AIS Identification Fact Sheets available in AIS Lake Monitoring Early Detection Resource Guide
    b. Double-sided garden rake with rope or homemade anchor shaped rake.
    c. Magnifying hand lenses for examining fine characteristics of plant structure necessary for positive ID. Purchase at L & M Supply ($3 - $5)
        i. X2 to X5 magnification
        ii. With lanyard is helpful
    d. Plastic vats/buckets for placing collected material for on-boat examination
    e. Supply of large plastic "zip-loc" bags for storing collected vegetation of subsequent examination.
    f. Hand towels
    g. Supply of permanent markers for marking standard collection information on bags.
    h. Pair of Polarized glasses – takes the glare off the water surface and easier to see through water.
    i. Hand-held GPS units for identifying locations of collected samples precise enough to enable re-location.
    j. Lake contour map / survey site map
    k. A plankton tow-net for collecting veligers from the water column
    l. Pole marked with one foot increments to sample substrate and shallow water depths
    m. Large glass jars for temporary storage of collected plankton for later examination.
    n. A supply of field data recording sheets. (see attachments)
    o. Clipboard/Pencil/Pen
    p. Cooler w/ice pack – to keep "catches" cold until they reach the DNR
    q. Hip/chest waders – for near-shore inspection in the cooler months
    r. Cinder blocks to use as monitoring device to hang from docks (available from HCCOLA)
    s. Zebra mussel settlement sampler (Note attached pattern). Samplers are available from: http://minnehahacreek.org/sites/minnehahacreek.org/files/attachments/MCWD%20AIS%20Early%20Detector%20Manual_generic_web.pdf

APPENDIX B

Tips & Tactics for Opportunistic Searches for Aquatic Invasive Species on Hubbard County Lakes "The Casual Observer"

The Hubbard County Coalition of Lake Associations would like to encourage our neighbors & visitors to keep an eye out for Aquatic Invasive Species! Help Protect your Property and Our Public Waters!

What are Opportunistic Searches for AIS?

- Opportunistic searches are casual, non-structured efforts to look for AIS as time permits.
- They can be done at any time by anyone using the lake – even children who are playing on the beach.

Who can be a casual observer?

- Lakeshore property owners!
- Extended families and friends!
- Visiting boaters and anglers!

Why consider doing Opportunistic Searches for AIS.

- Frequent, ongoing visual inspections of hard underwater surfaces and aquatic plants where zebra mussels typically attach will reveal a truly early introduction.
- The more frequently and more intense AIS monitoring occurs, the more likely a new AIS introduction will be detected**.**
- Review of literature (newspapers and other media outlets) reveals that most zebra mussel populations are discovered casually by lake users or people enjoying the lake**.**

When can lakeshore owners, visiting boaters and anglers keep an eye out for those naughty invasive plants and animals?

- Any time you are using and enjoying your lake.
- Turn over a few rocks.
- Check plants that have washed ashore on your beach.
- Check your boat, dock & boat lifts when you take them out and put them into your lake.
- Check the access when putting in and taking out your boat.
- Boat, wade or walk along the shoreline of your lake property and look for suspect plants and animals.
- Checking plants that you pull up on your fishing line.
- Visually look through the water while you are on the lake. Polaroid sunglasses help with your visual observation.
- Share the work! Encourage your neighbors and friends to participate in Opportunistic Searches.

Learn to identify Aquatic Invasive Species:

- Conduct AIS identification trainings at lake association meetings.
- AIS identification fact sheets are available on the Hubbard COLA website at: http://www.hubbardcolamn.org/identification-facts--monitoring.html

Report location of suspected invasive:

- Do not transport any potential AIS
- Note location of potential AIS or mark with GPS coordinate.
- Contact your local AIS specialist
    - Nicole Kovar, DNR AIS Specialist, Park Rapids, 218-732-8960.
    - Park Rapids Area Fisheries Office, 218-732-4153
    - Environmental Services Office, Hubbard County, 218-732-3890

Act Responsibly – Do your duty to help protect all Hubbard County Lakes.

APPENDIX C

ZEBRA MUSSEL MONITORING – PROTOCOLS FOR USING A MONITORING DEVICE

Tips and Tactics for using a monitoring device to sample for Zebra / Quagga Mussels:

- Monitoring device/sampler are surfaces on which zebra mussels will settle after they complete their larval (veliger) stage. These may include cinder blocks, PVC pipe or settlement samplers.
- Suspend monitoring device from docks at approximately 8-12 locations spaced around the lake.
- Place monitoring device at key locations on your lake including: 1) Near public access, 2) At or near high boat-use areas, 3) Near inlets/outlets, 4) At private accesses (resorts)
- Place samplers in water in May and retrieve in September for annual counts.
- If you want to check the samplers more frequently, you can examine the monitoring device every other week starting in August. Be careful not to disturb settled mussels and return the sampler to original depth.
- Place sampler in shade and near but not resting on the bottom.
- Record the depth of each sampler and the dates that each sampler was placed in the water and retrieved.
- When examining cinder blocks, young zebra mussels like to hide so you need to look inside the block using a flashlight and hand lens. Young zebra mussels look like adult zebra mussels, only smaller.

Equipment Surveys:

- Look for zebra mussels attached to docks, lifts, boats and swim platforms when you remove your equipment at the end of season.

Shoreline Searches – Explore Your Shore!

- Inspect rocks, wood and other objects for attached zebra mussels.
- Inspect vegetation near your shore for attached zebra mussels
- Suitable habitat for zebra mussels is commonly hard or rocky lake bottoms.
- Wade or snorkel in shallower areas.

When is the best time to search for zebra/quagga mussels?

- Look for small, current year zebra mussels during August and September.
- Look for larger, prior-year zebra mussels during May through September.

I may have found an invasive species. What do I do?

- Document the invasive – take a picture, collect a sample in a plastic bag with tap water & keep cool.
- Record date & location – GPS coordinate, point on map or landmark.
- Report findings and your name and contact information to:
  - Nicole Kovar, DNR AIS Specialist, Park Rapids, 218-732-8960.
  - Park Rapids Area Fisheries Office, 218-732-4153
  - Environmental Services Office, Hubbard County, 218-732-3890

Questions:

- Contact your local DNR invasive species specialist at 218-732-8960 ext. 222.
- Contact Hubbard COLA to learn more about zebra mussel identification at:
  - http://www.hubbardcolamn.org/index.html

APPENDIX D
ZEBRA MUSSEL MONITORING SURVEY

SAMPLE ONLY – AN ON-LINE VERSION WILL BE USED FOR ACTUAL SURVEYING

NOTE: If you think you may have found zebra mussels, immediately contact both:
Nicole Kovar, DNR AIS Specialist, Park Rapids, 218-732-8960 and
Park Rapids Area Fisheries Office, 218-732-4153
Eric Buitenwerf, Environmental Services Officer, Hubbard County, 218-732-3890

Instructions – Please submit this survey once each year by October 15. See separate PROTOCOLS FOR USING A MONITORING DEVICE for how and when to monitor for zebra mussels.

Year_____ Water Body_____

Monitor: Name (s) _____
Address (on lake)_____
Email_____
Phone_____

Lake Association / Affiliation _____
Monitoring Device (**CB**=Cinder Block, **PV**=PVC pipe, **SS**=Settlement Sampler) ___
Side of lake monitored: (**North/South/East /West**) _____

Monitoring Activities:
Date monitoring device placed in water:_____ Date retrieved from water:_____
How many times did you check your monitoring device this season? _____

Did you also inspect your docks, lifts and swimming platforms at end of season for zebra mussels? (**Yes/No**)____

Did you look for zebra mussels attached to rocks, wood and vegetation along your lakeshore? (**Yes/No**)____

Did you report zebra mussels found from any of your monitoring activities this year? (**Yes/No**)____

Comments:
_____

Hubbard COLA thanks you for your help in protecting our lakes.

APPENDIX E
ZEBRA MUSSEL DISCOVERIES ON MINNESOTA LAKES

Review of literature (newspapers and other media outlets) reveals that most zebra mussel populations are discovered casually by lake users or people enjoying the lake. The following points summarize how new discoveries of zebra mussels have been found on Minnesota lakes.

1. On Fish Trap lake near Motley, a lake user reported that a zebra mussel was found adhered to a drenched tree branch close to shore of the lake.
2. On Lake Eunice a citizen tipped off the finding on the southeast side of the lake to the DNR AIS specialist in Fergus Falls.
3. On 9 July 2012, a faucet snail was reported as being found amongst some leeches for use as fishing bait that were purchased from a local bait shop.
4. New population of zebra mussels were discovered in Rose Lake and Lake Irene. Boat lifts transferred from zebra mussel-infested waters are suspected to be the cause.
5. The DNR says a suspected zebra mussel was found on a rock on the east shore of Forest Lake.
6. Zebra mussels were first reported in Gull Lake by a lake service provider in early October, 2010.
7. Lake residents reported finding a zebra mussel attached to a rock in the northeast bay on Lake Mary in Douglas County. With more than 10,000 lakes in Minnesota, the DNR reported needing help from the public to locate new infestations. Early detection is critical in preventing the spread to other waterbodies.
8. On August 15, 2014 a citizen volunteer checking water levels found a zebra mussel on floating vegetation near the public access at Lake Virginia.
9. Zebra mussels discovered in 2 Crow Wing County Lakes. The initial discovery was reported by the parents of two young boys who retrieved a plastic container with attached zebra mussels while snorkeling in Gilbert Lake. A few days later, children swimming in North Long Lake found zebra mussels and their parents reported this discovery to the DNR. These young people and their parents saw something that looked out of place and reported it.
10. On Lake John, a citizen involved in a monitoring program reported a single zebra mussel in late September, 2015.
11. A single zebra mussel was recently reported in Bryant Lake in Eden Prairie. It was discovered on a settlement plate, a simple underwater detection device placed around docks and shorelines. The combined efforts of the DNR, lake property owners, and lake users to spot and report suspected new infestations increase the chances of treating them or limiting their spread.
12. A homeowner on 85-acre Lake Sylvia, northwest of St. Cloud, took their pontoon boat to a shop for service. An employee at the shop found three zebra mussels on the boat.
13. A photographic guide showing where and how to check docks and lifts for zebra mussels is available at **www.dnr.state.mn.usinvasive/shoreland_owners.html**.
14. A property owner brought a suspected zebra mussel into the DNR's Hutchinson office, saying it was attached to a native mussel in about three feet of water on Lake Stella.
15. Closer to home on Cass Lake, someone found zebra mussels while collecting shells on the beach on Cedar Island.
16. Biologists from the Fond du Lac Band of Chippewa reported the discovery of zebra mussels after retrieving aluminum can in Crooked Lake encrusted with the marine creatures.
17. An adult zebra mussel was discovered in July along the eastern shore of Ruth Lake by a 15-year old vacationer.