



Monitoring for zebra mussels

MINNESOTA AQUATIC INVASIVE SPECIES
RESEARCH CENTER *in partnership with*
UNIVERSITY OF MINNESOTA | EXTENSION

Prepared by the Minnesota Aquatic Invasive Species Research Center, University of Minnesota (MAISRC) and the Minnesota Department of Natural Resources (DNR)

Purpose

You can use the monitoring protocols in this document to assist in early detection monitoring for zebra mussels in a lake where zebra mussels have not yet been found. If you are interested in a pilot project to control zebra mussels in a lake where zebra mussels have already been found, you will be required to provide data from population surveys to the DNR to determine whether you may apply for a pilot project.

Early Detection Monitoring

Zebra Mussel Settlement Samplers: Settlement samplers are surfaces on which zebra mussels will settle after they complete their larval (“veliger”) stage.

1. Suspend settlement samplers from docks or buoys at approximately 8-12 locations spaced around the lake. Place some settlement samplers at or near high boat-use areas or other areas suspected to be at risk for infestation. Place samplers near but not resting on the lake bottom. Settlement samplers do not need to be placed close to shore.
2. Place samplers in the water in May and retrieve them in September for annual counts. If you want to check the samplers more frequently, be careful not to disturb settled mussels and return the sampler to its original depth. Record the depth of each sampler and the dates that each sampler was placed in the water and retrieved.
3. Record the total number of settled mussels on each sampler, and the total dimensions of the settlement surface. Calculate the number of zebra mussels per square meter (see “Questions” at the end of this document to find out how to do this).

You can build your own settlement sampler using the instructions here: mndnr.gov/invasives/aquaticanimals/zebramusel/sampler.html



Photo courtesy of Minnehaha Creek Watershed District.

Veliger Counts: You may be able to detect larval zebra mussels in the water by sampling with a fine mesh net.

1. Conduct vertical tows with a plankton net in three to five locations around the lake.
2. Tow a “pooled depth” of 30 feet of water. Tow to a depth three feet shallower than the depth of the lake to keep from fouling the net with lake-bottom sediment. If the lake is deep enough, tow to 30 feet; if not, pool samples - for example, take three tows to 10 feet deep. Record the depth of the tows.

A standard plankton net is 30 cm in diameter and 90-120 cm long, with a 50-80 micrometer mesh size. DNR or MAISRC staff can provide more information on how to use a plankton net and preserve the samples.



Photo credit: Alisha Hallam, DNR

3. Pour the filtered lake water into a bottle, add five parts ethanol to one part water, and send the sample out for analysis. A number of laboratories can do veliger counts, using microscopy, at a reasonable cost. Ask for a report that includes the number of zebra mussel veligers per sample.

Shoreline and equipment surveys: Look for zebra mussels in suitable habitat around the lakeshore. Inspect rocks, wood and other solid objects as well as vegetation for attached zebra mussels. Suitable habitat for zebra mussels is commonly hard or rocky lake bottoms in water 2-12 feet deep. Use scuba to survey areas four feet deep or deeper; wade or snorkel in shallower areas. Also look for zebra mussels attached to docks, lifts, swimming platforms, and other equipment when you remove it at the end of the season. You can report your results - even if you don't find anything - to the volunteer zebra mussel monitoring program at www.dnr.state.mn.us/volunteering/zebramussel_monitoring/index.html.

Requirements for a Pilot Project Application

The DNR will require you to submit data from the following surveys to assess whether a lake where zebra mussels have been found is a good candidate for a zebra mussel pilot project (for more information about pilot projects: www.mndnr.gov/zmpilotprojects).

Completing the monitoring steps below does not guarantee that the DNR will issue a permit for your project. Contact your local DNR invasive species specialist to discuss your project *before* you begin monitoring.

Initial Population Assessment: The DNR will require data from initial population assessments to evaluate whether a lake is a good candidate for a pilot project to control zebra mussels.

1. Work with your local invasive species specialist to design a search plan, including locations and search duration.
2. Search all areas of suitable habitat parallel to shore in both directions from the site of the new zebra mussel discovery, up to five hundred feet in each direction. Suitable habitat for zebra mussels is hard or rocky bottoms in water 2-12 feet deep.
3. Use scuba to survey areas 4 feet deep and deeper; wade or snorkel in shallower areas.
4. Inspect rocks, wood and other solid objects as well as vegetation for attached zebra mussels. Record:
 - o the total number of objects that were inspected, including
 - o the number of objects with no mussels,
 - o the number of objects with mussels attached and
 - o the approximate size of zebra mussels found,
 - o the amount of time spent searching,
 - o a map of the areas that were searched, noting locations of any zebra mussels found, and
 - o the approximate dimensions of the areas searched.



Photo courtesy of Minnehaha Creek Watershed District.

Contact your local DNR invasive species specialist to determine the minimum requirements for search effort for your project.

5. Working with your local DNR invasive species specialist, determine other areas of suitable habitat around the perimeter of the lake and away from the newly discovered population of zebra mussels. Repeat steps 3 and 4 in those areas.
6. Discuss results of initial population assessment surveys with DNR to determine whether additional surveys are necessary.

Veliger Counts and Zebra Mussel Settlement Samplers: The DNR may also require data from veliger counts and settlement samplers, according to the protocols above, to evaluate whether a lake is a good candidate for a pilot project to control zebra mussels.

Questions?

- Contact your local DNR invasive species specialist:
www.dnr.state.mn.us/invasives/ais/contacts.html
- Contact the Minnesota Aquatic Invasive Species Research Center to learn about training opportunities related to these protocols and for more information about how data from pilot projects will contribute to research on zebra mussel control:
www.maisrc.umn.edu/contact-us/
- For more information on zebra mussel pilot projects refer to the DNR's website:
www.mndnr.gov/zmpilotprojects