

# Zebra Mussel Monitoring for Early Detection



## Introduction

Monitoring non-infested lakes for Zebra mussels allows for early detection if the lake becomes infested. Early detection can prevent spread to other water bodies. There are two types of monitoring for early detection of Zebra mussels in lakes: veliger monitoring and adult/juvenile monitoring. When zebra mussels first establish in a lake, they can be at very low densities, so it is not always possible to detect them right away. **Using both these methods together gives the best chance at detecting zebra mussels in a lake.**

**Veliger monitoring** involves field collection from a boat using a plankton net and then laboratory identification from a trained professional. Field collection can be done by a hired professional or a trained volunteer. Field collection and laboratory identification can be done by RMB Environmental Laboratories in Detroit Lakes, MN.

**Adult monitoring** can be done through the Minnesota Department of Natural Resources Volunteer Zebra Mussel Monitoring Program. This program involves inspecting docks and lifts and/or placing a monitoring device such as a brick in the water to inspect for adult zebra mussel colonization. See page 2 of this document or the program's website for more information. ([http://www.dnr.state.mn.us/volunteering/zebramussel\\_monitoring/index.html](http://www.dnr.state.mn.us/volunteering/zebramussel_monitoring/index.html))

## Zebra Mussel Veliger Monitoring Training

Zebra mussel veligers can be collected by a trained volunteer. RMB Environmental Laboratories can conduct a volunteer training session so that volunteers can collect samples throughout the summer. Maps of each participating lake will be provided, and volunteers will learn when and where specifically to sample in their lake. The training session would last 1.5-2 hours and needs to be at a lake with dock access or on a pontoon boat to be able to demonstrate the sampling procedures. For best hands-on results, training sessions would be limited to 20 people total. This number can be revised depending on the location. The training session could be held at the end of June or early July during a weekday day or evening or a Saturday morning.

### Volunteer Training Session Costs

Item	Total Cost
Travel within 1 hour of Detroit Lakes	\$100
Training session	\$300
Total	\$400

### Sample processing Costs

Item	Total Cost
Sample processing at the laboratory	\$90/sample

\*Samplers will also need a net. Nets need to be decontaminated between each use to prevent the spread of zebra mussels. A net can be purchased by an organization such as a COLA and loaned out to individual lake associations, or nets can be rented from RMB Lab for an extra fee.



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# Zebra Mussel Veliger Monitoring Procedure

## Sampling Equipment

- Boat
- Anchor
- 50-cm diameter, 64-micron mesh plankton net, 5:1 length:diameter ratio
- Rope on net with the meter increments marked
- Chlorine bleach for decontaminating the net after sampling
- Large container to hold plankton net for bleach solution for decontaminating the net after sampling
- 250 ml plastic bottles (*supplied by lab*)
- 1-liter plastic bottles (*supplied by lab*)
- Alcohol for sample preservation, 95% alcohol (190 proof ethyl alcohol) (*supplied by lab*)
- Lake Maps (*supplied by lab*)
- Sharpie marker
- Cooler (*supplied by lab*)
- GPS unit – optional

## Sampling Procedures\*

\*This protocol has been simplified and generalized for educational purposes. For complete protocols necessary for sampling, contact RMB Environmental Laboratories (see below for contact information).

This protocol is for early detection in lakes that are believed to be uninfested with zebra mussels. For this type of sampling, the specific sample volume is not as important. In addition, the laboratory processing will be geared toward a presence/absence result rather than individual counts. Should zebra mussel veligers be found in a lake that was previously uninfested, sampling would then become quantitative and location specific to try and pinpoint the infestation for possible early treatment with copper sulfate.

### Sample Frequency

Three samples should be collected from a particular lake on one to three dates between July 1 – August 31. The samples from these three locations will be composited into one bottle. When compositing samples from different spots in the lake, you lose the ability to pinpoint the locations of zebra mussels, but you increase your chance at finding new infestations while minimizing the sample processing cost (i.e. 3 samples composited into one bottle only cost \$90 to process at the lab, while 3 samples analyzed in 3 individual bottles costs \$270 to process at the lab). Ideally, samples should be collected when the water is between 63-74°F. These conditions give the best chance at early detection of zebra mussels.

### Sample Location

On each sampling date, veliger samples should be collected from three different locations in a lake. The sites should be in different bays or basins or at several of the more heavily used lake sites. One site could be in front of a lake's outlet where the water funnels and flows out and another of the sites could be in the middle of the lake. The three sampling sites should be in water deep enough to sample, so locations over 15 feet deep is a good rule of thumb. Additional samples can be taken in bigger bodies of water where there may be multiple fingers, bays, or multiple boat launches. Mark on a lake map where samples were collected and optionally collect GIS coordinates. These same sites should be used for each of the sample periods – if not, then submit a revised map with subsequent samples.

It is important to note that the location of planktonic veligers is not related to the location of adult mussels. Compositing samples may help reduce the likelihood of false negative results in the field (i.e. failing to collect the veligers when they are present). Limit the composite to a section or area of the lake having 5 or fewer samples.

With sample compositing, spatial information is lost. The search for the original location of veligers (or possibly adults) is limited due to the loss of spatial information during compositing.

### Sample Collection

Using the standard plankton net (50-cm diameter\*, 64 micron mesh, see Figure 1) collect two tows from each site (tows could vary from 2-6 meters depending on the lake depth).

Condense and decant your plankton sample into your bottle after each tow. All samples should be composited into one plastic bottle. Preserve the sample using 95% alcohol supplied by the lab.

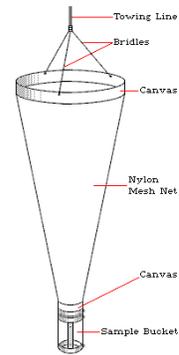


Figure 1. Plankton net.

Transport or ship the sample bottle(s) in a cooler to the laboratory for analysis.

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## Zebra Mussel Adult Monitoring Program

Minnesota Department of Natural Resources

[http://www.dnr.state.mn.us/volunteering/zebramussel\\_monitoring/index.html](http://www.dnr.state.mn.us/volunteering/zebramussel_monitoring/index.html)

[Zebra mussels](#) are spreading to lakes and rivers in the Midwest. These small invasive mussels attach to hard surfaces in lakes and rivers killing native mussels, limiting recreational activities, clogging water supply pipes, and competing with larval fish for food. You can provide important help tracking their distribution in Minnesota by spending a few minutes monitoring the lake or river where you live without any specialized equipment. Early detection for zebra mussels is important in protecting your property and Minnesota's water resources.



### How can you monitor for zebra mussels?

**In the late summer or fall when removing equipment from lakes or rivers:**

1. **Visually inspect hard surfaces for zebra mussels** such as docks, dock floats and supports, swimming platforms, boats, motors, anchors, and any objects that have been in the lake or river for the summer. Check areas where zebra mussels may be attached, such as trim tabs, rubber gaskets, grooves along the keel of pontoon boats, and sailboat centerboards. During early infestations, zebra mussels are likely to be small (1/4-1/2 inch long) and the number attached on any object is likely to be low. You can also examine rocks and other hard surfaces along the shoreline and in shallow water, especially near water accesses.
2. **Complete and send in a [online Volunteer Monitor Report Form](#)** by November 1st each year. Send in the report whether or not you found zebra mussels.

**What else can you do? (optional activities):**

**Make your own monitoring device.** Hang a PVC pipe , brick or cinder block under a shady spot of your dock (zebra mussels tend to avoid direct sunlight) in the summer to monitor for zebra mussels. Suspend the object as deep as possible at the end of your dock, keeping it at least one foot above the bottom. Examine the monitoring object, and add these observations to the Volunteer Monitor Report Form.