See VIDEO MICHU-V-96-001

DETECTING ZEBRA MUSSELS

A Monitoring Program for Citizens

Sea Grant

GREAT LAKES
SEA GRANT NETWORK

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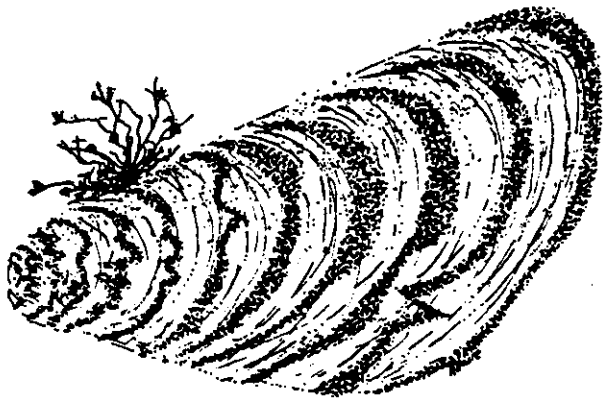
DETECTING ZEBRA MUSSELS



Monitoring Procedures for Citizens

TROUBLE? CALL _____ BETWEEN

THE HOURS OF _____ AND _____ FOR ASSISTANCE.

Sea Grant

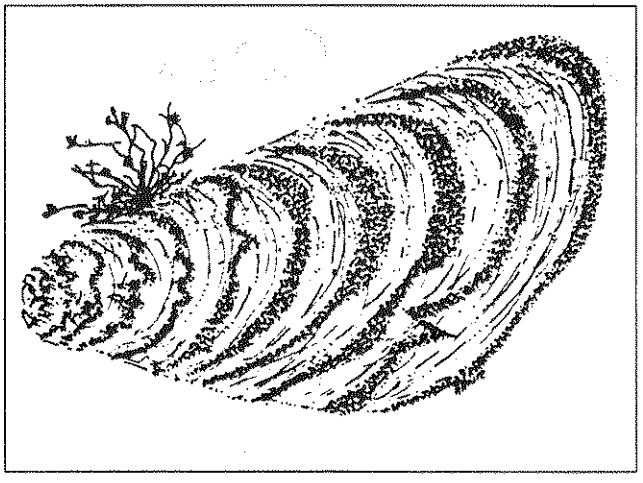
Produced by the
Great Lakes Sea Grant Network

Introduction

Many people have become concerned about zebra mussels and what might happen if this aquatic nuisance species appears in the water they live by, play on or simply care about.

You may have seen adult zebra mussels on television or in newspaper or magazine photographs. They're best known for the stripes from which they get their common name.

Not all zebra mussels are striped, however. Byssal threads are their most distinctive feature. Zebra mussels use their byssal threads to attach themselves to many types of underwater surfaces and form clusters or colonies that can damage structures and disrupt ecosystems.

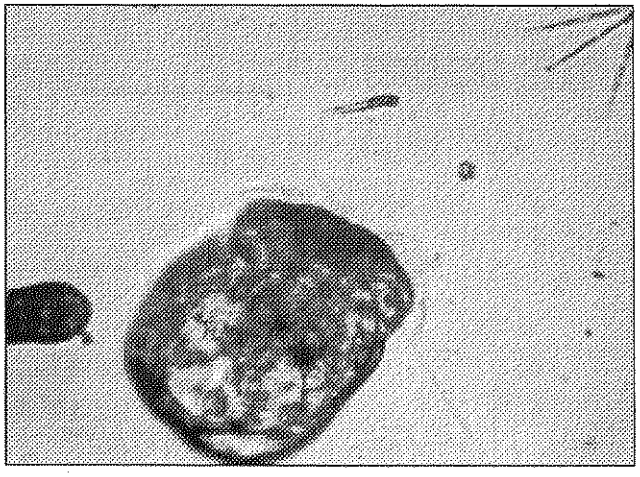


Because **you're** concerned about whether zebra mussels are present in your water and are participating in this citizen monitoring program, you can do more than just worry. You're going to use the scientifically valid procedure demonstrated in the accompanying videotape and described in these instructions to help find out if young zebra mussels are present in your lake or reservoir.

People using this sampling procedure correctly have discovered very young zebra mussels in bodies of water up to two years before they could be seen with the unaided eye. Though monitoring does not guarantee a discovery, your effort can provide an effective "early warning system" for zebra mussel infestations.

Veliger Vigilance

Every body of water has an abundance of tiny native organisms—barely visible plants and animals—and that's necessary for a properly functioning ecosystem. The question is, are non-native zebra mussels present in your water? To find out, you will collect samples of water and microscopic plants and animals from the lake or reservoir where the young zebra mussels may be swimming and send them to a laboratory for analysis.



What you're trying to collect are young zebra mussels in their larval or **veliger** stage. After adult zebra mussels reproduce, their offspring—the veligers—live as free-swimming planktonic organisms. They can survive, floating in the water, for three to five weeks.

The veligers are also capable of drifting, especially during storms or temperature inversions. After that, they develop small bivalve shells, settle down and begin to develop into adult zebra mussels.

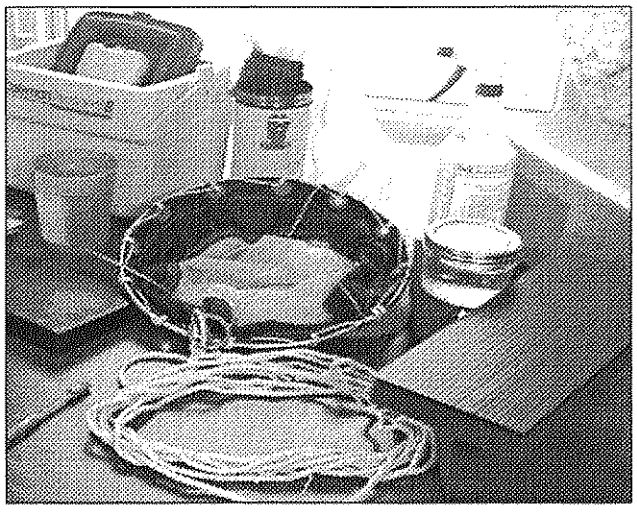
Zebra mussel veligers are tiny — about as thick as a human hair — so you won't be able to see them without magnification. Finding veligers requires collecting water samples, then using a microscrope to look at the tiny plants and animals in the water sample with a special light analysis technique.

The video shows you how to collect those samples correctly. Watch it carefully and follow the simple instructions in this publication. That's the critical first step in assessing the condition of your body of water.

Sampling Kit

All the **equipment** and materials you'll need for the sampling procedure **except a cooler and preservative** are included with your kit. It contains:

- A bathymetric lake map or navigational chart (two copies).
- A thermometer.
- A plankton net with marked rope attached.
- The cod end of the net.

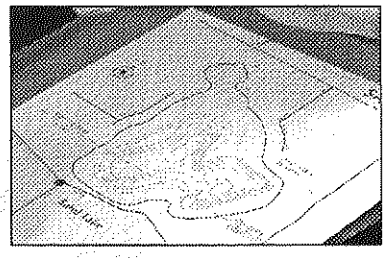


- A squirt bottle.
- A concentrator cup.
- Labelled sample containers.

It also contains instructions that tell when to sample and other educational materials.

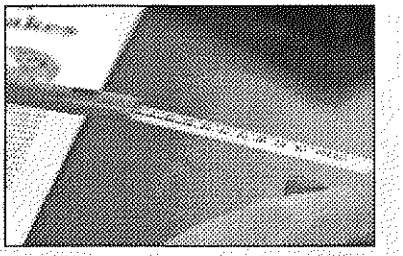
It's all right if your supplies don't look exactly like the ones in the video or this publication. Check your kit now. If anything is missing, please call the number provided on the inside cover page of this notebook BEFORE trying to take a sample.

Bathymetric lake map or navigational chart (two copies)



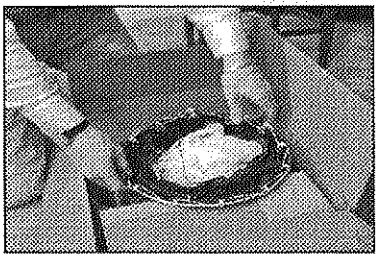
First, you will need a bathymetric map or navigational chart of your body of water, showing the depth contours. Two copies are included in your kit in sealed plastic bags. From one of the maps or charts, you'll select three locations from which to take samples and mark them with the numbers 1, 2 and 3.

Thermometer



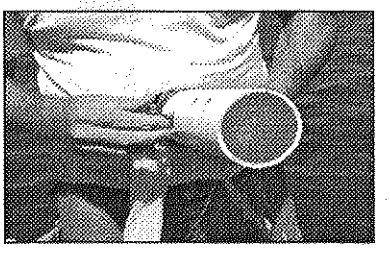
You will use the thermometer in your kit to take the surface temperature of the water. It will help you provide the laboratory with important information about your samples.

Plankton net



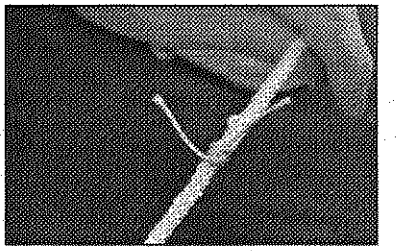
You need to use a plankton net to take a sample of the water's microscopic organisms, which may include zebra mussel veligers. A plankton net is just a high-tech strainer shaped like a wind-sock and made of a fine mesh fabric. It can filter out and isolate these small organisms as the water passes through it. Later in the publication you will see how to use it.

Cod end

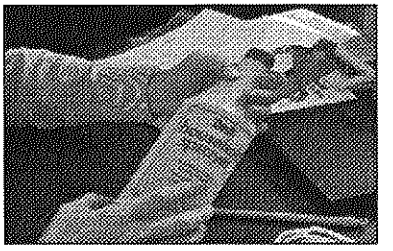


The cod end of the net is a cylinder that collects and traps organisms in the water sample. It has mesh-covered holes and clamps onto the end of the plankton net.

Rope



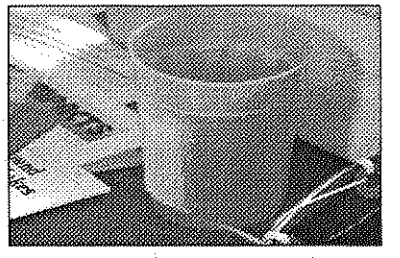
The rope will be marked to assist you in lowering the net to the proper depth. One end of the rope is attached to the handle of the plankton net, and the other end of the rope should be knotted.



Squirt bottle

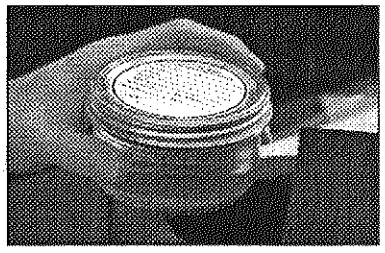
The squirt bottle performs a very important function in preparing the sample to send to the laboratory. You'll fill it from the tap or from the body of water you are sampling. It is used to rinse small particles down into the cod end of the plankton net. It might also be used to clear the mesh-covered drain holes in the cod end if they become clogged. And it may be used in combination with the concentrator cup to reduce the volume of the samples you collect.

Concentrator cup



By concentrating a subsample, you make veligers easier to detect under the microscope. This plastic cup has a special mesh insert. With this adaptation, you can handle troublesome subsamples more easily and concentrate them better.

Labelled sample containers



You will use containers such as these to preserve your samples and ship them to a laboratory.

Other necessary items

You'll need a cooler large enough to hold all three sample containers. One that holds a six-pack of 12-ounce canned beverages will work fine.

You'll also need to purchase 24 to 48 ounces of pure isopropyl alcohol to preserve the samples, as described in the "Preserving the Samples" instructions on page 10. You can purchase isopropyl alcohol at any pharmacy and most supermarkets.

When to Sample

Because you're trying to collect tiny zebra mussel veligers from a large body of water, you need to take the samples when veligers are expected to be at peak abundance in the water. Suggested sampling times and conditions for your area are provided with this instruction notebook. It will take about two hours to take a complete set of three samples. Choose a time when the weather forecast does NOT predict any storms.

Weather conditions

For sampling, choose a day that is slightly windy — the wind stirs up the water so that the organisms are distributed more evenly throughout the sampling area. Too much wind will make it difficult to hold the plankton net still, and the boat may move too much. USE AN ANCHOR TO HOLD YOUR BOAT IN PLACE.

Choosing Sampling Locations

Based on the contour lines on the map or chart, choose three sampling locations where the water is greater than 18 feet deep. The sampling sites should be in different easily accessible parts of the water.

MARK THESE LOCATIONS WITH THE NUMBERS 1,2 AND 3 ON THE MAP OR CHART, ALONG WITH THE DATE.

Presampling Procedures

Put ALL the items from your sampling kit, **including the instruction notebook and one copy of your map or chart marked with sampling locations,** on the boat. Remember the cooler and ice! Travel to the first sampling spot, then ANCHOR THE BOAT. You can do the sampling alone, but it will be easier if someone assists you.

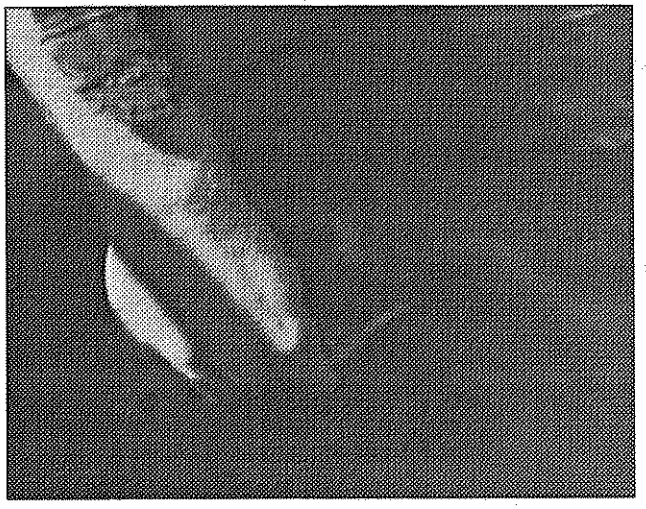
After you write the name of the lake or reservoir and the date on the sample container with the #1 label, record the environmental data for the sampling site. Include the surface water temperature, approximate wind direction and speed, and weather conditions. Here's how to collect the environmental data.

Water temperature

First, take the surface water temperature. Simply dip the thermometer in the water and leave it there for approximately 20 seconds.

Then pull the thermometer out of the water and take the temperature reading right away. If you leave the thermometer up in the wind, the wind will blow across the wet bulb and dry it, and the temperature will drop. Then you will get an artificially low reading.

Record the temperature for location #1 on the sample container marked #1.



Wind direction and speed

Next, record the approximate wind direction and speed on label #1. From which direction is the wind coming? Use the following guidelines for wind speed:

0-5 MPH – Flags barely fluttering.

5-15 MPH – Flags flying but no whitecaps.

Weather conditions

Finally, describe the current weather conditions—sunny, partly cloudy, cloudy or rainy—and write it on the label in the space marked "weather."

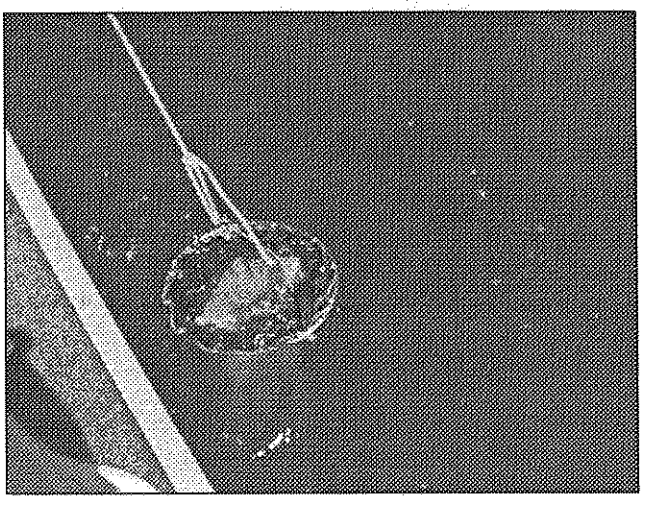
Sampling Procedure

You will take one complete sample at each of the three locations you've chosen. *Each sample will consist of two subsamples. Each subsample will be collected separately and then combined in a single sample container.*

Before beginning the sampling procedure, make sure to tie the loose, knotted end of the rope to part of the boat so that it will not slip away. Nets are lost each year by people who are sure that the rope won't slip from their hands. These nets are expensive.

Lower the plankton net

To collect a subsample, first lower the plankton net into the water, cod end first. Let the cod end of the net fill with water for about five seconds so that it becomes



heavy. Let the net sink until the water level reaches the mark on the rope. The bottom of the plankton net—the cod end—will be 18 feet deep.

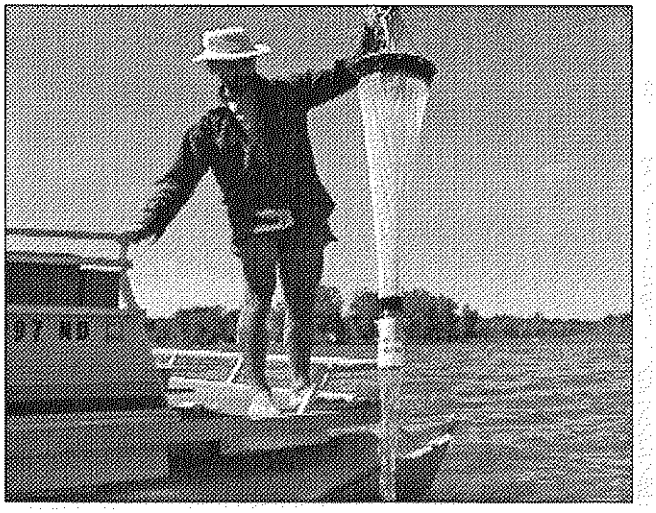
Pull the net up SLOWLY, using a hand-over-hand motion. Once the net is out of the water, hold it steady to let the water drain for a few seconds.

You will capture algae and other microscopic organisms in the net. You may be able to see a thin layer of organisms on it. If zebra mussel veligers are in the lake, they will be among the organisms you capture.

Rinse the net in the water

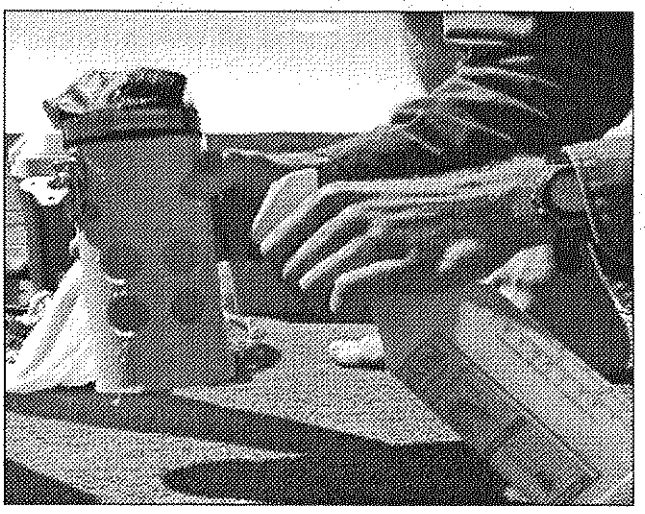
Even if it appears to be clean, rinse the net by lowering it partway into the water so that the opening is just above the surface. Quickly pull it out of the water to wash any organisms stuck on the net down into the cod end. Repeat three or four times. **Do NOT let the net opening go below the surface while you are rinsing it.**

If the net opening DOES go below the surface while you are rinsing it, please discard the sample, rinse the net completely and start over.



Rinse material into the cod end

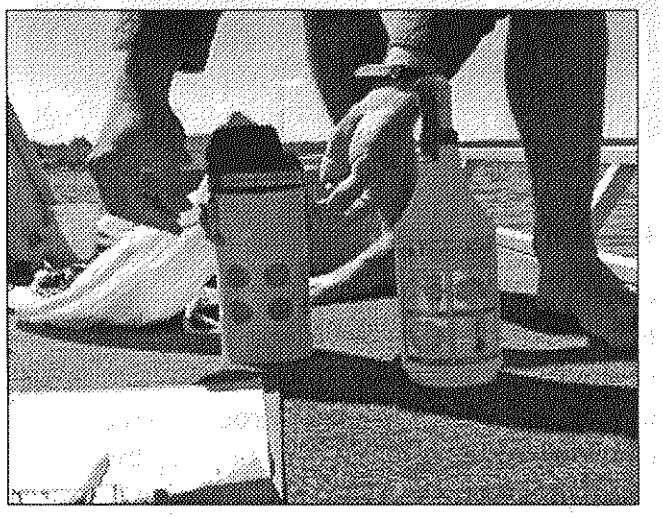
Some fine particles may still be on the net. If so, squirt your squirt bottle into the net to rinse any remaining material down into the cod end. Do it all the way around. This is most easily done if you are holding the net up, if you have someone else hold it for you, if you can hang the net or if you leave the cod end resting on the boat.



Rinse the cod end of the net

If the cod end is filled with water because the drain holes are plugged, squirt water, as illustrated, through the mesh on the cod end to unclog it so that the water can drain. If you can't see the water level, all

you need to do is use your squirt bottle to squirt into the mesh again until water drains out of the cod end so that you can see the water level. Drain enough water so that the cod end won't overflow when you open it.



Unlatch the cod end

Once you can see the water level, then you can unlatch the net and remove the cod end. The latches come off with a twisting motion.

Sample Preparation

Pour the subsample—the plankton and water trapped in the cod end—into the sample jar.

Clean the particulates and plankton from the cod end

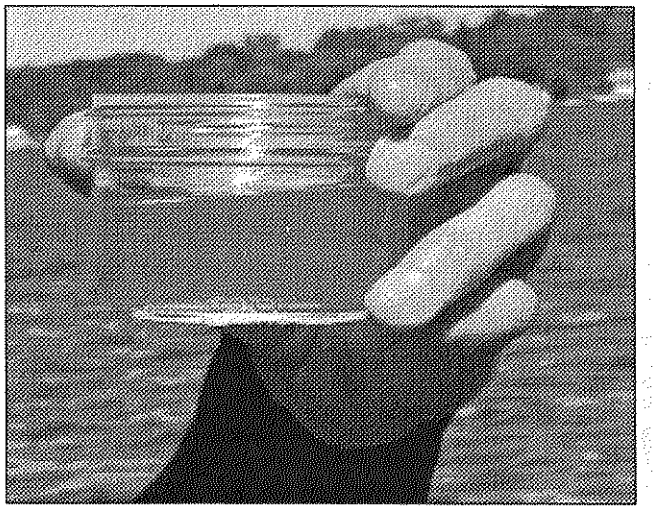
Use the squirt bottle to rinse ALL residual subsample from the cod end and fill the sample container to no higher than the first mark.

Repeat the procedure

Reattach the cod end to the plankton net and repeat the sampling procedure at the same location. Begin collecting your second subsample by slowly lowering the plankton net into the water again.

Pour second subsample into sample container

When you have finished collecting the second subsample from the same location, pour it into the sample container with the first subsample you collected there. Fill the sample container to the second line.



In other words, one sample container should hold the contents of two separate subsamples from one location and be filled to the second mark. Put the lid on the sample container, and set it aside until it is time to add the preservative.

Keep It Cool

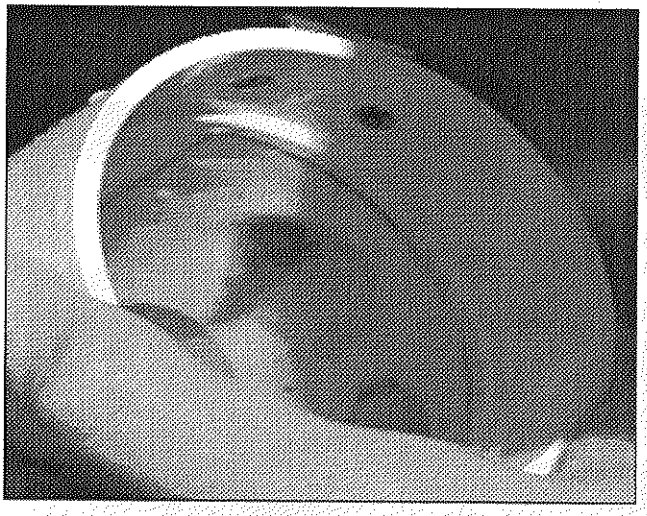
It is a good idea to keep your samples in the cooler until they're ready to be preserved and shipped to the lab. Chill but do not ever freeze your samples.

Second and third samples

Proceed to the other sampling sites and repeat the entire sampling procedure, collecting two subsamples at each of the two remaining locations.

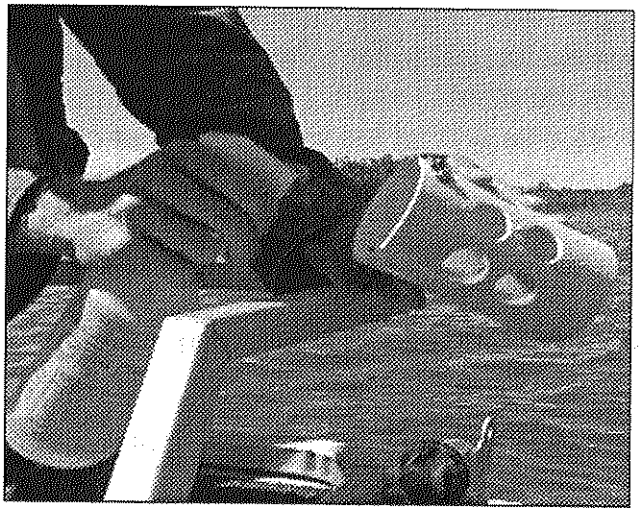
Troubleshooting

If conditions are right, your sampling can go quite smoothly. Here are some tips for those times when it doesn't.



My cod is clogged!

If the cod end becomes clogged with so much algae and plankton that the water does not drain properly, unclog the mesh



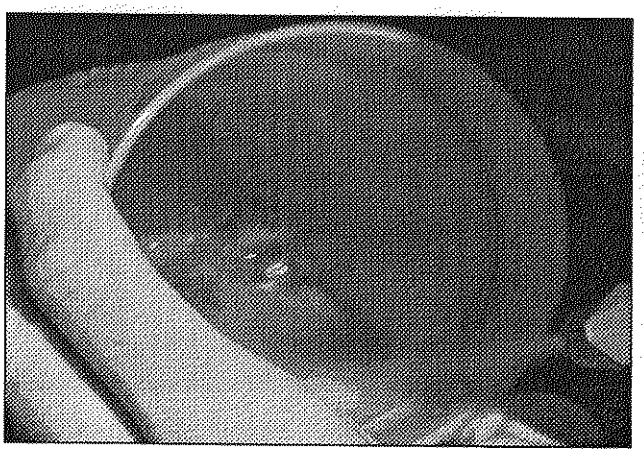
by squirting water into it. Squirt down onto the mesh into the cod end at an angle as illustrated.

Try to refrain from squirting directly down into the mesh. The objective is to push material off the mesh, not through it, so you need to do it at an angle.

If your sample is particularly troublesome, you can also spray from the outside, which produces the same effect.

My subsample is too large!

Use the concentrator cup to reduce the subsample to as small a volume as possible so that you can get both subsamples and the preservative into the sample container. Pour the subsample from the cod end of the net into the cup.



Squirt water into the mesh fabric from outside the concentrator to rinse the sample from the mesh screen. Tilt the concentrator on its side and let the water drain out of the mesh while squirting it to unclog the mesh.

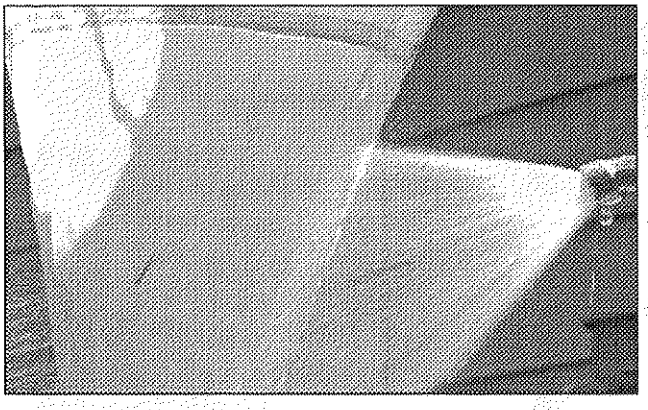
My subsample is too small

When you have concentrated your subsample into as small a volume as possible, pour it into the sample container. If your subsample does not reach the line on the container, simply add some lake water until it does. Then put the top on the container.

Caring for the Sampling Equipment

Once you've returned to shore, it is important to care for your equipment, especially the plankton net. Rinse the net thoroughly. A light duty garden sprayer is perfect for this purpose.

After it is thoroughly rinsed, hang the net to dry by its ring. IT IS VERY IMPORTANT not to leave the net drying in direct sunlight. UV light will cause premature aging of the netting. Hang the net indoors and place it in the kit only after it is **thoroughly** dry.



Protecting your drain pipes from zebra mussels is also important. Do not let any of the sample water or net rinsing water go down any pipe that drains directly to a body of water.

Preserving the Samples

Each sample container is now full to the second line marked on the side. Isopropyl alcohol will preserve the organisms in the sample while they're being shipped to the laboratory for analysis.

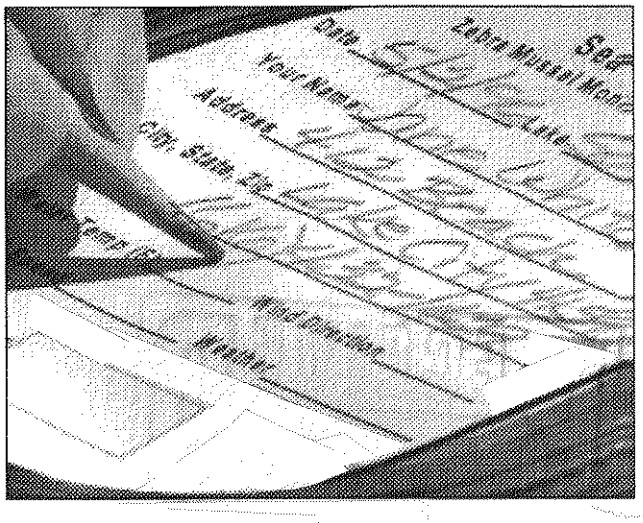
To preserve your samples, open each container and pour approximately 8 ounces of isopropyl alcohol into it—enough to fill the container. Reseal the container and tighten the lid.

Preparing to Ship the Samples

Make sure that all the sample containers are tightly sealed and that the label information is complete before you pack them. Pack the sample containers in the box marked for shipping to the laboratory.

Put one copy of your map or chart—marked with the date and sampling locations—back in the plastic bag provided in the kit and pack it with the sample containers.

Be sure to label the box with YOUR NAME and RETURN ADDRESS, too. Seal the sample package securely and ship it.



Watch the Video Again

After you've watched the video and read these instructions, it would be a good idea to watch the video again to become really familiar with the procedures.

Questions?

If you have any questions after viewing the video and reading the instructions, call the phone number on page 1 of this notebook.

Results!

Your samples will be processed as quickly as possible, usually within a few weeks, and the results will be mailed to you.

If veligers are found in your samples, you will receive additional information about reducing harmful impacts of infestation.

Educational Materials

If no veligers are detected in your sample, please continue to use the educational materials in this package about how to prevent infestations. You can also use this information and instructions while you're waiting to learn the results of your sampling.

Thanks!

Thank you for volunteering to monitor your water for zebra mussels. You and many other citizen monitors are part of Sea Grant's effort to learn more about the spread of this aquatic nuisance species. You may have helped slow their spread.

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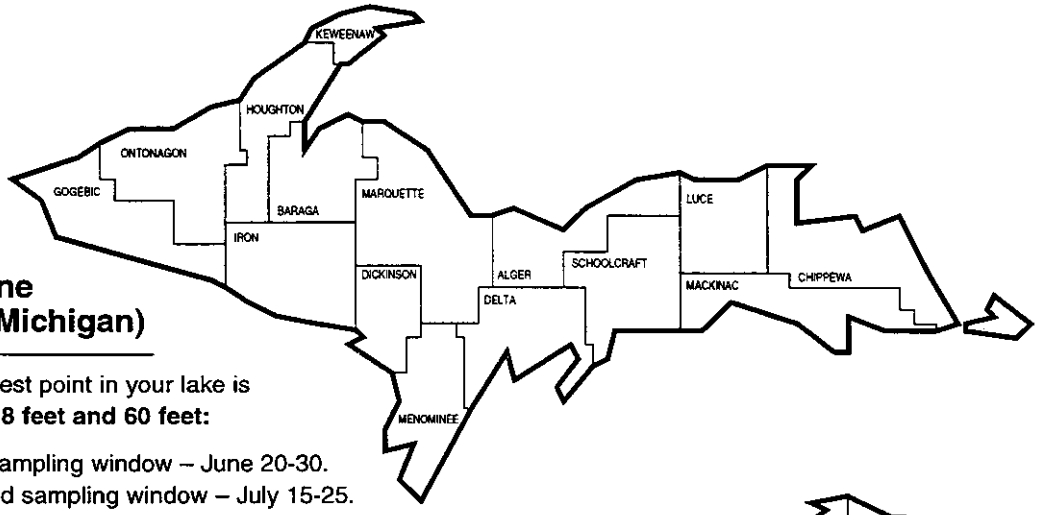
Sea Grant Citizen Zebra Mussel Monitoring Program

Sample Timing

When is the best time to take water samples?

The map below shows the best windows of time to take water samples in your area. Three factors are involved: lake depth, lake latitude and average daily temperature.



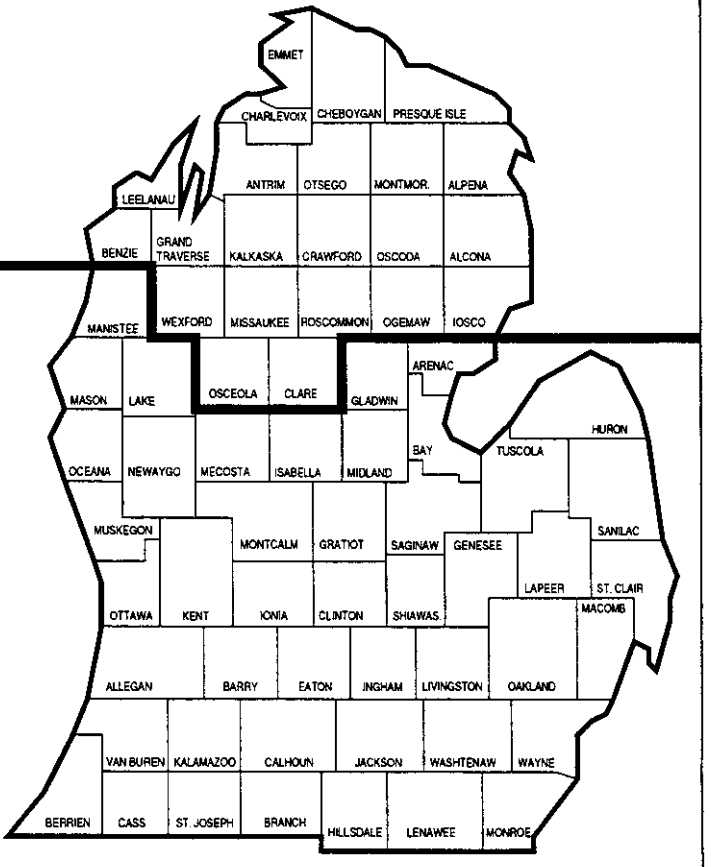
Zone One (upper Michigan)

If the deepest point in your lake is **between 18 feet and 60 feet:**

- First sampling window – June 20-30.
- Second sampling window – July 15-25.

If the deepest point in your lake is **greater than 60 feet:**

- First sampling window – July 1-10.
- Second sampling window – July 25 - August 5.



Zone Two (lower Michigan)

If the deepest point in your lake is **between 18 feet and 60 feet:**

- First sampling window – June 10 - June 20.
- Second sampling window – July 5 - July 15.

If the deepest point in your lake is **greater than 60 feet:**

- First sampling window – June 15 - June 25.
- Second sampling window – July 10 - July 20.

Zebra mussel veliger abundances fluctuate widely within a very short time. The peak on any lake may be as brief as 5 to 7 days or as long as 10 to 14 days. Please allow at least two weeks between your sampling days.