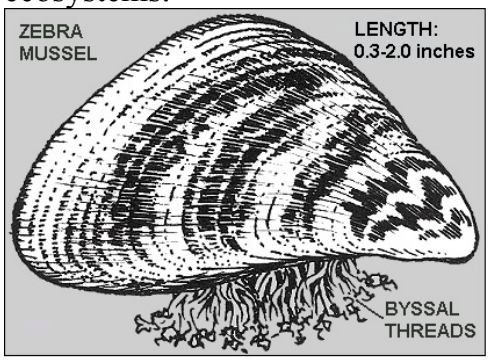
Zebra Mussel Sampling

Introduction:

Many people have become concerned about zebra mussels and what might happen if this aquatic nuisance species (ANS) 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.

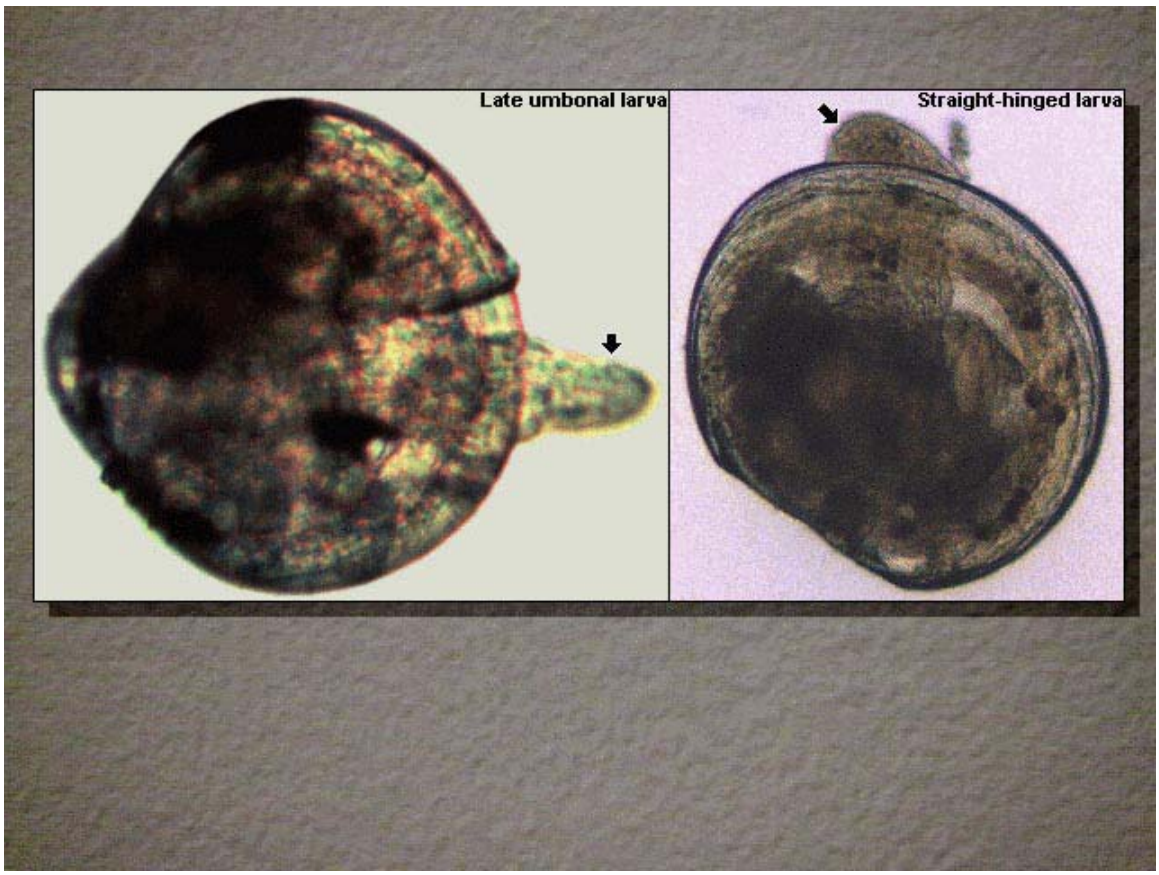
Not all zebra mussels are striped, however. Their distinctive D shape and unusually dense cluster of byssal threads are their most distinctive feature. Zebra mussels use their byssal threads to attach themselves to many types of underwater surfaces and form clusters or colonies that can damage structures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



Because of this concern, people have developed scientifically valid procedures to detect young zebra mussels in lakes and reservoirs. This method allows for the discovery of very young zebra mussels in bodies of water as much as two years before they may be seen with the unaided eye. Though monitoring does not guarantee a discovery, the efforts 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) that are necessary for a properly functioning ecosystem. The question is, are non-native zebra mussel larvae also present? 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. The samples will then either be sent directly or picked up and then sent to a laboratory for analysis.



What you are trying to collect are young zebra mussels in their larval or veliger stage. After adult zebra mussels reproduce, their offspring live as free-swimming planktonic organisms for three to five weeks.

The veligers are 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 them requires collecting water samples, then using a microscope to look at the tiny plants and animals in the water sample with a special light analysis technique.

Equipment:
A plankton net
The cod end of the net
20+ feet of rope
A plastic squirt bottle
Labeled sample containers
Alcohol – Ethyl or Isopropyl
Permanent marker
Net Weight(s)
A cooler and ice are helpful.

The plankton net is a fine mesh strainer that can filter out and isolate small organisms as the water passes through it.

If I am notified in advance what lakes you will be sampling, I may be able to provide bathymetric lake maps or copies of navigational charts so you can mark exactly where you have collected your samples. Select locations from which you wish to take samples, and mark them with numbers on the map (if available).

Bathymetric maps for many of the lakes are available on the Dept of Ecology Website at *Http://www.ecy.wa.gov/programs/eap/fw_lakes/lk_list.html* . The entire 1997 Water Quality Assessment of Selected Lakes within Washington State is also available on the Ecology website. The address is *Http://www.ecy.wa.gov/biblio/97010.html* .

For those of you monitoring river sites there is some data available at *Http://www.ecy.wa.gov/programs/eap/fw_riv/rv_main.html* .

The ideal weather condition for sampling is a slightly windy day – 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 work with the plankton net and minimize boat control.

Presampling Procedures:
Put all of your supplies in your boat. Travel to the first sampling site and anchor the boat. Write the name of the lake or reservoir, a description of the site, and the date on the sample container label, record the environmental data for the sampling site. Include:

- Surface water temperature
- Approximate wind direction and speed
  - 0-5 mph – flags barely flutter
  - 5-15 mph – flags fly, but there are no whitecaps
- Weather conditions
  - Sunny, partly cloudy, cloudy, or rainy

Sampling locations:
1) Part of the sampling process depends on the assumption that mussels may be introduced in areas of high boater activity. The location of one tow sample should be performed near such an area where boats are first introduced into a lake, I.e. A marina or boat launch. Ideally, the sample should be collected from within a 150 foot range of a launch site or, within a marina area, 100-200 feet from docked boats.

The depth of launch and marina areas varies but generally is within the range of 10 to 20 feet deep. As a guide, the tow depth should attempt to be about 5-8 feet off bottom. But exercise caution so as not to hang the net on bottom! If the area being sampled is much deeper than 20', then collect the sample from the10 to 18 foot depth range.

2) The other part of the sampling process involves random occurrence. While it is known that zebra mussels are sensitive to light, thrive in areas with gentle to moderate current, and locate in areas of hard substrate, their location in a lake or river during the veliger stage is dependant on the general current movements that affect all planktonic forms. For this reason, it is important to collect a couple 'random' samples at different locations on the lake or river. Basically, pick a spot and take a sample! When sampling these random locations, samples can be taken in the 10-18 foot depth range which covers the most likely horizon for veliger occurrence.

Sampling Procedure:
Each sample will consist of two sub-samples taken from the same site and combined in a single container.

Before you begin, make sure the loose end of the rope is secured to part of the boat so it cannot slip away. Nets are lost each year, and they are expensive to replace.

It is also important that the net travel in a horizontal fashion through the water. This is accomplished by attaching a weight to the connecting point on the net. A 2 to 5 pound weight is generally sufficient, depending on the speed of tow and equipment set-up.

Pull up the anchor, and lower the 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 to the appropriate depth. Tow the net a reasonable distance in one direction for the first sub-sample (40 to 100 feet). Mark the distance of the tow on your site description. Note: Do NOT let the net scrape the bottom. We do not want a sediment sample and the lab analysis becomes very time consuming when too much debris enters the sample.

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 there are zebra mussels in the water body they will be among the organisms you capture.

Rinse the net in the water. Even if it appears to be clean, rinse it by lowering it partway into the water so the opening remains above the surface. Quickly pull it out of the water to wash any organisms from the net down into the cod end. Repeat three or four times. An alternative method is to hold the net partly above the water and gently splash water onto the outside of the net. Continue splashing water onto all outside areas of the net, while raising the net from of the water. This will cause the captured material to wash further down into the net and cod end. Continue washing until all material is washed into the cod end.

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 while holding the net up with the cod end resting on the boat.

Rinse the cod end of the net. If the cod end of the net is filled with water because the drain holes are plugged, squirt water 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 you can see the water level. Drain enough water so that the

cod end won't overflow when you open it. Water in the squirt bottle can be either lake water or tap water.

Unlatch the cod end once you can see the water level, and remove the cod end from the net.

Sample Preparation:
Further drain water from the cod until the level is at the bottom of the lowest mesh drain area. Swirling the sample around is effective in getting the last of the water to drain out. Pour the plankton and water trapped in the cod end into the sample jar. Use the squirt bottle or add a small amount of lake water to rinse all residual sub-sample from the cod end and fill the sample container **approximately ¼ full** (about 2 ounces). Put the lid on and prepare to collect the second sub-sample.

Second Sub-sample:
Reattach the cod end to the net and select another location within the same area (Ex. 50 to 100 feet away). Collect another tow sub-sample, repeating the steps for collecting the first sub-sample.

When you have finished collecting the second sub-sample from the same area, pour it into the sample container with the first sub-sample collected in the same area. The container will be about ½ full once the second sample is added.

Preserving the Samples:
The container should be about half full of sample. To the sample, add approximately 4+ ounces of isopropyl or ethyl alcohol into it – enough to fill the container. Reseal the container and tighten the lid. Make sure each container is tightly sealed and that the label information is complete and correct before they are collected or sent for analysis. Keep the samples at room temperature or cooler, but never freeze a sample.

NOTE: It is important to preserve the sample shortly after it is collected. This will help ensure sample integrity and eliminate the possibility of transporting live veligers to other water areas.

Samples may be stored at room temperature or in the refrigerator but NEVER frozen or boiled.

Next Sample Setup:
Once the sampling has been completed for the site area, either turn the net upside down or leave the cod end off and rinse the net thoroughly with water to wash out any residual material. Also, make sure to rinse out the cod end before reattaching to the net.

Troubleshooting:
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 at an angle, onto the mesh in the cod. Try to refrain from squirting directly into the mesh. The objective is to push the material down off the mess, not through it. If the sample is particularly troublesome, spray from the outside onto the mesh. You can also try tapping the cod end on a solid surface. Tapping lightly will help the water drain out.

If your sample is too large, tilt the cod end slightly to allow more water to drain out through the mesh holes. If the sample is too small (less than ¼ of the volume of the container) then add a small amount of lake water until the appropriate level is reached.

Equipment Care:
Once you have 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 has been 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 storage container only after it is thoroughly dry.

We don't want to spread zebra mussels if there are any in the water body you sampled. So do not let any of the sample water or net rinsing water go down any pipe that drains directly to a body of water.

Completion
If you have a map or chart of the area you sampled - marked with the date and sampling locations – include a copy of it with the samples.

Samples will either be picked up or they can be sent to the address provided. When sending samples, make sure the lids are tightened, and pack them in a heavy cardboard box. It is best to top off the samples to avoid any sloshing.

The samples will be processed as quickly as possible, usually within a few weeks, and the results returned to the Department of Fish & Wildlife. If veligers are found in any of your samples, you will receive additional information about reducing the harmful impacts of infestation.

Thank you for volunteering to monitor your waters for zebra mussels. Your role is an important one in controlling the spread of zebra mussels into Washington waters.

Contact information:

Pamala Meacham
Asst. Aquatic Nuisance Species Coord.
Washington Dept of Fish & Wildlife
600 Capitol Way N.
Olympia, WA 98501-1091
360-902-2741
e-mail <meachpmm@dfw.wa.gov>