Saskatchewan Adult Invasive Mussel Monitoring (AIMM)

About the Adult Invasive Monitoring Program

The Adult Invasive Mussel Monitoring (AIMM) Program is a partnership project with non-government organizations (NGOs) and agencies to monitor waterbodies throughout Saskatchewan for aquatic invasive species and adult invasive mussels. It is co-ordinated by the Government of Saskatchewan's Fish, Wildlife and Lands Branch.

Monitoring adult invasive mussels such as zebra and quagga mussels, and other aquatic invasive species is important to early detection in Saskatchewan. This protocol was developed by combining materials from Wisconsin, California, Alberta and British Columbia, with the goal of having a pragmatic, cost-effective monitoring program that provides a valuable tool for widespread early detection of waterbodies throughout Saskatchewan.

The objective is to establish partnerships with community organizations, including local stewardship, administrative, community and business groups, to provide valuable local involvement, information and data in a co-ordinated and collaborative manner. This protocol and the Saskatchewan Conservation Data Centre's (SKCDC) data entry protocol, reports three types of monitoring: Human-Built Structures (e.g. docks, buoys, water intake pipes, etc.); Natural Shoreline Survey (e.g. driftwood, rocks, etc.); and AIS Substrate Samplers. The new reporting form provides an easy-to-use tool that the general public, NGOs and other agencies can use to record their monitoring efforts in Saskatchewan waterbodies. If you find evidence of invasive mussels or other AIS, please call **24-hour TIP line at 1-800-667-7561**.

About Aquatic Invasive Species

Zebra and quagga mussels are a type of aquatic invasive species that could threaten the livelihood of Saskatchewan waters. These mussels have been transported by freight boats and other watercraft from the ocean into freshwater. Zebra and quagga mussels have adapted to the change of environment and started to migrate and thrive, reproducing at a rapid rate. One adult mussel can produce up to one million veligers (baby mussels) which are hard to detect, as they are small and invisible to the naked eye. Veligers are small enough to infiltrate water treatment systems, fire protection systems, dams and water movement pipes, and cause serious problems as they grow into adult mussels. They can grow on top of each other which can lead to blocked pipes. In North America, 34 states and three provinces have been contaminated with these types of mussels, including two states, Montana and North Dakota, that border Saskatchewan.

Introduction to the AIMM Form

The Saskatchewan Adult Invasive Mussel Monitoring (AIMM) Program is a tool for recording aquatic invasive species monitoring. The AIMM Form can be used by government, non-government organizations and the general public. The objective is to document the absence or presence of invasive mussels and other aquatic invasive species by substrate sampling, shoreline inspections, and checks when removing docks, buoys and anchors.

Remember

Both the Substrate Sampling and Shoreline Survey should be incorporated; however, if achieving this is not possible, then the Shoreline Survey should be the one program implemented.

There are three types of adult invasive mussel monitoring documented in this form:

Human-Built Structures/Equipment

This option records checks for the presence or absence of invasive mussels, and includes docks, buoys and other structures/equipment removed from the lake.

The form will provide a list of structures and equipment to choose from. Please select all that apply from the list provided. If an option is not provided, select "Other" and specify in the textbox that appears.

Natural Shoreline Survey

This option documents shoreline surveys in which rocks, logs or other plant material along the shoreline are checked for the presence or absence of invasive mussels.

The form will provide a list of natural shoreline survey items to choose from. Please select all that apply from the list provided. If an option is not provided, select "Other" and specify in the textbox that appears.

Substrate Sampler

There are two main types of substrate samplers:

- stacked-plate design
- Portland sampler (Figures 1 and 2). The Portland sampler (Figure 1) is a low-cost, minimum effort sampler that works best for detecting the presence or absence of invasive mussels. The stacked-plate design is often used in circumstances where understanding the change in an invasive mussel population is of interest, rather than just presence/absence.

Selecting Your Location/Waterbody

The provincial map provided in the AIMM form, allows you to select the waterbody you are monitoring from the seven compliance areas located within. First select a compliance area. Another map will appear for the specific area you selected. This second map will be broken into smaller compliance districts. Next, select a compliance district. A list of waterbodies will appear. Select from the list which waterbody you are conducting invasive mussel monitoring. If the specific waterbody is not a part of the list provided, select "Other" and type in the name of the waterbody that you monitored in the textbox that appears.

Entering Latitude/Longitude of your Location

If you have the GPS co-ordinates of your location, there is an option to enter them into the AIMM form. The form gives you the option to enter latitude/longitude in three different formats: degrees-minutes-seconds; decimal degrees; and decimal minutes. There is also the option to enter your co-ordinates in a Universal Transverse Mercator (UTM) format. There is also a textbox to provide additional information on the specific location within the waterbody that you monitored.

Inspection/Check Results

To check for adult invasive mussels on the surface of structures/equipment:

- Rub your hands along surfaces to feel for invasive mussels, which may feel gritty, like sandpaper.
- Pay attention to cracks and crevices, as mussels like to attach to these areas.
- Invasive mussels may also be attached to plants/aquatic vegetation that may be attached to the removed structure(s).

At the end of your check, the 2017 AIMM form asks if you found any evidence of adult invasive mussels or other aquatic invasive species. If there is evidence of mussels or other aquatic invasive species, please use the textbox provided to describe the presence and/or evidence found.

If you identify finding evidence of invasive mussels, immediately call the 24-hour TIP line at 1-800-667-7561.

Substrate Samplers

How to Build a Portland Sampler

Materials

- coded clothesline wire, or other heavy line
- 5 cm (2") PVC pipe, cut into 15 cm (6") lengths
- sandpaper
- cement or an attachable weight
- 10 cm (4") I-bolt

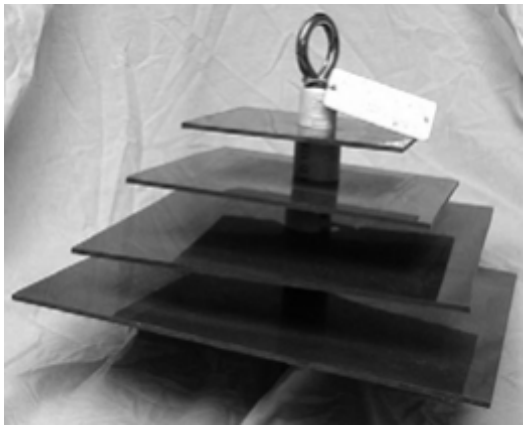

Figure 1. Substrate sampler for zebra mussel monitoring.

Figure 2. Image of a "Portland Sampler" substrate (Portland State University Center for Lakes & Reservoirs).

How to Construct

- Cut the 5 cm PVC pipe in 15 cm (6") pieces.
- Rough up the outside of the PVC with the sandpaper.
- Drill a hole through the pipe in the approximate centre (7.5 cm/3") of the pipe to allow the I-bolt to pass through.
- Attach the I-bolt.
- Prepare the cement as directed on the package and then fill half the PVC pipe with cement to help weigh down the sampler. Another option is to find an object that can be attached to the sampler to weigh it down, and eliminate the need for cement.

Location Selection

- Ideally the sampler would be deployed in a shady area as deep as possible (preferably at least six feet, but can be shallower) with some water flow in the area.
- Avoid areas where there is a large amount of current.
- As boat traffic is a vital part of the spread of aquatic invasive species, it is recommended that sampler be deployed in areas of high boat traffic such as marinas, docks, piers and boat launches.
- Other access points such as fishing hotspots, resorts, campgrounds, or where diving ducks tend to reside, are additional areas for potential deployment of substrate samplers.

How to Deploy Your Sampler

- Always ask permission before deploying/attaching a substrate sampler to any structure such as a dock, buoy or swim area marker.
- At each location, one substrate should be deployed in a manner that will not interfere with boater or swimmer activities. The number of locations will vary from one waterbody to another.
- In efforts, to prevent wildlife from severing the line suspending the sampler, plastic-coded clothes wire or chain may work better than rope. As an option to increase the sampling surface area, mesh or pot scouring pads can be attached along the line suspending the substrate sampler.

- A small brick or concrete block anchor will help hold the sampler in place and provides an additional substrate sampler.
- A physical description of the area, a lake map indicating each sampler location and corresponding GPS co-ordinates should be obtained at the initial time of deployment.
- If possible, record the local contact information for the person who will be checking the substrate most often for each site/location.

Monitoring

- Substrate samplers should be checked at minimum once a month during the timeframe when water temperatures are most suitable for invasive mussels to spawn. Initial deployment should happen before the water temperature reaches 12°C.
- Monitoring shall be conducted as follows:
  - ~ Remove substrate from water slowly and carefully. **Don't clean the substrate sampler off.**
  - ~ Place substrate into a bucket for inspection to capture anything that may fall off.
  - ~ Closely inspect all surfaces of the substrate, paying close attention to corners and holes as well as the suspending lines and anchors.
  - ~ Juvenile mussels are very small, so inspect carefully by feeling along all the surfaces for a rough sandpaper-like feeling which, if present, may indicate the presence of small juvenile mussels.
  - ~ During the inspection, also look for other potential invasive species. Suspect organisms can be collected, labelled and frozen in water; arrangements will be made for pick up.
  - ~ If attached mussels are found or suspected, remove the substrate from the water, place in a sealed plastic bag or container, **call the TIP line 1-800-667-7561 immediately** and deploy a new substrate (if one is available).
  - ~ If no invasive mussels are found, replace any damaged or worn materials and deploy again **(do not clean substrate sampler)**.
  - ~ Completely fill out a reporting form each time the substrate sampler is checked. This includes taking note of any aquatic or riparian plant coverage in the area of the substrate.

List of Equipment You May Need

- Personal protective equipment and supplies
- Clip board with forms and field book
- GPS and digital camera with spare batteries
- Heavy monofilament or braided fishing line, rope, and/or coded clothesline wire
- Small concrete block or brick to act as anchor
- Basic tools such as knife, screw driver, etc.)
- Boat hook (might be helpful when retrieving the substrate sampler during monitoring)

End of Season

During the final substrate sampler monitoring event of the season, follow the steps identified in the AIMM protocol and remember if attached mussels are found or suspected, place substrate sampler in a sealed plastic bag or container, and **call the TIP line at 1-800-667-7561 immediately.**

If no invasive mussels are found, rather than redeploying the substrate sampler, it can be cleaned. This will help prevent the transfer of organisms while preparing the samplers for reuse next year.

To do this, please follow the steps below to clean a substrate sampler:

1. Remove all vegetation, mud or debris that may be clinging to the complete substrate sampler set-up (including all deployment lines, floats, anchors, etc.) and dispose of them properly;
2. In a bucket or container, submerse the compete sampler set-up (i.e. anything that came in contact with the lake) in hot tap water 50oC (or warmer) for at least 10 minutes;
3. Untie any knots or clamps, and thoroughly scrub all surfaces including the space inside the PVC pipe (a bottle brush may work well for this), then rinse with hot water;
4. Allow everything to completely dry before placing it in storage for the winter; and
5. To be safe, dump all water used during this process on land in a suitable location away from any storm drains, ditches and waterways.