

Zebra Mussel Ecology

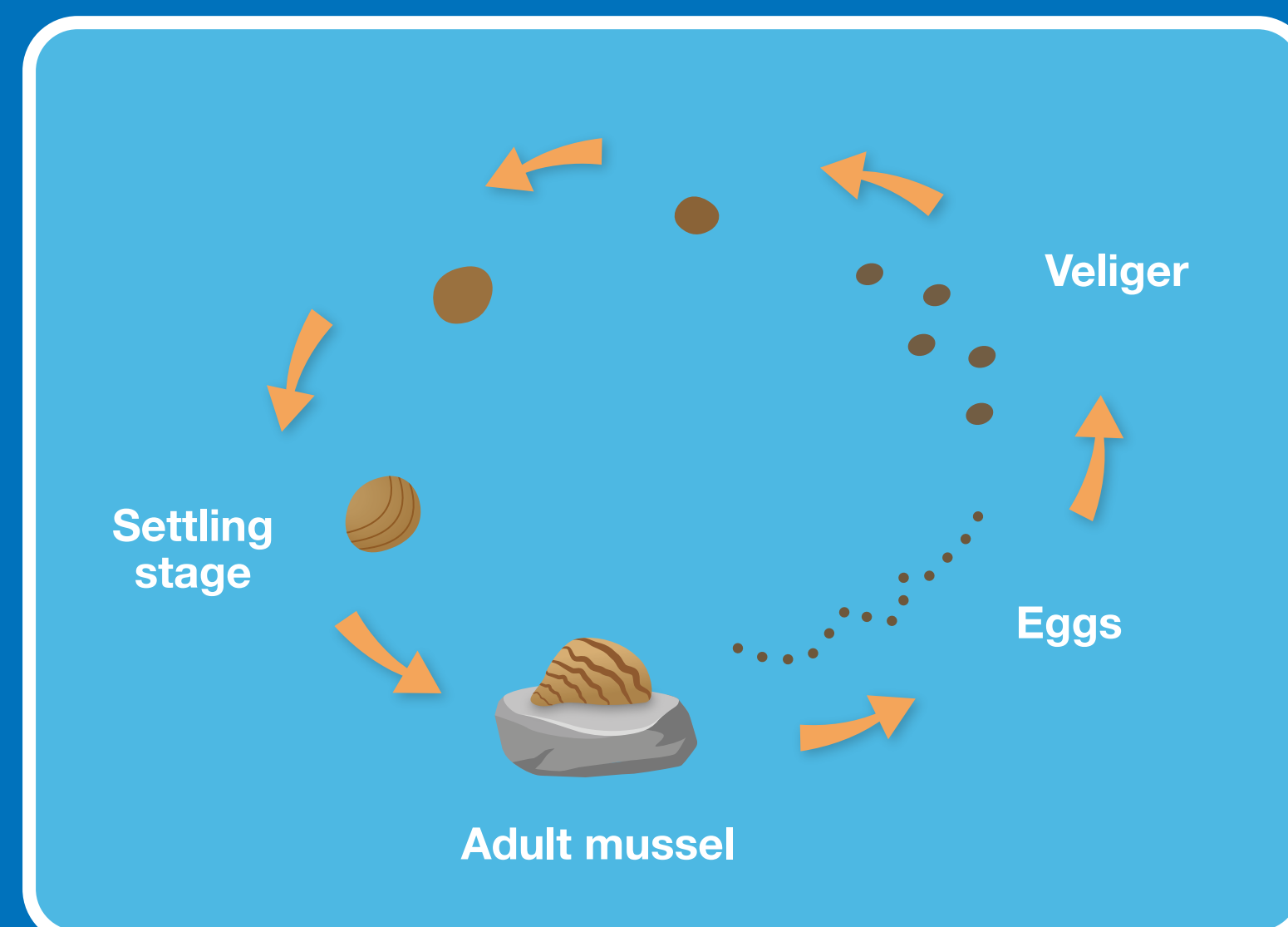
What are Zebra Mussels?



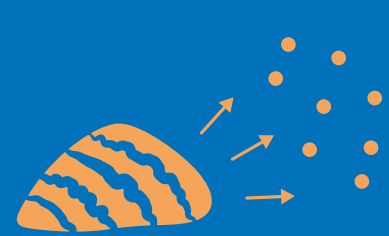
Zebra mussels are small (1-3 cm long), clam-like aquatic animals. They have triangular or “D” shaped shells, and most have light and dark brown bands on their shells. They are invasive to North America.



Life Cycle of a Zebra Mussel



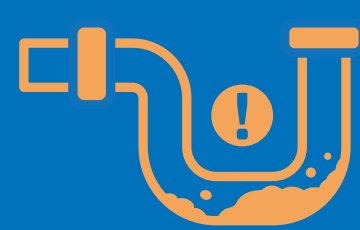
Why are they a Problem?



Prolific reproduction abilities.
Females may release up to 1 million eggs in a single spawning season.



Cling to things.
They can attach to vegetation, hard surfaces, and other immersed items.



Negatively impact infrastructure.
Zebra mussels clog intakes for water treatment plants, power stations, and other industrial or commercial operations.



Costly nuisance.
They can reduce recreational opportunities for boaters, commercial fishers, anglers, and beach goers. Removing mussels and cleaning up their shells costs money.



Outcompete native species.
Zebra mussels filter up to a litre of water per day, removing algae and microscopic aquatic animals which are important to the food web. Because very few things eat them, these nutrients are then not available for other life in the system.

Methods of Transfer

Zebra mussel larvae (veligers) float until they attach to an object. Mussels cannot swim. They move with the water current or are transported by humans. Veligers can survive in residual water left in bait buckets, live wells, bilge areas, ballast tanks, motors and other equipment. If **Clean, Drain, and Dry** practices are not followed they can enter subsequent water bodies.

Example of zebra mussels being transferred between waterbodies by boat



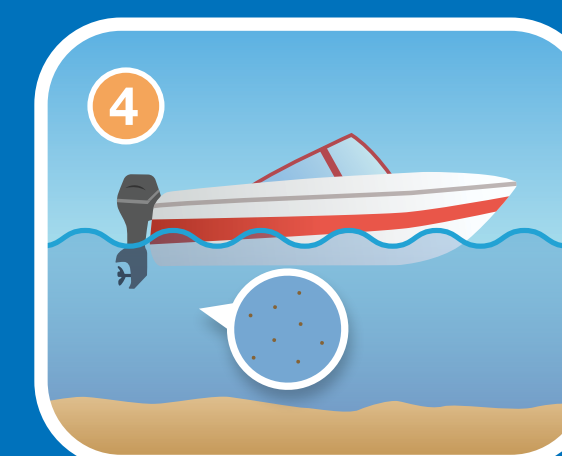
1. Boat is used in water with zebra mussels. Veligers enter boat.



2. Boat is not **Cleaned, Drained, and Dried** after use. Veligers survive in water left in boat.



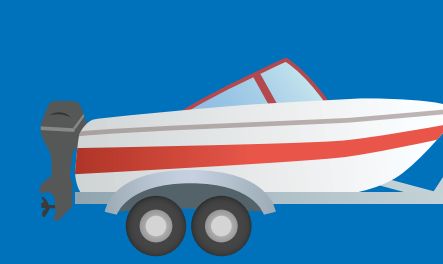
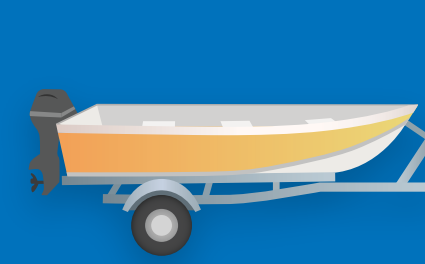
3. Boat enters new waterbody that does not have zebra mussels.



4. Veligers are released into waterbody where they may develop into adult mussels.

Risk Level of Watercraft and Equipment

Every watercraft or piece of equipment poses a risk of transferring zebra mussels:



Lowest Risk

All or most surfaces visible and thus easy to decontaminate.

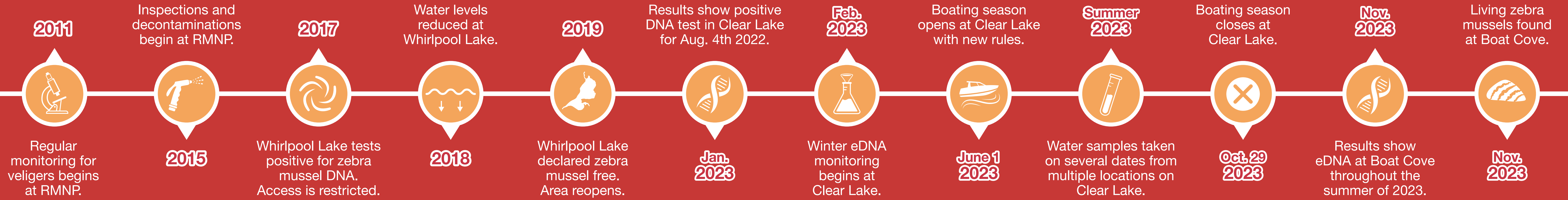
Canoes and kayaks may pose a higher risk because they are often used in multiple waterbodies in a short period of time. However, if they are properly, **cleaned, drained, and dried**, this risk is significantly reduced.

Highest Risk

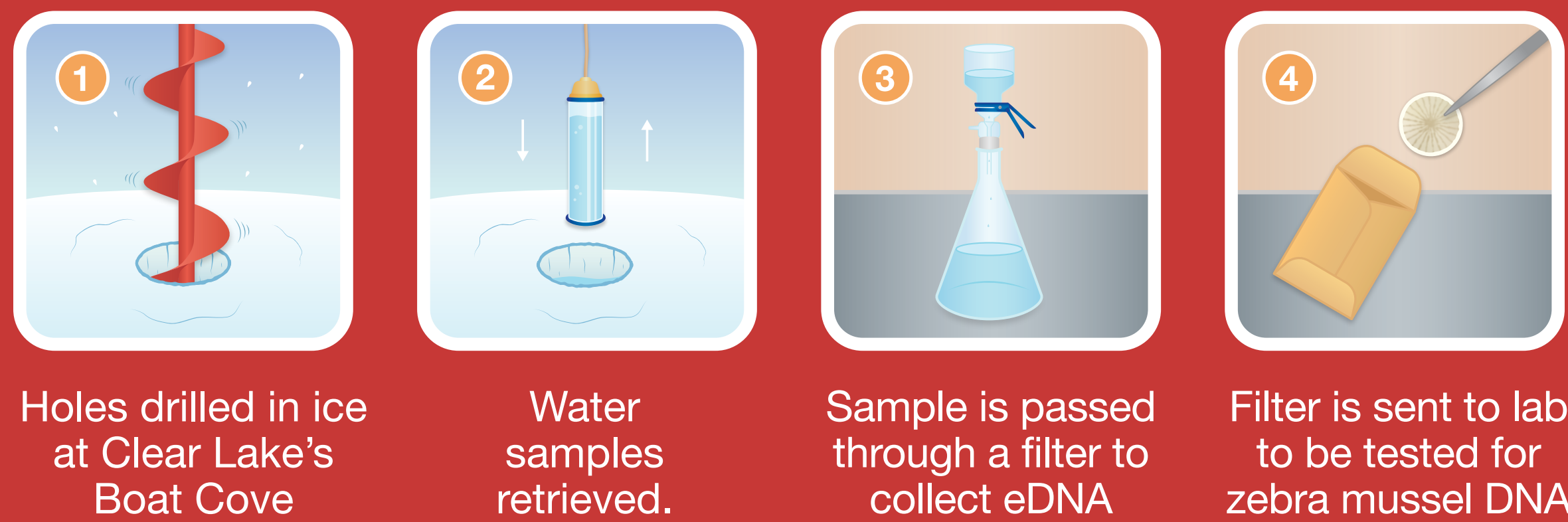
Difficult to drain. Hidden areas can store water and harbour aquatic invasive species.

What Have We Done So Far?

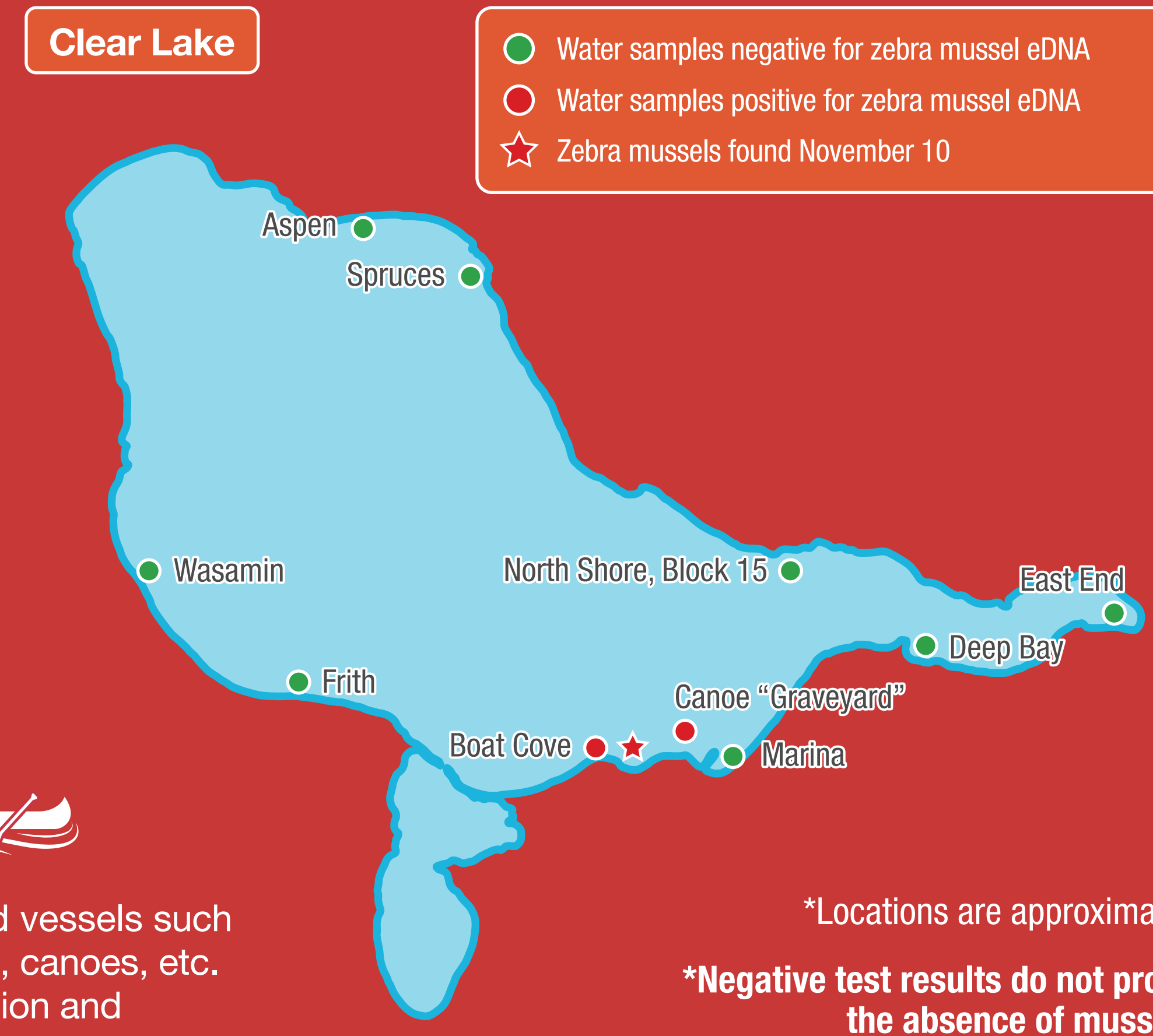
Prevention has been the priority



Feb. 2023 Winter eDNA Monitoring



Summer 2023 Water Sampling



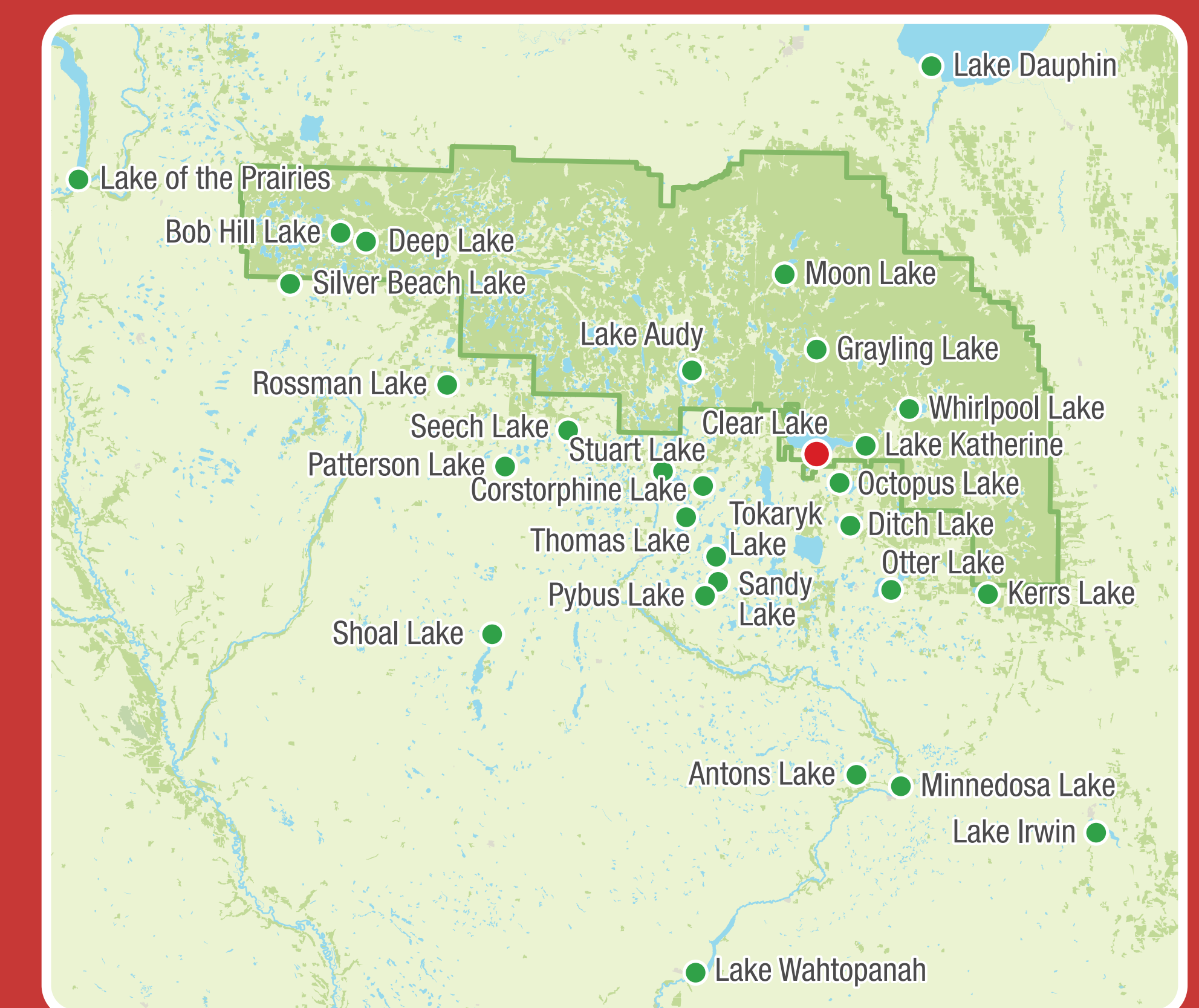
June 1 2023 New Regulations

- ### Trailer Boats
- In 2023, RMNP enhanced its AIS program. To be permitted on Clear Lake, trailer boats must have:
- NOT have been in any other waterbody in 2023
 - PASSED an inspection by June 15

- ### Self-propelled Vessels
- All self-propelled and non-trailer boats such as stand-up paddleboards, kayaks, canoes, etc. were subject to mandatory inspection and decontamination for the 2023 season.



Park and Surrounding Waterbodies



Oct. 29 2023 2023 AIS Program Statistics

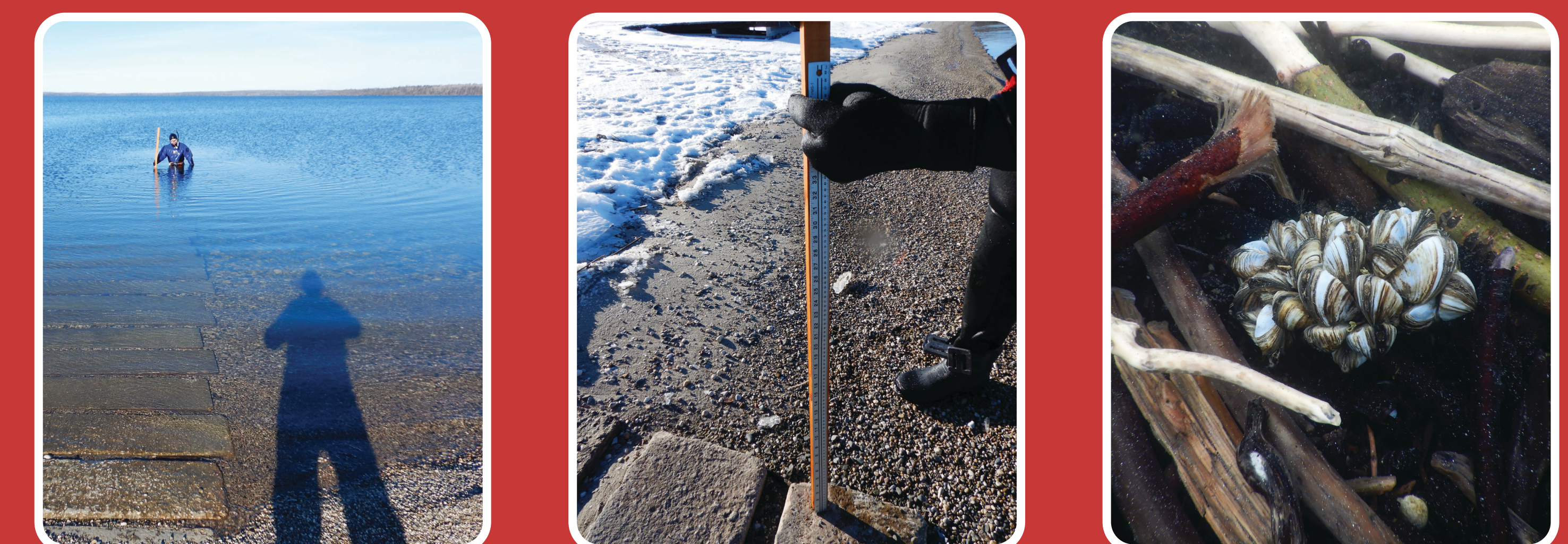


Program Successes

The program helped keep other AIS, such as spiny waterflea, rusty crayfish and others from getting into Clear Lake. It also prevented the potential spread of zebra mussel veligers out of Clear Lake.

Nov. 2023 Zebra Mussels Found

In early November, staff discovered and retrieved living zebra mussels from Boat Cove.



Where We Are Now

We have confirmed the presence of zebra mussels. We are now looking for an established population somewhere in Clear Lake.

Zebra Mussels at Boat Cove



Zebra mussels retrieved from Boat Cove on Nov. 10, confirming their presence in Clear Lake.

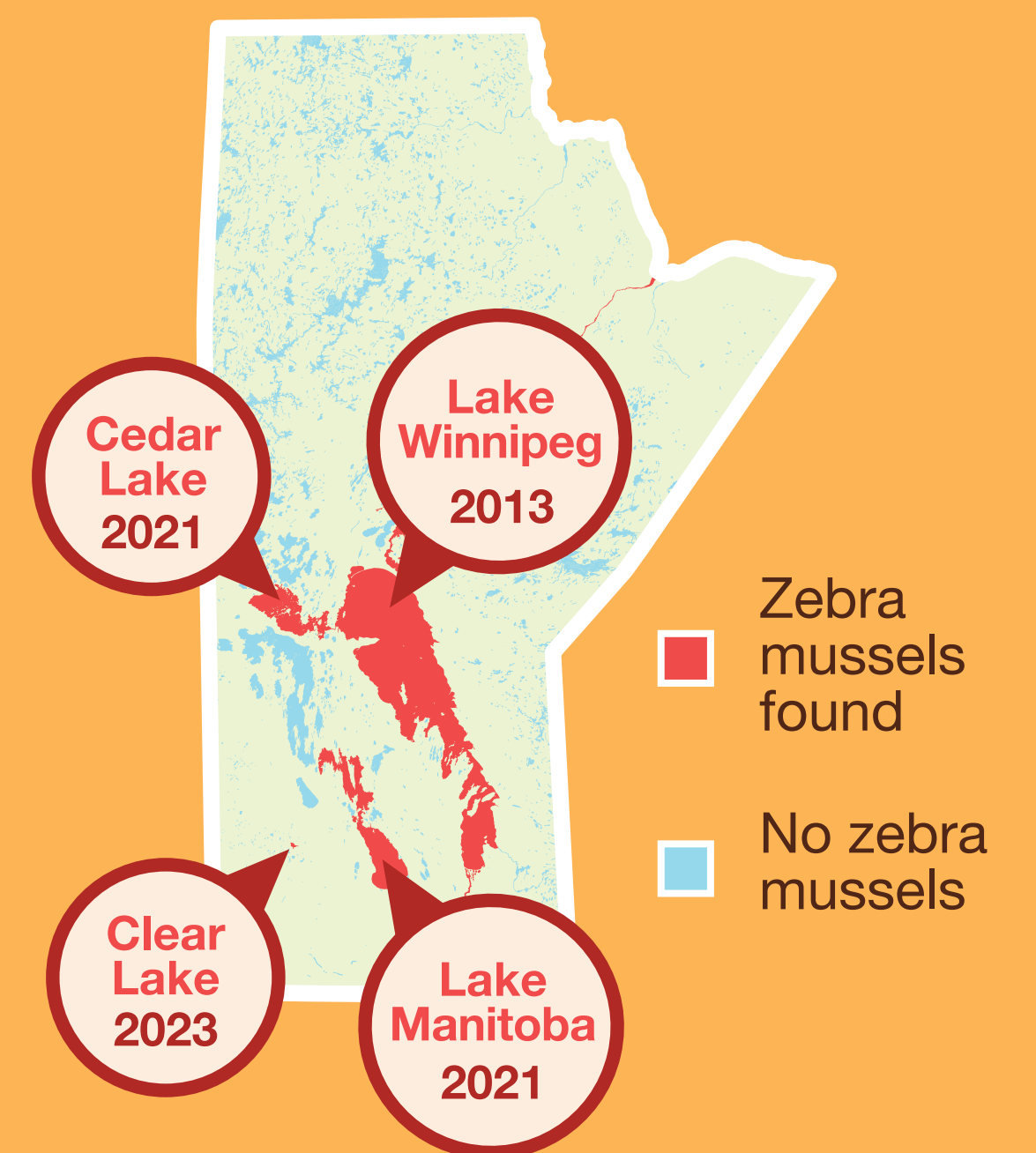


Separated zebra mussels from Boat Cove, grown to 1-3 cm in size.

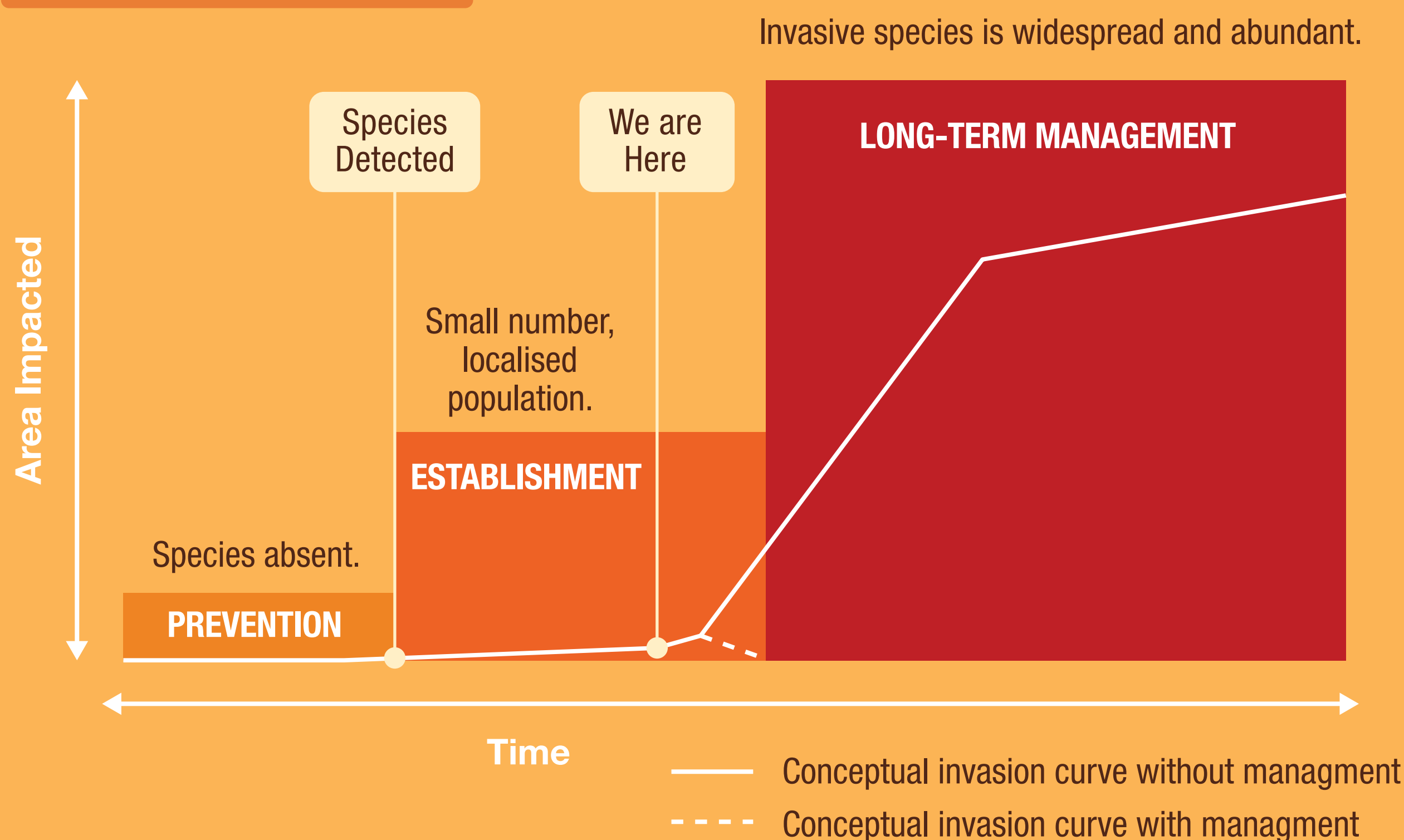
Downstream Flow from Clear Lake



Spread in Manitoba



Establishment Graph



What are we doing now?

We are working with the Coalition of First Nations with Interest in Riding Mountain National Park, Fisheries and Oceans Canada, the Province of Manitoba and other specialists from Parks Canada.

Work is underway to confirm if there is an established population in Clear Lake. This knowledge will inform our next steps.

The absence of evidence does not mean the absence of zebra mussels. In other words, just because we have not yet found them anywhere else, does not mean they are not here.

How Might this Affect Me?

Potential Physical Harm

Sharp shells can cut.

People protect themselves by wearing water shoes or other protective layers.



Arm cut by zebra mussel shell.
Photo: Pamela Racette

Monetary Cost

Increased maintenance costs.

Zebra mussels attached to watercraft, motors, docks and other surfaces are difficult to remove. If not physically removed, they can damage equipment, and block water flow. Dealing with them costs millions of dollars every year in Canada.



Propellers encrusted in mussels
Photo: Province of Manitoba

Ecological Impact

Zebra mussels often outcompete native fish and wildlife, lock away nutrients in their shells, and disrupt the food web. They can colonize fish spawning areas, and consume plankton. They have also been linked with toxic algal blooms.

Effects on Infrastructure

Clogged water intakes can create problems for water treatment facilities, irrigation systems as well as industrial and commercial operations.



Water intake pipe clogged with mussels.
Photo: Province of Manitoba

Once they are established, there is no known way to get rid of zebra mussels.

What Can I Do?

Clean, Drain, Dry



CLEAN

all plants, organisms, and mud from boat and gear.



DRAIN

all water from boat and gear onto land. Remember to keep all plugs out until next launch.



DRY

boat and gear completely before launching again.

Have Patience

Parks Canada makes evidence based decisions. Our next steps will be guided by the best available science.

Abide by Fishing Regulations

- The use of frozen or live bait is illegal in RMNP.
- Don't use your fishing equipment on multiple water bodies.
- Decontaminate your ice fishing equipment properly. It must be frozen at -10°C for 72 hours.

Spread the Message. Not the Mussels.

Do not transport live zebra mussels.
It is illegal.

Tell your friends and family about the importance of not transferring aquatic invasive species.

Stay Informed

Educate yourself. Go to our website:
parks.canada.ca/ridingmountain

or to the Province of Manitoba's AIS Unit's website:

manitoba.ca/stopais/index.html



RMNP



Manitoba