



**GRAND COUNCIL  
TREATY #3**  
THE GOVERNMENT of THE ANISHINAABE NATION in TREATY #3



**Invasive  
Species  
Centre**

# ENVIRONMENTAL MONITORING REPORT

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**2023 Invasive Species Report: Zebra Mussels**

**REPORT PREPARED BY THE GRAND COUNCIL TREATY #3  
TERRITORIAL PLANNING UNIT**

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**APRIL 2024**



**PLEASE DIRECT ANY QUESTIONS OR COMMENTS REGARDING THE CONTENT IN THIS  
REPORT TO MICHAELA NOVAK, [MICHAELA.NOVAK@TREATY3.CA](mailto:MICHAELA.NOVAK@TREATY3.CA).**

## Why We Monitor

The Grand Council Treaty #3 Territorial Planning Unit (TPU) coordinates invasive Zebra Mussel monitoring across the Treaty #3 territory, following the guidance and traditional protocols of the Treaty #3 communities within the territory.

### WHAT IS A ZEBRA MUSSEL?



Invasive Zebra Mussels are small, striped freshwater mollusks that were introduced to Canada from the Eurasian Seas in the 1980's. Zebra Mussels have two life stages; veligers (larvae) and adults. While veligers are microscopic, adults can grow up to 5cm during their 15-year lifespan.

By the time they are one year in age, females can release upwards of one million eggs each spawning season. In the span of one month, the developing veligers drift to new locations and can quickly spread throughout any connected waterbodies. The Zebra Mussels use their foot equipped with a cluster of long strands called byssal threads to help them secure a strong attachment to underwater structures, often outcompeting native freshwater mussels, predators, and removal methods (Non-Native Species Secretariat, 2018).

### WHAT ARE THE IMPACTS CAUSED BY ZEBRA MUSSELS?

Zebra Mussels that have successfully spread into lakes and rivers can have significant environmental impacts. As filter feeders, they often remove phytoplankton from the waterbody, which severely diminishes a critical food source for many local species. Even more, toxins that they filter from the water are retained in their tissues, and can end up causing illnesses in predators that consume them.

Their high reproductive rate and strong foot attachment allows for a rapid infestation causing biofouling, such as coverage of boat hulls and blockages in water pipes. Their microscopic size during the veliger stage allows them passage through small openings, including intake pipe filters.

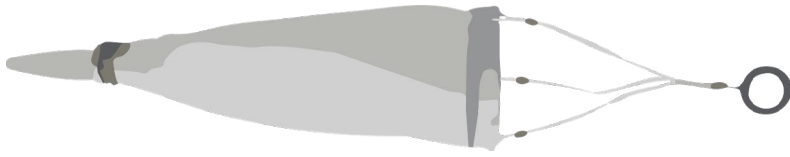
### WHERE ARE ZEBRA MUSSELS FOUND?

A waterbody is deemed to host an established population of Zebra Mussels when there are reproductively-capable adults and veligers present. As habitat requirements change throughout an mussel's lifetime, certain habitats may only be able to support a specific life stage, for example, a waterbody may have confirmed Zebra Mussel presence but not an established population of adult stage Zebra Mussels.

### HOW CAN INVASIVE ZEBRA MUSSELS BE CONTROLLED?

The removal of Zebra Mussels is very difficult. Physical removal requires scraping off the mussels from the substrate, with caution taken to ensure the removed mussels do not re-enter the waterbody from which they were removed or enter a new one. While the introduction to a new waterbody must occur within 5 days for optimal reproductive viability, adult Zebra Mussels can seal their shells and survive up to 30 days of air exposure (Province of Manitoba, 2023; Fisheries and Oceans Canada, 2023). High-pressure and high-temperature washing of the boat hull immediately after it is unlaunched strongly decreases the spread potential of invasive species.

# How we Monitor



## OUR MONITORING METHODS

In 2023, the TPU visited sites across Treaty #3 and collected samples using an 80 micron mesh plankton net and

sample container that were towed through water. Methods for collection included verticle tows for depths greater than 7m, horizontal tows for depths less than 7m, and shoreline tosses for any tows that required a greater length. All of the net tows were pulled at a speed of 1m per second.

The TPU prioritized sample areas in Treaty #3 communities, as well as high-traffic public boat launches and docks. Treaty #3 communities were considered a priority due to potential impacts on community infrastructures, whereas high-traffic public boat launches and docks were considered a priority due to their potential to act as an entry point for Zebra Mussel veligers into Treaty #3 waters. Whenever possible, Treaty #3 youth and other youth groups took part in the sample collection process. All samples collected in 2023 were sent to the [Invasive Species Centre \(ISC\)](#) to test for the presence of invasive Zebra Mussel veligers.



The photos above were taken during the 2023 monitoring season, and show the TPU staff completing monitoring efforts with help from the MNRF Youth Rangers. Not only were these youth supporting the collection of samples for aquatic invasive species testing, they also helped gather water chemistry data from the testing sites!

## SETTING UP SAFE MONITORING PROTOCOLS

In order to ensure monitoring efforts are safe and productive, two different sanitation methods were used between sampling to kill and remove potential Zebra Mussel veligers in the monitoring equipment. These methods are the hot water method, and the vinegar method.

The hot water method submerges all equipment in hot water (>60°C) for at least 10 minutes. This method was used when moving between waterbodies, and between each sample collection day, including when the equipment was returning to the same waterbody upon its next use. The vinegar method submerges all equipment in a 5% vinegar solution for a minimum of 24 hours, followed by a thorough rinse with water. This method was used between sampling in each of the four Treaty #3 geographic directions, and was completed a total of three times.

## Results from 2023 Monitoring Efforts

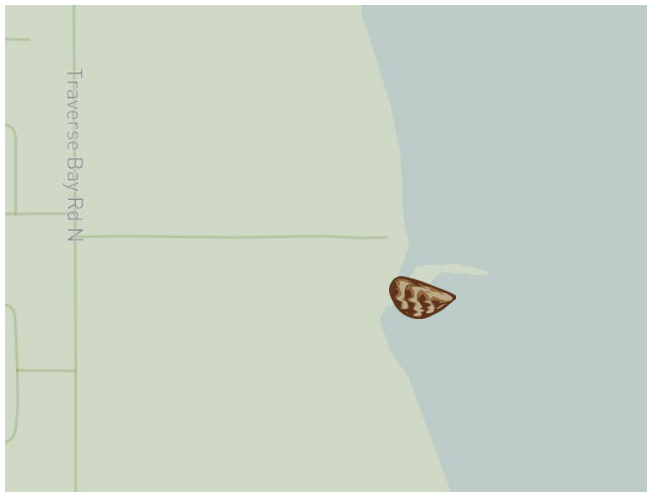
Between August 17th and September 26th, 2023, the TPU collected 78 samples from 73 unique sites across 38 waterbodies within the Treaty #3 territory. The samples were sent to the ISC for visual analysis to confirm the presence of Zebra Mussel veligers. After the analyses, three sample sites were confirmed positive for Zebra Mussel veliger. Two of the samples positive for veligers were from Lake Winnipeg, a waterbody known to host Zebra Mussels. The third positive sample was from Rainy Lake, and is the first confirmed Zebra Mussel identification in the Canadian portion of the binational waterbody.



*Government Landing, Christie Creek/Rainy Lake, Ontario*

Three unique collection sites were positive for the presence of Zebra Mussel veligers. Two positive samples were collected from the south basin of Lake Winnipeg in Manitoba and the third was collected from Christie Creek/Rainy Lake in Ontario. These maps show where the samples were taken. Less than

ten veligers were found in each of the positive samples. The positive sample from Christie Creek/Rainy Lake was retested and independently confirmed positive three additional times; a single veliger was identified.



*Traverse Bay Launch, Lake Winnipeg, Manitoba*



*Grand Beach Launch, Lake Winnipeg, Manitoba*

A full, in-depth 2023 Zebra Mussel Monitoring Report, complete with a results table for all sites tested, is also available to view or download by clicking [here](#). For any further inquiries about the results, or to inquire about the sites tested, email [michaela.novak@treaty3.ca](mailto:michaela.novak@treaty3.ca).

# Conclusion

## SUMMARY OF THE 2023 MONITORING SEASON

Over the course of the monitoring season, 38 waterbodies across Treaty #3 were sampled by the TPU for the presence of invasive Zebra Mussels. In total, 78 samples were collected from 73 unique locations. The presence of Zebra Mussel veligers were found in two waterbodies; Lake Winnipeg and Rainy Lake. Positive results indicate that there is a potential for Zebra Mussels to establish an adult population leading to a potential infestation in the waterbody; although, calcium concentration in the each location was not as high as is ideal to the species. A single negative result relates solely to the sample; a waterbody can host Zebra Mussels and receive a negative test result if no individuals were caught when sampling. Adult Zebra Mussels were not the target of the experiment and therefore not identified at any site.

## WHAT DO THE RESULTS MEAN?

It has been well documented that Lake Winnipeg has been deemed infested with Zebra Mussels since 2013 (Lake Winnipeg Foundation, n.d.). The two samples taken from the south basin of Lake Winnipeg act as further evidence to support the designation. The negative result from a nearby site in the connected Winnipeg River suggests that veligers have not spread upstream from Lake Winnipeg.

One of nine unique samples collected from Rainy Lake confirmed veliger presence, with a single individual identified. As no tests were done for adult Zebra Mussels, there is no evidence of an infestation. The single veliger found in Christie Creek/Rainy Lake is the first confirmed veliger in the Canadian portion of Rainy Lake; although, veligers were previously identified in multiple samples from the American portion (MDNR, 2021). The origin of the veliger is unknown; possibilities include an undiscovered established population of invasive Zebra Mussels active in the Minnesota portion or attachment to a watercraft that travelled through.

## NEXT STEPS & FUTURE MONITORING EFFORTS

Further efforts are required concerning invasive species in Treaty #3. The TPU is working to expand and increase monitoring in waterbodies across the territory for adult Zebra Mussels and veligers. Within 5 years, the TPU will install and maintain three boat wash stations between the hub cities in Treaty #3 to prevent and reduce the spread of aquatic invasive species. By the upcoming summer, the TPU aims to have the first station operational in the Kenora area. In 2024, sampling for veligers will occur throughout spring and fall during prime water temperatures for reproduction. A Zebra Mussel adult settlement sampler will be placed at high priority sites, especially near the locations with a positive result.

The TPU is also in the process of creating an information booklet of the invasive species present within the Treaty #3 territory! Increased education on the pathways and the impacts of invasive species is required to prevent and slow their spread. As opportunities arise, the TPU will continue taking on new projects, partnerships, and monitoring methods as directed by the Nation.

Click [here](#) to view or download the full, in-depth 2023 Zebra Mussel Monitoring Report, complete with a results table for all sites tested. For any further inquiries, email [michaela.novak@treaty3.ca](mailto:michaela.novak@treaty3.ca).