



IsampleON: eDNA Sampling Results

Invasive Species Awareness and Monitoring Program for Lakes Education in Ontario

BACKGROUND

IsampleON is a project that engages volunteers in monitoring efforts to help prevent the spread of invasive species. Environmental DNA (eDNA) monitoring was piloted during this monitoring program. For more information about eDNA, see the section “*What is eDNA monitoring?*”

Efforts from 2022 helped monitor for invasive spiny waterflea and invasive mussels (quagga and zebra mussels), three species with a well-established history of invasion in the Ontario Great Lake Region. From the combined effort of volunteers, we collected samples from 28 lakes. Thank you to all of the volunteers!

WHAT IS eDNA MONITORING?

eDNA monitoring is a method of sampling to detect genetic material shed by organisms into the environment. Genetic material can be detected from cells, tissue and excrement, amongst other sources. Using eDNA grants us the opportunity to get the jump on Invasive species because it can support detection early in the invasion process from even small amounts of genetic material. eDNA slots in well for early detection in part because it is quick, easy and it detects specific species, like invasive species. However, it does not tell us the number of organisms or whether that organism has persisted in the body of water. For example, the organism may have since passed through or died.

In the case of IsampleON, we looked for all types of eDNA shed by invasive mussels and spiny waterflea into the water of your lake. If we found eDNA of one of these species, it means that the invasive species might have been in your lake. See the sections below about “*Reading the Results*” and “*Interpreting Positive/Negative Samples*”.

If you were a volunteer who conducted eDNA sampling, you filtered water from your lake through a filter following the [Aquatic eDNA Participant Guide](#). For more information about eDNA, check out our [Aquatic eDNA Factsheet](#).

READING THE RESULTS

A table of the results is found in Table 1 of this document.

Find your lake name listed in the first column.

Reading from left to right you will also see your local association and the nearest town to the sampling location. Use this information to identify the location you helped sample.

Three columns on the far right (shaded with darker blue headers) show the results of three different sampling types.

- “*Zebra Mussel eDNA*” shows whether there was zebra mussel genetic material present in your sample.
- “*Quagga Mussel eDNA*” shows whether there was quagga mussel genetic material present in your sample.
- “*Mussel Veliger*” shows whether there were larva present from either quagga or zebra mussels in your sample. This method does not detect genetic material like eDNA.

- *Spiny Waterflea eDNA* shows whether there was spiny waterflea genetic material present in your sample
- *Spiny Waterflea Visual* shows whether there were spiny waterflea present in your sample. This method does not detect genetic material like eDNA.

“*Negative*” means the sample did not have one of the tested species in it.

“*Positive*” means the sample did have one of the tested species in it.

“*Na*” means the sample collected was not tested and/or there were no samples collected. A sample may not have been tested for a number of reasons (e.g., contamination, limited processing budget, etc.). Few sites had all four types of sampling conducted and not all samples collected had conclusive results. “*Na*” represents an absence of information and are neither positive or negative. “*Inconclusive*” means the sample was tested, but the result of the test was not definitive.

Different sampling types provide different forms of information. For example, veliger sampling only picks up specific life stages of mussels (i.e., larval) whereas eDNA sampling picks up all stages of life. However, eDNA sampling will only detect genetic material before it falls apart. It is possible that invasive mussels could shed genetic material into your lake, but it falls apart before you have the chance to capture it in your eDNA sample. Mussel veligers are detectable over a longer period of time.

It is also worth noting that the veliger and eDNA results come from different samples of water and therefore different parts of the lake. While a positive result means that the sample had signs of an invasive species in it, that doesn’t mean that every sample taken from the lake will have the same result.

These reasons explain why two different types of samples taken from the same lake may not have the same result. A positive sample from any sampling type is reason enough to take precautions.

INTERPRETING POSITIVE RESULTS

Positive samples do not indicate whether the invasive species have established in your lake.

To verify whether the organism is present, we recommend follow-up sampling to visually confirm the extent of invasion. Substrate sampling with dock hangers is one way to do so for invasive mussels and we recommend a wider distribution of sampling throughout the lake.

Only once you have visually confirmed Invasive mussels and/or spiny waterflea, we recommend reporting your sighting through one of the sources below.

As always, we advise preparing for possible negative impacts and we strongly encourage you to address sources of possible introduction and spread. Spiny waterflea does not have established control methods once introduced, which makes prevention all the more important.

INTERPRETING NEGATIVE SAMPLES

Negative samples do not mean invasive mussels and/or spiny waterflea are absent either. This result only means that they were not captured in the samples. Invasive species could be elsewhere in your lake or too low in abundance to detect.

Monitoring is an ongoing responsibility. Continue to keep a watchful eye out for signs of invasive species and practice preventative measures like [Clean, Drain, Dry](#).

Thank you for participating. Your role helps protect Ontario lakes from aquatic invasive species. Please refer back to your toolkit for advice on next steps.

Report invasive species to:

- [EDDMapS](#) App or Webpage (Early Detection and Distribution Mapping Systems)
- [iNaturalist](#) App
- Invading Species Awareness Hotline: **1-800-563-7711**

eDNA RESULTS

Table 1. Invasive Mussel Sampling Results from the 2022 IsampleON Program

Location name	Lake/Cottage Association	Nearest Town/city	Invasive Mussels eDNA	Invasive Mussel Veliger	Spiny Waterflea eDNA	Spiny Waterflea Visual
Chandos Lake	Chandos Lake	Apsley	negative	negative	Na	negative
Kashwakamak	Kashwakamak Lake Association	Northbrook	negative	negative	negative	positive
Horseshoe	Horseshoe Crotch Lake Property Owners	Arden	negative	negative	Na	negative
Canonto	Canonto Lake Property Owners Association	Plevna	negative	negative	inconclusive	negative
Menominee Lake Association	Menominee Lake Association	Lake of Bays/Huntsville	negative	negative	Na	negative
Growler Lake	Growler Lake Property Owners Association	West Guilford	negative	negative	Na	negative
Steenburg Lake	Na	Bancroft	Na	Na	Na	Na
Canning Lake	Canning Lake Property Owners Association	Minden	negative	negative	Na	negative
Rankin Lake	Rankin Lake Property Owners Association	Parry Sound	negative	negative	inconclusive	positive
Fagan Lake	Bennet and Fagan lakes Association	Maberly	positive	positive	Na	negative
Manitou Wabing	Manitou wabing Lake Community Association	Na	negative	negative	Na	negative
Catchacoma Lake	Catchacoma Cottagers Association	Na	negative	negative	inconclusive	Positive
Trout Lake	Carson Trout Lepine and Greenan Lake Association	Barry's Bay	negative	negative	inconclusive	positive
Trout Lake	Trout Lake Campers Association-Sudbury district	French River/Alban	negative	negative	inconclusive	positive
Mazinaw Lake	Mazinaw Property owners association	Cloyne	negative	negative	inconclusive	negative
Lake Vernon	Lake Vernon Association	Huntsville	negative	negative	inconclusive	positive

Round Lake	Round Lake Cottagers association	Havelock	positive	positive	inconclusive	negative
Farquar Lake	Farquar lake	Harcourt	negative	negative	inconclusive	negative
Lake Healey	Lake Healey Property Association	Mactier	positive	negative	inconclusive	positive
Crego Lake	Crego Lake, Kinmount Parks Estate association	Kinmount	negative	negative	Na	negative
Big Gull Lake	Big Gull Lake	Northbrook	negative	negative	Na	negative
Glamor Lake	Glamor Lake Cottagers Association	Gooderham	negative	negative	Na	negative
Fortescue Lake	Fortescue Lake Cottagers Association	Gooderham	negative	negative	Na	negative
Salerno Lake	Salerno Devils Lake Cottagers Association	Na	negative	negative	Na	negative
Duck Lake	Duck Lake Cottagers Association	Port Loring/Parry Sound	negative	negative	negative	negative
Three mile Lake	3 Mile Lake	Port Carling	negative	negative	inconclusive	positive
Mary Lake	Mark Lake Cottagers Association	Huntsville	negative	negative	inconclusive	positive
Temagami	Temagami Lake Association	Temagami	Na	Na	Na	Na
Billings Lake	Billings Lake Cottage Association	Gooderham	negative	negative	Na	negative