ONTARIO PARKS

STATE OF ONTARIO'S PROTECTED AREAS

Aquatic Alien and Invasive Species

2021

Ontario

Aquatic Alien and Invasive Species

This indicator tracks the introduction and spread of alien aquatic species in inland lakes of provincial parks and conservation reserves.

Status

Status: Mixed

Trend: Baseline

Why it's important

Alien species are species of plants, animals and micro-organisms introduced by human activity outside their natural range. Invasive species are alien species whose introduction or spread threatens the environment, the economy and society. Invasive species include those that are native to Ontario but have been introduced to a new geographic region due to human activity.

Aquatic ecosystems in provincial parks and conservation reserves, such as lakes, rivers, streams and wetlands, are increasingly threatened by invasive species that:

- Degrade aquatic habitats
- Reduce native fishes and other species
- Alter aquatic food webs
- Negatively affect fishing, boating, and swimming

Visitors to provincial parks and conservation reserves can unintentionally spread invasive species through activities such as boating and fishing. Invasive species may also expand from lakes and streams outside protected areas.

Monitoring and reporting of alien and invasive aquatic species will help us plan actions to prevent their spread and reduce harmful impacts.

How we monitor

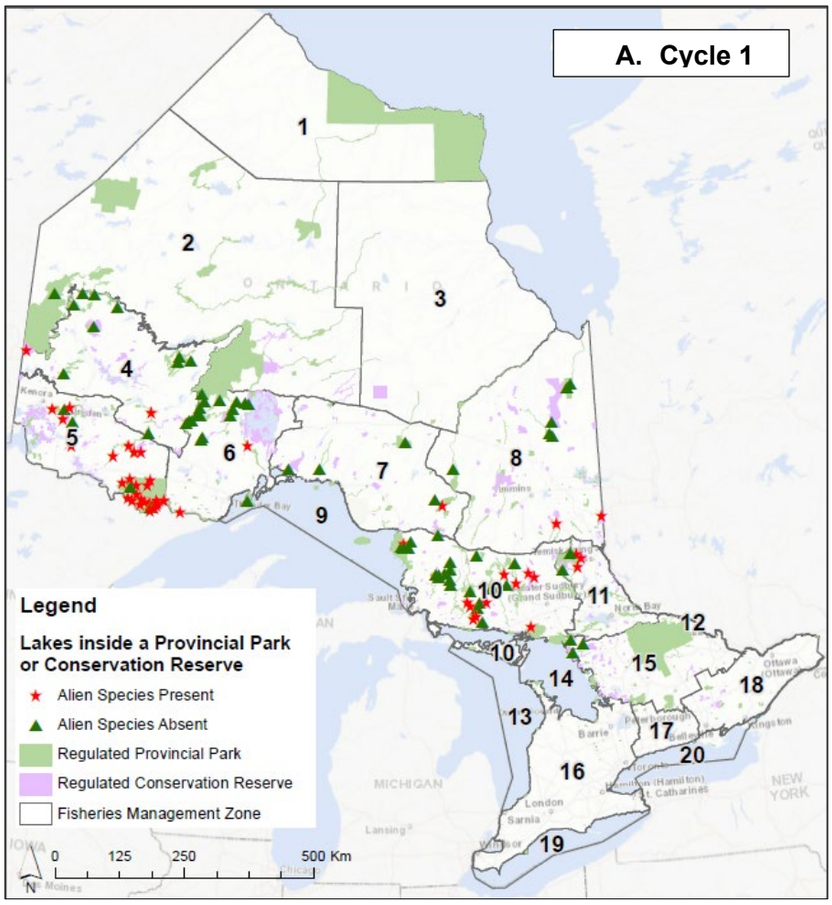
We used data from Northern Development, Mines, Natural Resources and Forestry (NDMNRF) for our assessment. NDMNRF's Broad-scale Monitoring Program for Inland Lakes systematically collects information on water quality, invertebrates and fishes from a selection of lakes in each fisheries management zone. Fisheries management zones are the units used for fisheries management in the province, and are identified by their number in Figure 1. Monitoring is conducted on a 5-year cycle. Cycle 1 was completed from 2008 to 2012 and cycle 2 in 2013 to 2017.

Since it is not always known if a species is invasive, we assess alien species to better understand potential threats. Alien species includes native species where they occur outside their natural range, such as smallmouth bass that have been introduced to new areas. For each fisheries management zone, we calculated the percentage of inland lakes in provincial parks and conservation reserves with alien aquatic species and the average number of alien species per lake. A lake was considered to be in a provincial park or conservation reserve if at least 51% of its surface area was within the boundary.

What's happening

Lakes were sampled in 67 provincial parks and conservation reserves (Figure 1). A total of 117 lakes were sampled in provincial parks and conservation reserves in cycle 1 and 107 in cycle 2 (Table 1). Lakes sampled in these protected areas were distributed among 8 fisheries management zones in central and northern Ontario. There were no lakes sampled in provincial parks and conservation reserves in fisheries management

zones in southern Ontario (zones 12, 16, 17 and 18). Monitoring did not occur in the far north of the province in zones 1, 2 and 3.



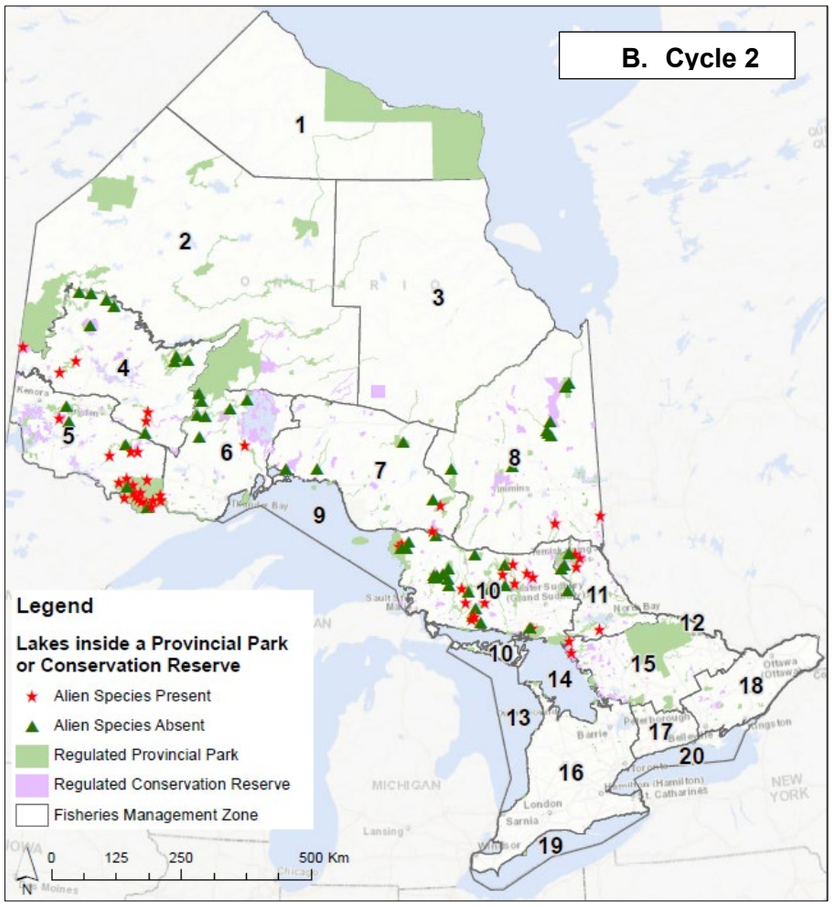


Figure 1. Sample lakes in provincial parks and conservation reserves for monitoring cycle 1 (A) and cycle 2 (B). Red stars show lakes where alien species were present during a monitoring cycle; green triangles indicate sample lakes where no alien species were detected in a monitoring cycle. Black numbers correspond to fisheries management zones.

Table 1. Number of inland lakes sampled in provincial parks and conservation reserves during monitoring cycles 1 and 2, including number of lakes with alien species.

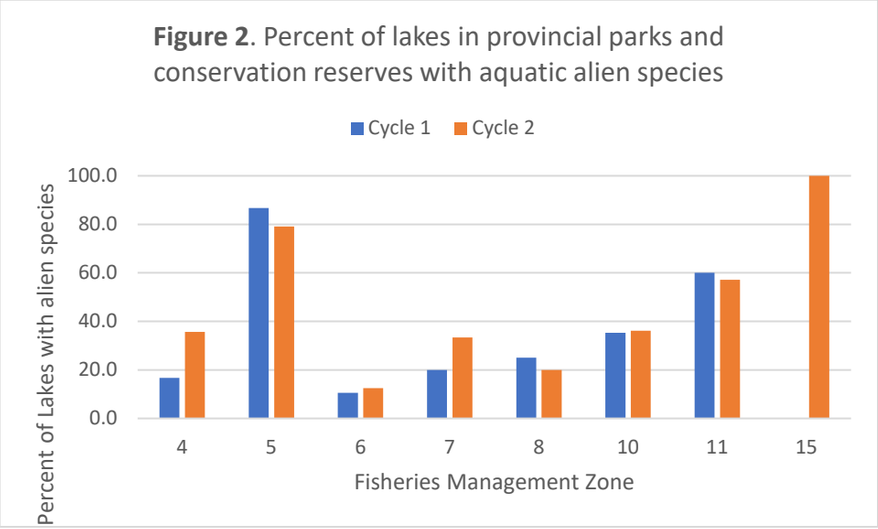
Fisheries Management Zone (see Figure 1 for location)	Cycle 1	Cycle 1-No. of Lakes with Alien Species	Cycle 2	Cycle 2- No. of Lakes with Alien Species
4	12	2	14	5
5	30	26	24	19
6	19	2	8	1
7	5	1	6	2
8	8	2	10	2
10	34	12	36	13
11	5	3	7	4
12	0	-	0	-
15	3	0	2	2
16	0	-	0	-
17	0	-	0	-
18	0	-	0	-
Total	**117**	**48**	**107**	**48**

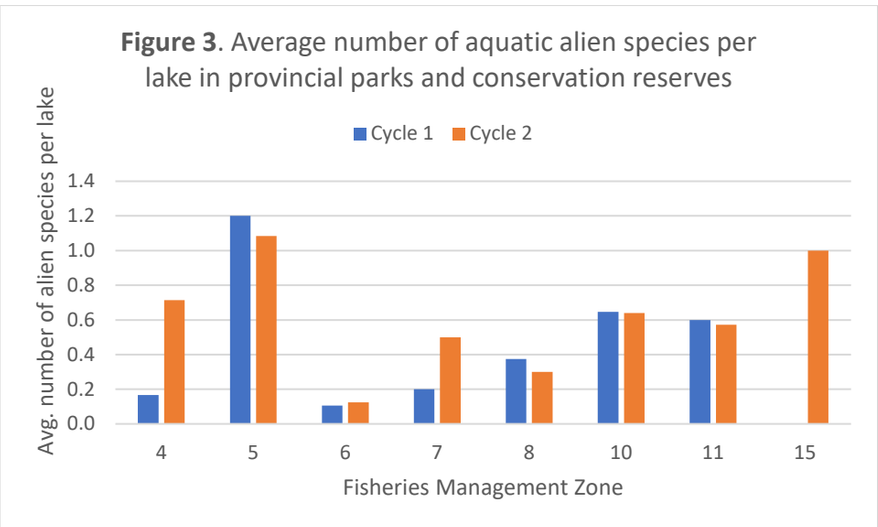
Alien species were found in 41% of the lakes in provincial parks and conservation reserves in the first monitoring cycle, and 45% of lakes in the second monitoring cycle. The proportion of lakes with alien species varied by fisheries management zone. The highest proportion of lakes with alien species occurred in fisheries management zones 5 and 11 in both monitoring cycles, and in zone 15 in cycle 2. (Figure 2). The proportion of lakes with alien species increased in 5 fisheries management zones (zones 4, 6, 7, 10 and 15) between monitoring cycle 1 and 2.

There was an average of 0.6 alien species per lake in provincial parks and conservation reserves in cycle 1 and 0.7 in cycle 2. The average number of alien species per lake ranged from 0.1 in fisheries management zone 6 to 1.1 in zone 5 (Figure 3). There was a slight increase in the average number of alien species per lake in some fisheries management zones during cycle 2 (zones 4, 7, and 15).

The proportion of lakes with alien species and the average number of alien species per lake decreased slightly in some fisheries management zones between monitoring cycle 1 and 2 (e.g., zones 5, 8 and 11). These declines were likely due to changes in the lakes sampled or to species not being detected, rather than to the absence of alien species in lakes where they were previously present.

The proportion of infested lakes and the average number of alien species per lake generally increased from north to south. Closeness to high density population centres and easier access to lakes in central and southern Ontario increases the risk of human transport of species, for example through the illegal dumping of live bait, or movement of aquatic plants and invertebrates attached to boats. Lakes in southern Ontario are also at higher risk of species introductions because of their proximity to the Great Lakes where over 180 alien species have established since the 1830s.





A total of nine alien species were recorded in inland lakes of provincial parks and conservation reserves. The most common species were Smallmouth Bass, Rainbow Smelt and Spiny Water Flea (Table 2).

Table 2. List of alien species in inland lakes of provincial parks and conservation reserves.

Species	No. of Lakes
Rainbow Smelt	11
Rusty Crayfish	1
Spiny Water Flea	11
Zebra Mussel	2
Black Crappie	3
Largemouth Bass	3
Rainbow Trout	1
Smallmouth Bass	51
Threespine Stickleback	1

More data is needed to assess trends in this information. We will be better able to assess trends when more lakes in provincial parks and conservation reserves are sampled and when another cycle of the Broad-scale Monitoring Program is completed.

Ontario Parks is preventing and controlling aquatic invasive species in provincial parks and conservation reserves by:

- Cleaning boats and equipment used for park operations when moving between waterbodies
- Requiring researchers and contractors to clean their equipment when working on water
- Restricting the use of live baitfish in some provincial parks (e.g., Algonquin, Lake Superior, Esker Lakes Provincial Parks) or only allowing the use of artificial lures (Quetico Provincial Park)
- Managing populations of aquatic invasive species to reduce or eradicate them, such as Water Chestnut control in Voyageur Provincial Park
- Developing and delivering interpretive and educational programs by Ontario Parks Discovery Program staff, as well as creating products and messaging to park visitors and social media followers about invasive species and the risks they pose

Implementation of Ontario's Invasive Species Strategic Plan and the Invasive Species Act is helping to address the threats of invasive species across the province. In October 2021, 13 additional invasive species and watercraft as a carrier were regulated under the Ontario's Invasive Species Act, helping to prevent future introductions and spread.

Indicator last updated

November 2021

Data source(s)

- Broad-scale Monitoring Program for Inland Lakes
- Land Information Ontario
- Cover photo: "Zebra Mussel cluster" by NOAA Great Lakes Environmental Research Laboratory is licensed under CC BY-SA 2.0

Related links

- Ontario's Invasive Species Strategic Plan
- Invasive Species Act