

# Lake Whitefish (Opeongo Lake large - and small-bodied populations)

## Ontario Government Response Statement



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### Protecting and Recovering Species at Risk in Ontario

Species at risk recovery is a key part of protecting Ontario's biodiversity. The *Endangered Species Act, 2007* (ESA) is the Ontario government's legislative commitment to protecting and recovering species at risk and their habitats.

Under the ESA, the government must ensure that a recovery strategy is prepared for each species that is listed as endangered or threatened. A recovery strategy provides science-based advice to government on what is required to achieve recovery of a species.

Generally, within 9 months after a recovery strategy is prepared, the ESA requires the government to publish a statement summarizing the government's intended actions and priorities in response to the recovery strategy. The response statement is the government's policy response to the scientific advice provided in the recovery strategy. In addition to the strategy, the government response statement considers (where available) input from Indigenous communities and organizations, stakeholders, other jurisdictions, and members of the public. It reflects the best available local and scientific knowledge, including Indigenous Knowledge where it has been shared by communities and Knowledge Holders, as appropriate, and may be adapted if new information becomes available. In implementing the actions in the response statement, the ESA allows the government to determine what is feasible, taking into account social, cultural and economic factors.

The Recovery Strategy for Lake Whitefish (*Coregonus clupeaformis*) (Opeongo Lake large and small bodied populations) in Ontario. was completed on January 16, 2024.

### Description of Lake Whitefish (Opeongo Lake large- and small-bodied populations)

Lake Whitefish is silvery in colour with a darker back, lighter underside and large, rounded scales. It has a short head with small eyes and a snout that slightly overhangs the mouth.

As suggested by the name, large-bodied individuals reach a larger size at maturity than small-bodied individuals.

## Protecting and Recovering (Opeongo Lake large- and small-bodied populations)

Lake Whitefish (Opeongo Lake large- and small-bodied populations) are listed as threatened species under the ESA, which protects both the animals and their habitat. The ESA prohibits harm or harassment of the species and damage or destruction of their habitat without authorization or complying with the requirements of a regulatory exemption.

In response to the listing of the Lake Whitefish (Opeongo Lake large- and small-bodied populations), Ontario closed recreational fishing for Lake Whitefish in Opeongo Lake in 2022.

Lake Whitefish is widely distributed across Canada and the northern United States including New England west to Minnesota. It is generally common where it occurs, but has undergone local adaptations in some lakes, giving rise to evolutionarily distinct forms. Lake Whitefish in Opeongo Lake, Algonquin Provincial Park (southeastern Ontario) are unique, as they have co-evolved as 2 separate populations of larger and smaller bodied individuals. The 2 forms – collectively referred to as a “species pair” – occur only in Opeongo Lake. Although they are the same species, the forms are physically distinct and reproduce independently of one-another. For more information about the identification of each form, read the [Recovery Strategy for Lake Whitefish \(\*Coregonus clupeaformis\*\) \(Opeongo Lake large and small bodied populations\)](#) in Ontario.

Although the Lake Whitefish found in Opeongo Lake are not a separate taxonomic species from the Lake Whitefish found in other lakes in Ontario, they are considered discrete, significant entities that are eligible for assessment under the ESA. Only one other Lake Whitefish pair has been assessed in Ontario (Como Lake populations) and both forms are classified as extinct. Lake Whitefish found in other Ontario lakes are not considered at risk.

Lake Whitefish is a freshwater member of the salmonid family, found mainly in large, cold lakes and their tributaries. Opeongo Lake is the largest lake in Algonquin Provincial Park and consists of 4 basins separated by shallow narrows. Large- and small-bodied populations of Lake Whitefish are found throughout Opeongo Lake, though there are fewer records from shallower bays, which likely reflects the species’ preferences for deeper areas and cooler temperatures. Generally, species pairs arise when Lake Whitefish evolve to occupy different trophic niches within the same lake: one form tends to occupy the benthic (bottom) zone and feed on benthic organisms, while the other form tends to occupy the limnetic (open water) zone and feed on plankton. However, available information suggests that adults of both the large- and small-bodied forms in Opeongo Lake are using benthic habitat throughout most of the ice-free season. Additional research is needed to better understand the degree and timing of overlap in trophic niches and habitat use between the 2 forms and clarify the factors that support the maintenance of the 2 different forms.

Lake Whitefish generally spawn in nearshore areas of lakes with rocky shoals. However, locations and key characteristics of spawning habitat in Opeongo Lake are not known with certainty. Lake Whitefish are also known to spawn in rivers, but it is unknown whether the Opeongo Lake forms use creeks which are connected to the lake (e.g., Costello Creek, Hailstorm Creek). Habitat needs of juvenile Lake Whitefish in Opeongo Lake are also unknown, though historical capture of juveniles alongside adults suggests some degree of overlap in habitat use.

The most significant threat to the Lake Whitefish species pair in Opeongo Lake is the introduction of invasive or non-native species, such as invasive zooplankton (e.g., Spiny Water Flea [*Bythotrephes longimanus*], Fishhook Water Flea [*Cercopagis pengoi*]), dreissenid mussels (e.g., Zebra Mussel [*Dreissena polymorpha*], Quagga Mussel [*D. bugensis*]), and nonindigenous and predatory fish (e.g., Rainbow Smelt [*Osmerus mordax*], Northern Pike [*Esox lucius*]). The introduction and establishment of invasive or non-native species can alter food web dynamics, with implications for the conditions which maintain the Lake Whitefish species pair, as suggested by the extinction of the species pair in Como Lake, Ontario after the introduction of Spiny Waterflea around 2011. New populations of Rainbow Smelt (e.g., Radiant Lake) and Spiny Waterflea (e.g., Rock Lake) have recently become established in the park, demonstrating that there is a real and current risk for their introduction into Opeongo Lake. Two species of nonindigenous fish, Cisco (*Coregonus artedii*) and Smallmouth Bass (*Micropterus dolomieu*), were introduced into Opeongo Lake prior to the intensive study of Lake Whitefish and historical impacts are unknown. However, any potential impacts do not appear to be ongoing.

Climate change represents another potential threat to the Lake Whitefish species pair in Opeongo Lake, as increases in temperatures and reductions in dissolved oxygen and winter ice cover may reduce suitable habitat, increase egg mortality, influence prey availability, and increase the incidence of harmful algal blooms. Incidental catch by anglers fishing for other sport fish species may pose a minor risk, but the likelihood and intensity of this threat is low.

The Lake Whitefish species pair in Opeongo Lake represents a unique component of whitefish diversity, and its single location makes it especially vulnerable to extinction. Given that Opeongo Lake is in a provincially protected area, threats, particularly those with the potential to impact habitat, are minimized. However, the lake receives a high level of traffic, which poses a risk of introduction of invasive and/or non-native species. Species pairs are typically distinguished by isolated niches, but the conditions maintaining the Opeongo Lake species pair are not well-understood. Research is needed to provide reliable estimates of abundance, genetics, and population structure and trends to determine whether the population is self-sustaining, and to better understand the dynamics of the 2 forms, individually and in relation to one another, and how they may be impacted by the identified threats.

### **Government's Recovery Goal**

The government's goal for the recovery of Lake Whitefish (Opeongo Lake large- and small-bodied populations) is to maintain self-sustaining populations of both forms.

Protecting and recovering species at risk is a shared responsibility. No single agency or organization has the knowledge, authority or financial resources to protect and recover all of Ontario's species at risk. Successful recovery requires inter-governmental co-operation and the involvement of many individuals, organizations and communities. In developing the government response statement, the government considered what actions are feasible for the government to lead directly and what actions are feasible for the government to support its conservation partners to undertake.

## Actions

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The government endorses the following actions as being necessary for the protection and recovery of Lake Whitefish (Opeongo Lake large- and small-bodied populations). Actions identified as "high" may be given priority consideration for funding under the Species at Risk Stewardship Program. Where reasonable, the government will also consider the priority assigned to these actions when reviewing and issuing authorizations under the ESA. Other organizations are encouraged to consider these priorities when developing projects or mitigation plans related to species at risk.

Given the species pair is found only within a provincially protected area, it is recognized that all recovery actions for this species will likely require some level of government oversight or involvement, therefore some actions below are identified as both government led and supported.

The government will conduct a review of progress toward the protection and recovery of Lake Whitefish (Opeongo Lake large- and small-bodied populations) within 5 years of the publication of this document.

### Focus Area: Threat Mitigation and Awareness

Objective: Take proactive measures to mitigate threats to the species and their habitats and increase the level of public awareness and engagement in protecting the species pair.

The greatest threat to the Lake Whitefish species pair in Opeongo Lake is the introduction and spread of aquatic invasive species and non-native predatory fishes. As knowledge gaps are being filled to better understand how these threats might impact the species pair, proactive efforts should be undertaken to minimize the risk of introducing aquatic invasive and predatory species to Opeongo Lake and nearby waterbodies.

Increasing public awareness of the Lake Whitefish pair in Opeongo Lake and its threats is essential to garnering public support of, and participation in, threat mitigation activities. The public is the primary vector for the introduction and spread of invasive species through recreational activities, and their diligence in participating in activities to mitigate the risk is essential.

### Actions:

1. **(High)** Continue to implement Ontario's *Invasive Species Act, 2015* to prevent the introduction and spread of invasive species (e.g., dreissenid mussels, Spiny

Water Flea) that threaten Lake Whitefish (Opeongo Lake large- and small-bodied populations) and their habitats by requiring boaters to take mandatory precautions to remove aquatic organisms and drain water from watercraft and watercraft equipment prior to transporting overland or launching into any waterbody in Ontario. **(government led)**

2. **(High)** Support Action 1 by facilitating cleaning of watercraft and gear before accessing Opeongo Lake and nearby waterbodies. This action may include the installation or use of mobile watercraft and gear washing stations at key locations (e.g., Opeongo Lake access road). **(government led and supported)**
3. Continue efforts to educate the public about the risks of invasive species on natural ecosystems and species at risk and actions that can be taken to prevent the threat. **(government led and supported)**
  - i. undertaking communications and outreach to increase public awareness of species at risk in Ontario (e.g., through Ontario Parks Discovery Program, where appropriate)
  - ii. installing signage at the Opeongo Lake boat launch, Annie Bay dam, and other strategic locations to inform anglers and visitors about the risks of aquatic species introductions and related prohibitions (e.g., against transporting live sportfish overland and dumping bait within 30 m of water) and best management practices (e.g., drying gear between lakes)
  - iii. leveraging the park reservation system to promote awareness of Lake Whitefish in Opeongo Lake and highlight activities which may pose risks
  - iv. creating and disseminating educational materials (e.g., pamphlets) and delivering lectures/workshops at strategic areas (e.g., Visitors Centre, Opeongo Lake Access Point)
  - v. supporting aquatic invasive species prevention efforts
4. Increase angler awareness of the Lake Whitefish pair, including how to identify the species and that they should be immediately released if caught. **(government led and supported)**

**Focus Area: Research and Monitoring**

**Objective:** Fill knowledge gaps related to Lake Whitefish (Opeongo Lake large- and small-bodied populations) habitat, trophic niches and population trends.

In order to better understand how identified threats may impact the Lake Whitefish species pair in Opeongo Lake, research is needed to clarify the conditions that are maintaining differentiation of the large- and small-bodied populations. For this purpose, all research and monitoring efforts should distinguish between the large- and small-bodied forms. Surveys are required to refine physical and spatial habitat needs for all life stages, determine population dynamics and clarify trophic niche of each form. Lake wide, depth-stratified netting surveys using the large-mesh gill nets used in Ontario's Broadscale Monitoring Program were conducted by Harkness Lab in 2013, 2019, and 2023 . These surveys provide a foundation of spatial distribution and relative abundance information to build upon. Continuous open-water temperature profile monitoring has been in place in Lake Opeongo since 2001 against which future changes in thermal habitat availability may be assessed. Annual ice-out dates (the first day of the year on which a boat can travel from one end of the lake to the other unimpeded by ice) have been recorded for Opeongo

Lake since 1964. Continued monitoring of ice-out dates will provide important information about lake characteristics in the short-term and serve as an indicator of climate change in the long-term. Where possible, these actions should be undertaken in collaboration with academic institutions, Indigenous communities and organizations, and other conservation partners to promote inclusion of local knowledge and resources.

**Actions:**

5. **(High)** Implement monitoring programs for Opeongo Lake, where feasible. **(government led and supported)**. Programs should include:
  - i. surveys that can provide reliable estimates of Lake Whitefish abundance, genetics, and population structure and trends
  - ii. monitoring of key water chemical parameters including dissolved oxygen, temperature, calcium, nitrogen, phosphorous and pH at stratified depths
  - iii. continued annual ice-out monitoring
  - iv. monitoring for invasive species
6. Undertake surveys to characterize physical and spatial habitat at different life stages to clarify niche occupancy and inform habitat protection. **(government led and supported)**. Actions may include:
  - i. surveys that can provide reliable estimates of Lake Whitefish abundance, genetics, and population structure and trends.
  - ii. increasing knowledge about early life history.
  - iii. assessing movement and occupancy patterns of adult Lake Whitefish throughout the year to determine the functional value, spatial distribution, and importance of different habitat types
  - iv. confirming whether connected watercourses (e.g., Costello Creek, Hailstorm Creek) provide important habitat (e.g., for spawning) and/or seasonal habitat (e.g., in spring and fall)
7. Clarify diet and trophic niche of each form at different life stages through isotopic and stomach content analysis to inform an understanding of the mechanisms maintaining species differentiation. **(government led and supported)**
8. Encourage the submission of Lake Whitefish (Opeongo Lake large- and small-bodied populations) data to Ontario's central repository through the Natural Heritage Information Centre. **(government led)**

**Focus Area: Protection and Management**

Objective: Continue to protect and manage the Lake Whitefish species pair in Opeongo Lake and its habitat through existing legislation, programs and plans.

Opeongo Lake is located within a provincially protected area which is managed for the purposes of maintaining natural and cultural landscapes and supporting low-intensity recreational opportunities. As a result, threats to the species pair are minimized. The government will support the persistence of the species pair by continuing to protect and manage Lake Whitefish in Opeongo Lake through existing legislation, programs and plans, and through the development of additional guidance for the management of the unique species pair and the ecosystem on which it relies.

### **Actions:**

9. **(High)** Continue to protect Lake Whitefish (Opeongo Lake large- and small-bodied populations) and their habitat through the ESA, the *Provincial Parks and Conservation Reserves Act, 2006* and associated regulations and policies, as applicable. **(government led)**
10. Educate other agencies and authorities involved in planning and environmental assessment processes on the protection requirements under the ESA. **(government led)**
11. Continue to support conservation, agency, municipal and industry partners, and Indigenous communities and organizations to undertake activities to protect and recover Lake Whitefish (Opeongo Lake large- and small-bodied populations). Support will be provided where appropriate through funding, agreements, permits and/or advisory services. **(government led)**
12. Continue managing Algonquin Provincial Park in a manner consistent with the Algonquin Provincial Park Management Plan (1998) and associated amendments or revisions. **(government led)**
13. Develop a Fisheries and Aquatic Ecosystem Management Plan for Algonquin Provincial Park. **(government led)**

### **Implementing Actions**

Financial support for the implementation of actions may be available through the Species at Risk Stewardship Program.

Conservation partners are encouraged to discuss project proposals related to the actions in this response statement with Ministry of the Environment, Conservation and Parks staff. The Ontario government can also provide guidance about the requirements of the ESA, whether an authorization or regulatory exemption may be required for the project and, if so, the authorization types and/or conditional exemptions for which the activity may be eligible.

Implementation of the actions may be subject to changing priorities across the multitude of species at risk, available resources and the capacity of partners to undertake recovery activities. Where appropriate, the implementation of actions for multiple species will be coordinated across government response statements.

### **Performance Measures**

Progress towards achieving the government's goal for the recovery of Lake Whitefish (Opeongo Lake large- and small-bodied populations) will be measured against the following performance measures:

- By 2029, both forms of Lake Whitefish continue to be present in Opeongo Lake.
- By 2049, no aquatic invasive species or new nonindigenous fish have been established in Opeongo Lake.
- By 2049, there is evidence that both forms of Lake Whitefish are self-sustaining in Opeongo Lake.

## **Reviewing Progress**

The ESA requires the Ontario government to conduct a review of progress towards protecting and recovering a species no later than the time specified in the species' government response statement, which has been identified as 5 years. The review will help identify if adjustments are needed to achieve the protection and recovery of Lake Whitefish (Opeongo Lake large- and small-bodied populations).

## **Acknowledgement**

We would like to thank all those who participated in the development of the Recovery Strategies and Government Response Statement for the Lake Whitefish (*Coregonus clupeaformis*) (Lake Opeongo large- and small-bodied populations) in Ontario for their dedication to protecting and recovering species at risk.

For Additional Information:

Visit the species at risk website at [ontario.ca/speciesatrisk](http://ontario.ca/speciesatrisk)

Contact the Ministry of the Environment, Conservation and Parks

1-800-565-4923

TTY 1-855-515-2759

[ontario.ca/environment](http://ontario.ca/environment)