

COSEWIC
Rapid Review of Classification

on the

Atlantic Whitefish
Coregonus huntsmani

in Canada

ENDANGERED
2022

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada



COSEPAC
Comité sur la situation
des espèces en péril
au Canada

The rapid review of classification process is used by COSEWIC for wildlife species that have not changed status since the previous COSEWIC assessment. Readily available information from the previous status report or status appraisal summary, recovery documents, recovery teams, jurisdictions, conservation data centres, and species experts is initially reviewed by the relevant Species Specialist Subcommittees before being reviewed by COSEWIC. The following is a summary of the relevant information.

COSEWIC Rapid Review of Classification are working documents used in assigning the status of wildlife species suspected of being at risk in Canada. This document may be cited as follows:

COSEWIC. 2022. COSEWIC Rapid Review of Classification on the Atlantic Whitefish *Coregonus huntsmani* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii pp. (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>).

Production note:

COSEWIC acknowledges David F. Fraser for writing the rapid review of classification on the Atlantic Whitefish, *Coregonus huntsmani*, in Canada, prepared under contract with Environment and Climate Change Canada. This report was overseen and edited by Margaret Docker, Co-chair of the COSEWIC Freshwater Fishes Specialist Subcommittee.

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Également disponible en français sous le titre Examen rapide de la classification du COSEPAC sur le Corégone de l'Atlantique (*Coregonus huntsmani*) au Canada.



COSEWIC Assessment Summary

Assessment Summary – December 2022

Common name

Atlantic Whitefish

Scientific name

Coregonus huntsmani

Status

Endangered

Reason for designation

This landlocked anadromous fish species is endemic to Canada. It once migrated between fresh water and the Atlantic Ocean, but it is now restricted to three interconnected lakes in southwestern Nova Scotia. It is threatened by illegally introduced predatory fishes, water-control structures that impede movement, municipal alteration of water levels, and declining habitat quality. If these threats are not reversed, they will lead to the extinction of this unique Canadian species.

Occurrence

Nova Scotia

Status history

Designated Endangered in April 1984. Status re-examined and confirmed in November 2000, November 2010, and December 2022.



COSEWIC Rapid Review of Classification

PREFACE

Atlantic Whitefish (*Coregonus huntsmani*) is a landlocked fish species that was historically anadromous, but it now occurs only in southwestern Nova Scotia. Reproduction is largely restricted to three small, partially interconnected, semi-natural lakes (Hebb, Milipsigate, and Minamkeak) in the upper Petite Rivière drainage area near Bridgewater. Some historical connections between these lakes have been blocked by water control structures. The species is believed to be extirpated from the Tusket River, where it was once reportedly abundant. It was almost certainly more widespread before European colonization (DFO 2018a). Wild Atlantic Whitefish is not found anywhere else in the world.

The exact size of the remaining population is not known but is believed to be small (DFO 2018a,b). Cook (2012) estimated contemporary effective population size (N_e), defined as the size of an ideal population experiencing the same rate of genetic change as the focus population, to be 18 and 38 using two different methods. Comparisons of N_e and census population size (N_c) show that the ratio between N_c and N_e averages approximately 10:1, although the relationship varies considerably. For example, if there are wide fluctuations in population size, N_e may be very much smaller than N_c (Frankham 1995). Nevertheless, the N_e observed in Atlantic Whitefish is among the lowest of any fish species examined (Cook 2012) and is cause for concern.

In the previous status report, non-native predatory Smallmouth Bass (*Micropterus dolomieu*) was reported to be reproducing in Minamkeak and Milipsigate lakes, and it was thought that it would almost certainly be reproducing in Hebb Lake in the near future (COSEWIC 2010). As of 2013, Smallmouth Bass reproduction has been confirmed in all three lakes (DFO 2018b). Chain Pickerel (*Esox niger*) was previously not known to be present within the Petite Rivière system (COSEWIC 2010), but it was reported in both Hebb and Milipsigate lakes in 2013 (Themelis *et al.* 2014; Feener *et al.* 2021). Introduction of Chain Pickerel into the Tusket-Annis system in the 1970s may have played a role in the extirpation of Atlantic Whitefish from this system. Negative effects from these illegally introduced predatory fishes could take the form of direct predation on Atlantic Whitefish, habitat displacement, and trophic disruption; and water control structures that impede movement, municipal alteration of water levels, and pollution also appear to be causing a decline in habitat quality (COSEWIC 2010).

Captive-reared Atlantic Whitefish were introduced into a small (<1 km²) lake, Anderson Lake (2005–2008, 2012) in Dartmouth, Nova Scotia, as part of an experiment to evaluate the feasibility of using captive-reared fish to establish successfully reproducing lake-resident populations of Atlantic Whitefish (Bradford *et al.* 2015). Environmental DNA (eDNA) work done in 2017 indicates that it is unlikely that the species persists in Anderson Lake (Dillon Consulting 2018).

Starting in 2018, larvae have been collected and housed at the Dalhousie Aquatron Laboratory and form the only captive stock of the species. Dalhousie Aquatron Laboratory, the Nova Scotia Salmon Association (NSSA), and Coastal Action are working to construct a streamside rearing trailer with the purpose of introducing young Atlantic Whitefish to a potential new waterbody. DFO, NSSA, and Coastal Action are also surveying Nova Scotia lakes to determine their suitability as Atlantic Whitefish habitat (Species at Risk Public Registry 2021).

Status History

Designated Endangered in April 1984. Status re-examined and confirmed in November 2000, November 2010, and December 2022.

Updated map

Required x Not required

No change in distribution known; see previous assessment (COSEWIC 2010).

TECHNICAL SUMMARY

Atlantic Whitefish

Corégone de l'Atlantique

Coregonus huntsmani

Range of occurrence in Canada (province/territory/ocean): Nova Scotia

Demographic Information

Generation time (usually average age of parents in the population)	Best estimate is 3 years, range of 2–5 years
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Unknown
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations, whichever is longer up to a maximum of 100 years]	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations, whichever is longer up to a maximum of 100 years].	Unknown
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations, whichever is longer up to a maximum of 100 years].	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any period [10 years, or 3 generations, whichever is longer up to a maximum of 100 years], including both the past and the future.	Unknown
Are the causes of the decline clearly understood?	Partially understood; invasive fishes are considered the greatest contemporary threat to persistence, but the species was in decline before their arrival
Have the causes of the decline ceased?	No
Are the causes of the decline clearly reversible?	Unknown
Are there extreme fluctuations in number of mature individuals?	Unknown

Extent and Occupancy information

Estimated extent of occurrence (EOO)	39 km ² (total size of all three lakes), but the value of 76 km ² is used here to make it equal to IAO to ensure consistency with the definition of IAO as an area within EOO (IUCN 2022)
Index of area of occupancy (IAO), reported as 2x2 km grid value.	76 km ² based on 2x2 km grid, although the actual IAO is ≤39 km ²

Is the population “severely fragmented” i.e., is >50% of its total area of occupancy in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	a. No b. No
Number of “locations”* (use plausible range to reflect uncertainty if appropriate)	1–3, although 1 location is most plausible as occupied lakes are interconnected and vulnerable to illegal introduction of predatory fishes, some of which are already present, and although their effect is not fully known, they likely will rapidly and negatively impact the entire population
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	Possible, but the EOO is already very small
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	No
Is there an [observed, inferred, or projected] continuing decline in number of subpopulations?	No
Is there an [observed, inferred, or projected] continuing decline in number of “locations”**?	No
Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality of] habitat?	Yes, observed decline in quality of habitat
Are there extreme fluctuations in number of subpopulations?	No
Are there extreme fluctuations in number of “locations”**?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature individuals (in each subpopulation)

Subpopulations (give plausible ranges)	N mature individuals
Total (one subpopulation)	No estimate available, but the population is believed to be small (DFO 2018b)

Quantitative Analysis

Is the probability of extinction in the wild at least [20% within 20 years or 5 generations whichever is longer up to a maximum of 100 years, or 10% within 100 years]?	Unknown; analysis not conducted
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* See Definitions and Abbreviations on [COSEWIC website](#) for more information on this term.

Threats and Limiting Factors

Was a threats calculator completed for this species?

No, but threats were most recently reviewed during a DFO Regional Science Advisory Process meeting undertaken by DFO (2009) and updated in DFO (2018b)

Key threats identified in the previous status report (COSEWIC 2010), with impact inferred here from the wording of that text, can be classified as (numbers refer to IUCN threats classification system):

8. Invasive & other problematic species & genes = High Impact
7. Natural system modifications = Medium Impact (water control structures and dams and anthropogenic alteration of water level (i.e., water supply for Town of Bridgewater))
9. Pollution = Low Impact (forestry runoff, leachate from historical mine sites and land development) based on current levels and if properly mitigated (DFO 2018a)
11. Climate Change = Unknown Impact (thermal suitability of egg incubation conditions (ice cover and duration), oxythermal constraints (i.e., reduced volume of coldwater refugia), changes in lake primary productivity)

What additional limiting factors are relevant?

Very small population and limited range

Rescue Effect (natural immigration from outside Canada)

Status of outside population(s) most likely to provide immigrants to Canada.	Not applicable There are no other natural populations, but captive broodstock are maintained at Dalhousie University Aquatron Research Facility. Larval Atlantic Whitefish have been collected from the Petite Lakes yearly since 2018 for rearing to broodstock (DFO 2018c)
Is immigration known or possible?	No, there are no other wild populations elsewhere
Would immigrants be adapted to survive in Canada?	Not applicable
Is there sufficient habitat for immigrants in Canada?	Not applicable
Are conditions deteriorating in Canada?+	Yes Habitat subject to multiple threats (COSEWIC 2010; DFO 2018a)
Are conditions for the source (i.e., outside) population deteriorating?+	Not applicable
Is the Canadian population considered to be a sink?+	Not applicable
Is rescue from outside populations likely?	No No other wild population exists

+ See [Table 3](#) (Guidelines for modifying status assessment based on rescue effect).

Occurrence Data Sensitivity

Are occurrence data of this species sensitive?	No
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Status and Reasons for Designation

Status: Endangered	Alpha-numeric codes: B1ab(iii)+2ab(iii)
Reasons for designation: This landlocked anadromous fish species is endemic to Canada. It once migrated between fresh water and the Atlantic Ocean, but it is now restricted to three interconnected lakes in southwestern Nova Scotia. It is threatened by illegally introduced predatory fishes, water-control structures that impede movement, municipal alteration of water levels, and declining habitat quality. If these threats are not reversed, they will lead to the extinction of this unique Canadian species.	
Reason for change of status	Not applicable

Applicability of Criteria

A: Decline in total number of mature individuals Not applicable. Timing and magnitude of past decline have not been documented, but likely occurred prior to the last three generations. Data are lacking on recent population trends.
B: Small distribution range and decline or fluctuation Meets Endangered, B1ab(iii)+2ab(iii), as EOO (76 km ²) and IAO (76 km ²) are below thresholds for Endangered, the population (a) exists at no more than three locations (most likely a single location), and (b) there is a continuing decline in quality of habitat.
C: Small and declining number of mature individuals Not applicable. Data on number of mature individuals are lacking.
D: Very small or restricted population Meets Threatened, D2. Number of locations 1–3 (most likely 1), and prone to substantial decline from effects of human activities or stochastic events within 1–2 generations.
E: Quantitative analysis No quantitative analysis of extinction risk was conducted.

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Writer of Rapid Review of Classification:

- David F. Fraser. RAMAS input by Dwayne Lepitzki, updated by David F. Fraser



COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS (2022)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994. Definition of the (DD) category revised in 2006.



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