

Allowable Harm Assessment for Atlantic Whitefish

Background

Atlantic whitefish (*Coregonus huntsmani*) are designated as “endangered” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and are listed on Schedule 1 of the Species at Risk Act (SARA). The prohibitions associated with SARA came into force 1 June 2004, SARA now provides the legal protection to this species. SARA provides that the Minister of Fisheries and Oceans may issue a permit to allow for incidental harm to a listed species if a number of conditions are met.

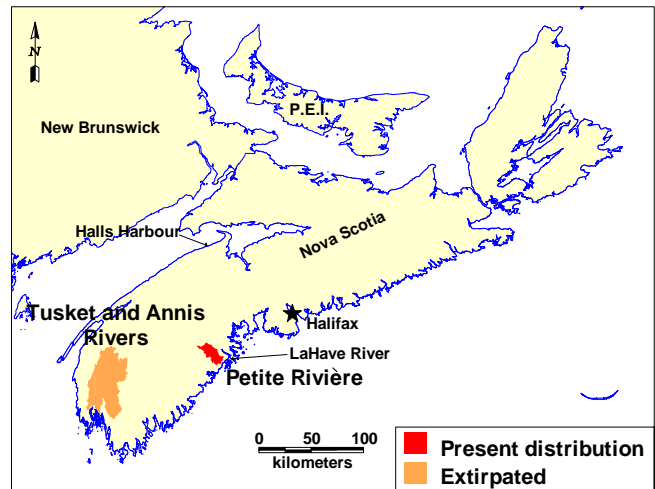
Under section 73(2) of SARA, authorizations may only be issued if:

- (a) the activity is scientific research relating to the conservation of the species and conducted by qualified persons;
- (b) the activity benefits the species or is required to enhance its chance of survival in the wild; or
- (c) affecting the species is incidental to the carrying out of the activity.

Section 73(3) establishes that authorizations may be issued only if the competent minister is of the opinion that:

- (a) all reasonable alternatives to the activity that would reduce the impact on the species have been considered and the best solution has been adopted;
- (b) all feasible measures will be taken to minimize the impact of the activity on the species or its critical habitat or the residences of its individuals; and
- (c) the activity will not jeopardize the survival or recovery of the species.

The analysis provided herein will support the Minister of Fisheries and Oceans in determining the basis under which permits are to be issued in Atlantic Canadian waters. In the context of this status report, “harm” refers to all prohibitions as defined in SARA.



Distribution of Atlantic Whitefish.

Summary

- Atlantic whitefish (*Coregonus huntsmani*), thought to be once widespread in distribution, restricted to two disjunct drainages by 1922, are now limited in distribution to the Petite Rivière.
- Life-cycle closure is a certainty only for those fish which are resident within three semi-natural lakes within the Petite Rivière.
- The three lakes cannot be accessed from the sea.
- A recent illegal introduction of smallmouth bass (*Micropterus dolomieu*) into one of these lakes creates uncertainty as to both the survival and potential for recovery of Atlantic whitefish.
- There are no indications that current human activities within the Petite Rivière drainage pose a threat to the survival of Atlantic whitefish.
- There may not be scope for further harm arising from new activities or proposed changes to existing activities because these may jeopardize the survival and recovery of the species.

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- The impact of harm from current human activities may increase once smallmouth bass have become established in the Petite Rivière drainage.

Issue

Designation by COSEWIC of Atlantic whitefish (*Coregonus huntsmani*) as “endangered” in 1984 and 2000 was based upon concerns associated with elevated risk to survival within a restricted global distribution, decline in abundance leading to possible loss of individual spawning populations, and further decline of remaining members of the species resultant of river acidification, invasive species, impediments to fish passage, and poaching.

In June 2004, prohibitions against harm to Atlantic whitefish came into force under SARA. Until a SARA compliant recovery plan is in place there is a requirement to evaluate the potential for allowable harm. With respect to SARA section 73, a scientific evaluation was conducted to resolve the current distribution of the species, the status of the individual populations, potential sources of harm, and which of these sources may pose a threat to either the survival or recovery of the species.

Assessment of Issue

Description of the Species

Atlantic whitefish are a member of the family Salmonidae, and belong to the subfamily Coregoninae. Like many salmonids they can occur as either anadromous or freshwater resident populations. Anadromous members are typically larger (up to 50 cm in length, 3.6 kg in weight) than freshwater resident specimens (usually less than 30 cm in length).

The life-history and habitat requirements of Atlantic whitefish are known only in general terms, or through analogy to North American coregonid fish species that have been studied

in greater detail. Neither eggs nor larvae have been collected from the wild. Juvenile Atlantic whitefish have been observed on only one occasion.

Adults feed on a wide variety of aquatic organisms. Stomach analyses of specimens from the landlocked Petite Rivière population indicated a diet dominated by aquatic insects and small fish and an absence of benthic organisms. Atlantic whitefish sampled from tidal waters had foraged on shrimp, amphipods, fish and marine worms.

When first described as a species in 1922, Atlantic whitefish were limited in distribution to the Tusket-Annis and Petite rivers. However, genetic and demographic factors indicate the species must have occupied a broader contiguous distribution at an earlier time.

Science collections and credible local knowledge indicate Atlantic whitefish once occurred in the Petite and Tusket estuaries. The marine distribution of Atlantic whitefish extended between LaHave estuary and Halls Harbour, however there are no records to indicate they ever extended seaward more than a few kilometers from the coast.

Upstream spawning migrations were known to have occurred from September-November. Spawning of both anadromous and freshwater resident fish appears to occur during December-January. Residence time of post-spawn adults in freshwater is not known. Age at which Atlantic whitefish initiate their first descent to the sea is not known.

Species Status

Because there is no assessment of abundance, Atlantic whitefish status and trends is limited to an analysis of relative indicators of spatial occupancy (i.e. change in geographic distribution over time).

The Tusket-Annis population appears to have been entirely anadromous whereas both anadromous and wholly freshwater resident fish have been reported from the Petite Rivière. The species was last reported from

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the Tusket-Annis system in 1982. Life-cycle closure is now certain only for the freshwater resident members of the Petite Rivière population. Emigrants from the lakes can not currently contribute to spawning owing to absent upstream fish passage.

There is no evidence either for expansion of the species range within the last century or for the existence of populations within other Nova Scotia rivers. Species survival is wholly contingent on the continued viability of a population restricted to approximately 16 km² of lacustrine habitat distributed among three lakes within the Petite Rivière system. The lakes cannot be accessed from the sea.

Smallmouth bass (*Micropterus dolomieu*) have been introduced illegally into one of the 3 lakes recently and are likely to colonize the remaining lakes. In light of the known negative effects on the abundance of salmonids in lakes where smallmouth bass have been introduced, there is uncertainty as to the future status of resident Atlantic whitefish and therefore of the species and potential for recovery.

Recovery cannot be effected by increasing abundance with Petite Rivière lakes. It can only be effected by enabling anadromy and extending its range outside the Petite. The timeframe for recovery is unknown.

Scope for Human-induced Harm (or Mortality)

Wild Atlantic whitefish presently occur only within three lakes within the Petite Rivière; scope for harm is limited to the present area of known occupancy. The hydrology of the river and lakes has been altered extensively over the course of the past two centuries either to harness water power or to meet municipal water demands. Supporting freshwater habitat has been and remains semi-natural in character with water levels, flows and habitat accessibility all susceptible to human manipulation.

Persistence of the species within the lakes, in the absence of specific measures that protect

both the species and their supporting habitat, indicates a degree of tolerance to human activities within their present area of occupancy. However, tolerance to further additive human pressure is likely low, due to the species restriction to a narrow geographic footprint and the potential impact of smallmouth bass.

There may not be scope for incremental increase in human-induced harm beyond current levels.

Potential Sources of Mortality and Aggregate Harm

There is no information that allows the partition of mortality associated with specific human activities. The persistence of the species within the semi-natural lakes suggest that aggregate harm from current human activities is low.

Potential sources of mortality and aggregate harm, and their relative rank effect by activity are:

Domestic Sources

Directed Fishing

- Not applicable. It is illegal to catch Atlantic whitefish.

Bycatch in Fisheries

- Bycatch in commercial fisheries directed at other species; low.
- Bycatch in recreational angling fisheries; low.

Fisheries Impacts on Habitat

- Fishing gear installation and operation, potential impediments to fish passage arising from presence and operation of fixed gear; low.

Direct Mortality Under Permit

- Permitted habitat alterations with highest rank effect are urbanization (shoreline alteration, domestic waste leachate) and presence of dams; those with lowest rank effect are water extraction for municipal or agricultural use (intrusion of fish).

Habitat Alterations Under Permit

- Detrimental alteration of habitats by permitted activities include increased

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sedimentation from forest harvest operations, eutrophication resulting from agriculture run-off, unmitigated acid run-off from mines or quarries, lake-level drawdown to provide water for municipal use during sensitive life history stages, and extraction of water from the river for irrigation; low.

Ecotourism and Recreation

- Not applicable.

Shipping, Transport and Noise

- Not applicable.

Fisheries on Food Supplies

- Not applicable.

Aquaculture

- Not applicable.

Scientific Research

- Removal of fish to support captive rearing, and incidental mortality arising from assessment and research actions; high.

Military Activities

- Not applicable.

Non-Domestic

- Acidification of the Petite Rivière as a result of acid rain from non-local sources is low. There is adequate residual capacity to maintain water pH above toxic levels.

Alternatives to Activities

There are few reasonable alternatives to current human activities that would reduce their impact on Atlantic whitefish. There remains, however, scope:

- for further regulatory changes should these be shown to be necessary,
- to restore fish passage between the lakes and the sea,
- for possible adoption of even better management practices .

Feasible Measures To Minimize Impact

To minimize the impact of activities on Atlantic whitefish, its habitat or residences of individuals the following measures have been taken:

- Forestry, agriculture, mining and urbanization operations all operate under best management practices, i.e., all are regulated under provincial laws and all are subject to remedial actions when activities are in violation of the sections of the *Fisheries Act* that protect fish habitat.
- Risk of bycatch in both commercial and recreational fisheries has been minimized by provisions within the *Fisheries Act* and supporting regulations. Several provisions had been enacted prior to the proclamation of SARA as a means to eliminate incidental captures during lawful fishing activities on an as-required-basis. Application of further protective measures under the *Fisheries Act* and supporting regulations remains an option for the future.
- Municipal water extraction practices that either divert water for human use, or alter the character of supporting habitat can be revised to accommodate and acknowledge the specific habitat needs of Atlantic whitefish as they become known.

Sources of Uncertainty

Past and current determinations of species status and trends have not been supported with quantitative estimates of abundance, or with consideration of the animals biological and ecological attributes. Therefore, future assessments may indicate that susceptibility to human induced mortality is not uniformly low.

The likely colonization of all waters that now support Atlantic whitefish by non-native smallmouth bass presents a risk. The impact of harm from current human activities may increase once smallmouth bass have become established in the Petite Rivière drainage. The degree of threat posed by smallmouth bass remains to be determined.

Conclusion

Atlantic whitefish, believed to have been widespread at one time, restricted to two disjunct drainages by the time of their discovery in 1922, are now limited in distribution to the Petite Rivière. Life-cycle closure is a certainty only for those fish which are resident within three semi-natural lakes which cannot be accessed from the sea. There is no certainty that the impact of harm from current human activities will remain low once Smallmouth bass have become established in the Petite Rivière drainage.

There are no indications that current human activities within the Petite Rivière drainage pose a threat to the survival of Atlantic whitefish. However, there may not be scope for further harm arising from new activities or proposed changes to existing activities because they may jeopardize the survival and recovery of the species.

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