

NAC(12)7

Update on activities related to the status of Atlantic salmon in eastern Canada in the context of the *Species at Risk Act*

The *Species at Risk Act* (SARA) was developed by the federal government of Canada as a key contribution to the common national effort to protect and conserve species at risk in Canada. SARA came into force in 2003 and one of its purposes is “*to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity.*”

In the context of species at risk conservation, recovery is the process by which the decline of an endangered, threatened or extirpated species is arrested or reversed, and threats are removed or reduced to improve the likelihood of the species’ persistence in the wild. A species is considered recovered when its long-term persistence in the wild has been secured.

A recovery strategy is a planning document that identifies what needs to be done to arrest or reverse the decline of a species. It sets goals and objectives and identifies the main areas of activities to be undertaken. Depending on the status of the species and when it was assessed, a recovery strategy has to be developed within one to two years after the species is added to the List of Wildlife Species at Risk (Schedule 1 of SARA). A listed species is protected under Schedule 1, Part 2 of SARA and is subject to the SARA provisions against the killing, harming, harassing, capturing or taking of individuals (section 32), and the damage or destruction of the species residence (section 33). The SARA also prohibits damaging or destroying their Residence or any part of their Critical Habitat. Section 2 of SARA defines critical habitat as the “*habitat necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species.*”

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is the organization that assesses the status of wildlife species which may be at risk of extinction in Canada. COSEWIC assesses the status of a species or components of the populations, referred to as Designatable Units (DUs). A Designatable Unit is a discrete and evolutionarily significant component of the taxonomic species, where “significant” means that the unit is important to the evolutionary legacy of the species as a whole and if lost would likely not be replaced through natural dispersion. More details on the identification of DUs and definitions of significant are available from the COSEWIC website (http://www.cosewic.gc.ca/eng/sct2/sct2_5_e.cfm).

COSEWIC assesses wildlife species relative to six status designations:

Status designation	Definition
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species that no longer exists in the wild in Canada, but exists elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation

Status designation	Definition
Special Concern (SC)	or extinction. A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Data Deficient (DD)	A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
Not At Risk (NAR)	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

Reference: http://www.cosewic.gc.ca/eng/sct0/assessment_process_e.cfm#tbl6

For a species assessed as “threatened”, “endangered”, “extirpated”, or “extinct”, the Minister of Fisheries and Oceans (DFO) must decide whether or not to list the species population (or DU) under the *Species at Risk Act*. To inform this decision and provide the basis for other SARA related functions, a Recovery Potential Assessment (RPA) is conducted to provide the information and scientific advice required to meet the various requirements of the SARA, such as the authorization to carry out activities that would otherwise violate the SARA as well as the development of Recovery Strategies. The information is also used when analyzing the socio-economic impacts of adding the species to the list as well as during subsequent consultations, where applicable. The RPA summarizes the current understanding related to the distribution, abundance, trends, extinction risk and current state of populations as well as provides information on habitat and threats. Generic terms of reference have been developed by DFO for the RPAs of aquatic species (Annex 1).

Status of Atlantic Salmon in Canada in the context of SARA

In its November 2010 assessment, COSEWIC identified 16 Designatable Units (DU) for anadromous Atlantic salmon in eastern Canada (Figure 1).

The summaries of assessments on Atlantic salmon are available to the public on the COSEWIC website (www.cosewic.gc.ca). and on the Species at Risk Public Registry (www.sararegistry.gc.ca/default.asp?lang=En&n=357EF835-1).

The 16 DUs and their status as assessed by COSEWIC are (Figures 1, 2):

Designatable Unit	Status
Nunavik Population	Data Deficient
Labrador Population	Not at Risk
Northeast Newfoundland Population	Not at Risk
South Newfoundland Population	Threatened
Southwest Newfoundland Population	Not at Risk
Northwest Newfoundland Population	Not at Risk
Quebec Eastern North Shore Population	Special Concern
Quebec Western North Shore Population	Special Concern

Designatable Unit	Status
Anticosti Island Population	Endangered
Inner St. Lawrence Population	Special Concern
Gaspé - Southern Gulf of St. Lawrence Population	Special Concern
Eastern Cape Breton Population	Endangered
Nova Scotia Southern Upland Population	Endangered
Inner Bay of Fundy Population	Endangered
Outer Bay of Fundy Population	Endangered
Lake Ontario Population	Extinct

The Inner Bay of Fundy Atlantic Salmon DU (iBoF Salmon) was designated “endangered” by COSEWIC in 2001, listed in June 2003 as “endangered”, and its status of “endangered” was re-confirmed by COSEWIC in 2006. A National Recovery Plan was prepared by the Department of Fisheries and Oceans Canada (DFO) in 2002 (National Recovery Team 2002). For iBoF Salmon, the RPA was conducted in March 2008. The main conclusions of the RPA included:

- Wild iBoF salmon have declined to critically low levels and are currently at risk of extinction.
- Population projections under current conditions indicate a very high probability that, without human intervention, iBoF salmon will be extinct within 10 years.
- To date, the primary activity that has been used to prevent the extinction of iBoF salmon has been Live Gene Banking (LGB), a form of captive breeding and rearing designed to minimize the loss of the genetic diversity and support the recovery of salmon populations into iBoF rivers once conditions are suitable for their survival.
- Modeling indicates that while iBoF salmon would rapidly become extinct without the LGB program, populations are expected to persist at low population sizes in the longer term with the LGB program in place.
- The Conservation Spawner Requirement for the designatable unit (DU) (~9,919 spawning adults) is considered to be a reasonable abundance target for iBoF salmon for recovery, representing about 25% of its past abundance. It is recommended that the distribution target include as many of the 32 rivers that iBoF salmon are known to have occupied just prior to their collapse as can be achieved.
- The factors that caused the collapse of iBoF salmon since the 1980s are not well understood, though the observed change in marine survival is large enough to explain the decline. While current threats to iBoF salmon have been identified, the primary factors limiting the survival and recovery of iBoF salmon are not known.

Subsequently in 2010, DFO published the recovery strategy of the Atlantic salmon of the inner Bay of Fundy populations (DFO 2010).

The Lake Ontario DU was assessed as “extinct” by COSEWIC in May 2006. A RPA was conducted in March 2007 (DFO 2009). Key results of the RPA included:

- The Lake Ontario Atlantic Salmon population is not currently self-sustaining and the population should be considered “extinct”.

- The Recovery Target for the Lake Ontario population was proposed to be based on the number of spawners returning each year with a target of 20% of historic levels.
- The entire wetted areas of the three rivers were considered Critical Habitat and Atlantic salmon redds were considered to have met the definition of a residence under SARA.
- The bottleneck to recovery is in the pre-adult (YOY, age 1+ and smolt) stages and if this bottleneck is dealt with, an Allowable Harm of 2% would not be considered an impediment to recovery for Lake Ontario Atlantic salmon.

Following on the COSEWIC assessment of November 2010, four other DUs were assessed as “threatened” or “endangered”. Analyses in support of the RPA for these DUs have begun and the schedule of RPAs to date is as follows:

- South Newfoundland Population:
 - Assessed as “threatened”
 - RPA science peer review meeting was conducted February 14-16, 2012
 - Advisory report presently being drafted and to be distributed for review
- Nova Scotia Southern Upland Population:
 - Assessed as “endangered”
 - RPA science peer review meeting was conducted May 22-25, 2012
 - Advisory report presently being drafted.
- Anticosti Island Population:
 - Assessed as “endangered”
 - Analyses have begun
 - RPA science peer review meeting anticipated by March 2013
- Eastern Cape Breton Population:
 - Assessed as “endangered”
 - Analyses have begun
 - RPA science peer review meeting anticipated by March 2013
- Outer Bay of Fundy Population:
 - Assessed as “endangered”
 - Analyses have begun
 - RPA science peer review meeting anticipated by March 2013

REFERENCES

COSEWIC. 2010. COSEWIC assessment and status report on the Atlantic salmon *Salmo salar* (Nunavik population, Labrador population, Northeast Newfoundland population, South Newfoundland population, Northwest Newfoundland population, Quebec Eastern North Shore population, Quebec Western North Shore population, Anticosti Island population, Inner St. Lawrence population, Lake Ontario population, Gaspé-Southern Gulf of St. Lawrence population, Eastern Cape Breton population, Nova Scotia Southern Upland population, Inner Bay of Fundy population, Outer Bay of Fundy population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa.

DFO. 2008. Recovery Potential Assessment for Inner Bay of Fundy Atlantic Salmon. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2008/050.

DFO, 2009. Proceedings of the Central and Arctic Regional Science Advisory Process on the Recovery Potential Assessment of Atlantic Salmon (Lake Ontario Population), March 1-2, 2007. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2009/019.

Department of Fisheries and Oceans. 2010. Recovery Strategy for the Atlantic salmon (*Salmo salar*), inner Bay of Fundy populations [Final]. In Species at Risk Act Recovery Strategy Series. Ottawa: Fisheries and Oceans Canada. Xxii + 58 pp. + Appendices. (available at <http://www.sararegistry.gc.ca/>).

National Recovery Team for Inner Bay of Fundy Atlantic salmon Populations. 2002. National Recovery Strategy for Inner Bay of Fundy Atlantic salmon (*Salmo salar*) Populations. National Recovery Strategy, Recovery of Nationally Endangered Wildlife (RENEW). Ottawa, Ontario. 57 p.

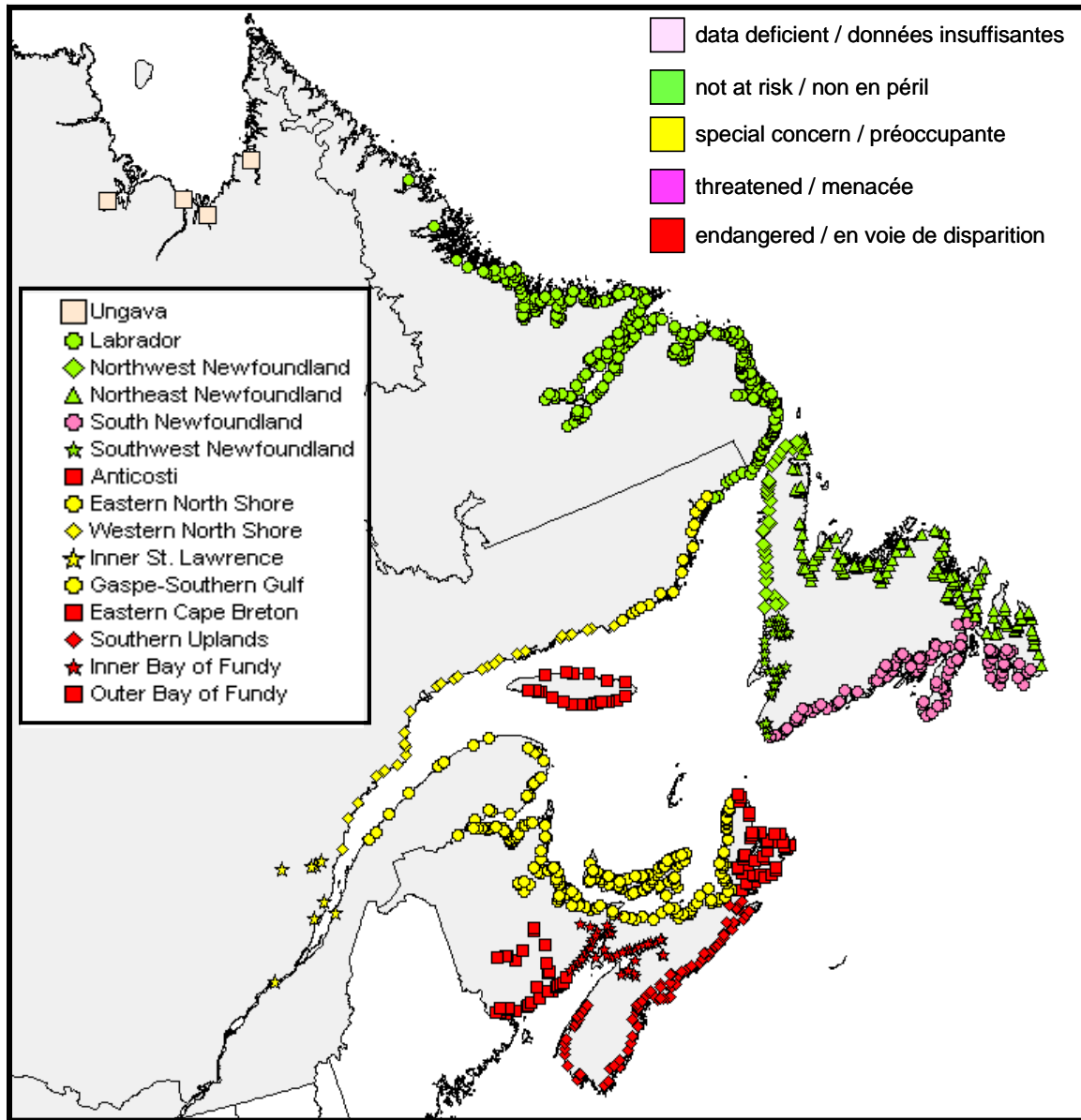


Figure 1. Summary of identified Designatable Units and their status for Atlantic salmon from eastern Canada as assessed by COSEWIC, November 2010. The Lake Ontario DU is not shown, it is located inland at the bottom left of the map.

Annex 1. Generic terms of reference developed for the Recovery Potential Assessment of aquatic species in Canada.

Context

When the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designates aquatic species as threatened or endangered, Fisheries and Oceans Canada (DFO), as the responsible jurisdiction under the Species at Risk Act (SARA), is required to undertake a number of actions. Many of these actions require scientific information on the current status of the species, population or designable unit (DU), threats to its survival and recovery, and the feasibility of its recovery. Formulation of this scientific advice has typically been developed through a Recovery Potential Assessment (RPA) that is conducted shortly after the COSEWIC assessment. This timing allows for the consideration of peer-reviewed scientific analyses into SARA processes including recovery planning.

Within context, consider inclusion of brief descriptions of:

- a) species status, SARA listing decision timeframes or other regulatory timeframes.
- b) any prior RPA or critical habitat assessment or analyses.
- c) status of Recovery Strategy, recovery team activities, etc.

In support of listing recommendations for this species, population or designable unit (DU) by the Minister, DFO Science has been asked to undertake an RPA, based on the National Frameworks (DFO 2007a and b). The advice in the RPA may be used to inform both scientific and socio-economic elements of the listing decision, as well as development of a recovery strategy and action plan, and to support decision-making with regards to the issuance of permits, agreements and related conditions, as per section 73, 74, 75, 77 and 78 of SARA. The advice generated via this process will also update and/or consolidate any existing advice regarding this species/population/DU.

Objectives

To assess the recovery potential of species/population/DU.

Assess current/recent species/ status

1. Evaluate present status for abundance and range and number of populations.
2. Evaluate recent species trajectory for abundance (i.e., numbers and biomass focusing on mature individuals) and range and number of populations.
3. Estimate, to the extent that information allows, the current or recent life-history parameters (total mortality, natural mortality, fecundity, maturity, recruitment, etc.) or reasonable surrogates; and associated uncertainties for all parameters.
4. Estimate expected population and distribution targets for recovery, according to DFO guidelines (DFO 2005, and 2011).

5. Project expected population trajectories over three generations (or other biologically reasonable time), and trajectories over time to the recovery target (if possible to achieve), given current parameters for population dynamics and associated uncertainties using DFO guidelines on long-term projections (Shelton et al. 2007).
6. Evaluate residence requirements for the species, if any.

Assess the Habitat Use

7. Provide functional descriptions (as defined in DFO 2007b) of the required properties of the aquatic habitat for successful completion of all life-history stages.
8. Provide information on the spatial extent of the areas that are likely to have these habitat properties.
9. Identify the activities most likely to threaten the habitat properties that give the sites their value, and provide information on the extent and consequences of these activities.
10. Quantify how the biological function(s) that specific habitat feature(s) provide to the species varies with the state or amount of the habitat, including carrying capacity limits, if any.
11. Quantify the presence and extent of spatial configuration constraints, if any, such as connectivity, barriers to access, etc.
12. Provide advice on how much habitat of various qualities / properties exists at present.
13. Provide advice on the degree to which supply of suitable habitat meets the demands of the species both at present, and when the species reaches biologically based recovery targets for abundance and range and number of populations.
14. Provide advice on feasibility of restoring habitat to higher values, if supply may not meet demand by the time recovery targets would be reached, in the context of all available options for achieving recovery targets for population size and range.
15. Provide advice on risks associated with habitat “allocation” decisions, if any options would be available at the time when specific areas are designated as critical habitat.
16. Provide advice on the extent to which various threats can alter the quality and/or quantity of habitat that is available.

Scope for Management to Facilitate Recovery

17. Assess the probability that the recovery targets can be achieved under current rates of parameters for population dynamics, and how that probability would vary with different mortality (especially lower) and productivity (especially higher) parameters.

18. Quantify to the extent possible the magnitude of each major potential source of mortality identified in the pre-COSEWIC assessment, the COSEWIC Status Report, information from DFO sectors, and other sources.
19. Quantify to the extent possible the likelihood that the current quantity and quality of habitat is sufficient to allow population increase, and would be sufficient to support a population that has reached its recovery targets.
20. Assess to the extent possible the magnitude by which current threats to habitats have reduced habitat quantity and quality.

Scenarios for Mitigation and Alternative to Activities

21. Using input from all DFO sectors and other sources as appropriate, develop an inventory of all feasible measures to minimize/mitigate the impacts of activities that are threats to the species and its habitat (steps 18 and 20).
22. Using input from all DFO sectors and other sources as appropriate, develop an inventory of all reasonable alternatives to the activities that are threats to the species and its habitat (steps 18 and 20).
23. Using input from all DFO sectors and other sources as appropriate, develop an inventory of activities that could increase the productivity or survivorship parameters (steps 3 and 17).
24. Estimate, to the extent possible, the reduction in mortality rate expected by each of the mitigation measures in step 21 or alternatives in step 22 and the increase in productivity or survivorship associated with each measure in step 23.
25. Project expected population trajectory (and uncertainties) over three generations (or other biologically reasonable time), and to the time of reaching recovery targets when recovery is feasible; given mortality rates and productivities associated with specific scenarios identified for exploration (as above). Include scenarios which provide as high a probability of survivorship and recovery as possible for biologically realistic parameter values.
26. Recommend parameter values for population productivity and starting mortality rates, and where necessary, specialized features of population models that would be required to allow exploration of additional scenarios as part of the assessment of economic, social, and cultural impacts of listing the species.

Allowable Harm Assessment

27. Evaluate maximum human-induced mortality which the species can sustain and not jeopardize survival or recovery of the species.

Expected Publications

Include a bulleted list with the types of publications that are expected to be produced from the meeting.

- Science Advisory Report(s)
- Proceedings
- Research Document(s)

Participation

Include a bulleted list of the groups (not individuals) invited to participate in the meeting.

- Fisheries and Oceans Canada (DFO) (specify sectors e.g., Ecosystems and Oceans Science, and Ecosystems and Fisheries Management sectors)
- Provincial/Territorial jurisdictions/Wildlife Management Boards (specify)
- Academia or Academics
- Aboriginal communities/organizations
- Industry (specify e.g., fishing industry, shipping industry)
- Other invited experts (if there are participants invited that do not fit into the other categories e.g., environmental non-government organizations)

References

COSEWIC. Date. COSEWIC assessment and update status report on the species/population/DU in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. (and provide URL directly to the document, if available)

DFO. 2005. A framework for developing science advice on recovery targets for aquatic species in the context of the Species at Risk Act. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/054. Available at http://www.dfo-mpo.gc.ca/csas/Csas/status/2005/SAR-AS2005_054_e.pdf.

DFO. 2007a. Revised Protocol for Conducting Recovery Potential Assessments. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2007/039. Available at http://www.dfo-mpo.gc.ca/csas/Csas/status/2007/SAR-AS2007_039_e.pdf.

DFO. 2007b. Documenting habitat use of species at risk and quantifying habitat quality. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2007/038. Available at http://www.dfo-mpo.gc.ca/csas/Csas/status/2007/SAR-AS2007_038_E.pdf.

DFO. 2010. A Complement to the 2005 Framework for Developing Science Advice on Recovery Targets in the Context of the Species At Risk Act. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2010/061. Available at http://www.dfo-mpo.gc.ca/CSAS/Csas/publications/sar-as/2010/2010_061_e.pdf.

Shelton, P.A., B. Best, A. Cass, C. Cyr, D. Duplisea, J. Gibson, M. Hammill, S. Khwaja, M. Koops, K. Martin, B. O'Boyle, J. Rice, A. Sinclair, K. Smedbol, D. Swain, L. Velez-Espino, and C. Wood. 2007. Assessing recovery potential: long-term projections and their implications for socio-economic analysis. DFO Can. Sci. Advis. Sec. Res. Doc. 2007/045. Available at http://www.dfo-mpo.gc.ca/CSAS/Csas/DocREC/2007/RES2007_045_e.pdf.