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## Species Profile

### Atlantic Salmon Inner Bay of Fundy population

<b>Scientific Name:</b>	<i>Salmo salar</i>
<b>Other Names:</b>	Atlantic Salmon (Inner Bay of Fundy populations)
<b>Taxonomy Group:</b>	Fishes
<b>Range:</b>	New Brunswick, Nova Scotia, Atlantic Ocean
<b>Last COSEWIC Assessment:</b>	November 2010
<b>Last COSEWIC Designation:</b>	Endangered
<b>SARA Status:</b>	Schedule 1, Endangered

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[Top](#)**Description**

The Atlantic Salmon has a pointed head, well-developed teeth on both jaws, and a slightly forked caudal fin. It has a laterally compressed body, which averages 60cm in length and 3 kg in weight. When at sea, its sides and belly are silvery, while the back varies through shades of brown, green and blue. It has black pectoral and caudal fins. There are numerous black spots scattered along the body. When spawning, both males and females become bronze-purple in colour, with reddish spots on the head and body.

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**Canadian Distribution of the Atlantic Salmon,  
Inner Bay of Fundy population (shown in red)**<sup>1,2</sup>

Distribution is approximate and not intended for legal use.



<sup>1</sup>Author: Canadian Wildlife Service, 2004

<sup>2</sup>Data Sources: The main source of information and data is the COSEWIC Status Report. In many cases additional data sources were used; a complete list will be available in the future.

[Top](#)**Distribution and Population**

This population of the Atlantic Salmon spawns in those rivers of Nova Scotia and New Brunswick that drain into the Minas Basin and Chignecto Bay, as far south as the Black River in New Brunswick. After these salmon go to sea, they remain in the Bay of Fundy, at least until late autumn, but it is not known where they spend the winter.

These populations have declined by 90% or more in abundance: they were estimated at 40,000 adults in some years, but have declined to less than 500 in 1998 and less than 250 in 1999.

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In freshwater habitat, the species requires clean, cool, flowing water free from chemical or organic pollution. It prefers natural stream channels with rapids and pools, a gravelly bottom, and water temperatures between 15 and 25°C in summer. The marine habitat in the Bay of Fundy has

provided the essential needs of this population of Atlantic Salmon. Temperatures remain in the appropriate range of 1 to 13oC during every month of the year.

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### **Biology**

The parr (young salmon actively feeding in freshwater) become smolts (young salmon at the stage of development when they assume the silvery colour of the adult and are ready to migrate to the sea) after two years in freshwater. Seaward migration may begin in autumn, but actual movement into salt water normally occurs in late May or June. The majority of individuals mature after one winter at sea. Although post-smolts (immature salmon at sea) occur in areas rich in amphipods (small crustaceans) and juvenile herring, there is no published data on the diet or foraging behaviour for these populations.

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### **Threats**

Population growth appears to be limited by marine survival rather than freshwater production capacity. The cause of the collapse of marine survival is unknown, but may be due to ecological changes in the Bay of Fundy, such as those brought about by tidal barriers placed at the mouths of several rivers and streams. Commercial salmon farms may also be a factor in the decline, since they may attract predators, alter habitat, obstruct migration or harbor disease.

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## **Protection**

### **Federal Protection**

The Atlantic Salmon, Inner Bay of Fundy population, is protected under the federal *Species at Risk Act* (SARA). More information about SARA, including how it protects individual species, is available in the [Species at Risk Act: A Guide](#).

Atlantic Salmon is protected by the *Canada National Parks Act* where it occurs in Fundy National Park. The federal *Fisheries Act* prohibits destruction of fish habitat.

### **Provincial and Territorial Protection**

To know if this species is protected by provincial or territorial laws, consult the provinces and territories websites.

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## **Recovery Initiatives**

### **Status of Recovery Planning**

#### **Recovery Strategies :**

**Name** National Recovery Strategy for the Atlantic Salmon (*Salmo salar*) - Inner Bay of Fundy Population

**Status** Review/consultation complete

**Number of Action Plans** 0

**Name** (SARA Compliant) National Recovery Strategy for Atlantic salmon (*Salmo salar*) - Inner Bay of Fundy Population  
**Status** Recovery team/planner in place  
**Number of Action Plans** 0

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## Recovery Team

### Inner Bay of Fundy Atlantic Salmon Conservation & Recovery Team

#### Claytor Ross - Chair - Fisheries and Oceans Canada

Phone: 902-426-4721 Fax: 902-- [Send Email](#)

#### Harvey Millar - Chair - Fisheries and Oceans Canada

Phone: 506-755-5060 Fax: 506-755-5065 [Send Email](#)

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## Recovery Progress and Activities

### Summary of Progress to Date

The long term goal of the Inner Bay of Fundy Atlantic Salmon Recovery Team is to re-establish all Atlantic Salmon populations in the inner Bay of Fundy. In the shorter term, the Team has focused on conserving the genetic diversity of the few remaining populations through a "live gene banking" program. Researchers are also trying to determine why these salmon populations have declined so precipitously in order to determine if the trend is reversible.

Atlantic Salmon abundance in the inner Bay of Fundy rivers has declined dramatically over the last decade. In the near absence of adult spawners, wild juvenile salmon have virtually disappeared in all but three rivers, the populations of which are also harbored in live gene banks. Various stages of live gene banked juveniles survive well when released to their rivers of origin and successfully migrate to the sea as smolts. Discovering the cause(s) of low survival at sea remains an urgent priority.

### Summary of Research/Monitoring Activities

Monitoring of low marine survival is ongoing in a few rivers in Nova Scotia and New Brunswick. There, both wild juveniles and living gene bank juveniles are monitored through to the smolt stage and enumerated as they descend to the sea. Monitoring of their return as adults provides insight to the status of marine survival. Researchers are optimistic about their ability to further investigate hypotheses on the demise of these adults at sea.

Unlike all other salmon in North America, evidence suggests that inner Bay of Fundy Atlantic Salmon have very limited migration, staying within the Bay of Fundy and the Gulf of Main for extended periods. This limited or delayed migration may be related to their decline.

Scientists have been tagging smolts and recovering tags from post smolts and adults since 1967. Salmon smolts have been tracked with acoustic tags during their first 3 months at sea since 1999 to monitor their distribution. Post smolts have also been live-captured in special trawls during their second month at sea to establish their health, condition, feeding habits and association with prey and predator fish species. None of these variables have yet suggested apparent reasons for any unusual rates of mortality.

Until the problems with marine survival are discovered and rectified or abate naturally, inner Bay of Fundy Atlantic salmon populations will continue to decline and genetic diversity will be lost. In a changing environment, higher genetic diversity in a population is associated with a higher probability of survival. Geneticists working with the Recovery Team conducted a genetic analysis of inner Bay of Fundy Atlantic Salmon and results indicated that the level of genetic diversity among the salmon was limited and declining.

### Summary of Recovery Activities

Preservation of the genetic diversity of Inner Bay of Fundy Atlantic Salmon is taking place through "live gene banking", a program initiated in 1998. Over generations, salmon raised in captivity lose the ability to survive in the wild. Therefore, two complementary approaches are taken in the live gene banking program. First, representatives from each remaining genetic family are kept in captivity. These captive salmon are mated according to prescribed breeding plans in order to produce genetically diverse offspring while maintaining the family groups. Progeny are used for restocking the rivers of origin. This augments the wild populations genetically and numerically.

The second approach of the live gene banking program uses healthy river environments instead of rearing in captivity. Several rivers have been populated by salmon from the captive populations. In the spring, as salmon smolts in these rivers attempt to migrate, or in the fall previous to spawning, some fish are captured and held at a Biodiversity Facility until they mature and can be used in the breeding program.

Another approach being researched is stocking of mature adults derived from the living gene bank. In this approach, captive or recaptured salmon are raised to maturity in captivity. These mature salmon are then released or re-released into the rivers in the fall, when salmon spawn. This process bypasses the mortality bottleneck of the marine stage in their life cycle.

Both the captive populations and the managed river populations serve as safety nets for Inner Bay of Fundy Atlantic Salmon genetic diversity. If a genetic family becomes extirpated from the managed river, the genes are still protected in the captive population, and vice versa. When threats to the salmon's survival have been identified and rectified, the few captive and managed river populations will be used to restore genetically diverse, self-sustaining populations to extirpated Bay of Fundy rivers.

Although the primary focus of the salmon recovery program is on identifying the source(s) of the unusually high marine mortality and protecting the salmon's genetic diversity, Atlantic salmon have faced significant historic reductions in habitat. Threats in the rivers are better known, and several groups are working to mitigate them. Habitat restoration, reduction of siltation and removal of dams and other man-made barriers are all priorities for river ecosystems. Most of the land around the rivers is privately owned, so outreach to landowners as well as people who use the rivers is being conducted to increase knowledge about how their activities can threaten or benefit the salmon.

### Documents

[COSEWIC Status Reports](#) (2 record(s) found.)

[COSEWIC Assessments](#) (1 record(s) found.)

[Response Statements](#) (1 record(s) found.)

[Recovery Strategies](#) (1 record(s) found.)

[COSEWIC Annual Reports](#) (2 record(s) found.)

[Permits and Related Agreements](#) (50 record(s) found.)

[Critical habitat descriptions in the Canada Gazette](#) (1 record(s) found.)

58 record(s) found.

### COSEWIC Status Reports

### [COSEWIC Assessment and Status Report on the Atlantic Salmon \*Salmo salar\* in Canada \(2011\)](#)

The Atlantic Salmon (*Salmo salar*) is a member of the family Salmonidae. This species has a fusiform body shape and matures at sizes ranging from 10 to 100+ cm. Atlantic Salmon exhibit plastic life histories and may have multiple reproducti...

### [COSEWIC Status Report - Atlantic Salmon - Inner Bay of Fundy populations - Update \(2006\)](#)

The anadromous form of the Atlantic salmon (*Salmo salar*) grows to maturity in the ocean but returns to fresh water to reproduce. The species is naturally structured into genetically differentiated populations due to homing to natal rivers, juvenile ...

## COSEWIC Assessments

### [COSEWIC Assessment - Atlantic salmon - Inner Bay of Fundy populations \(2006\)](#)

Designated Endangered in May 2001 and in April 2006. Last assessment based on an update status report....

## Response Statements

### [Response Statements - Atlantic Salmon \(2006\)](#)

These salmon represent a unique Canadian endemic; their entire biological distribution exists within Canada. Adult numbers are estimated to have declined by more than 95% in 30 years, and most rivers no longer have either adults or juveniles.+ ...

## Recovery Strategies

### [Recovery Strategy for the Atlantic Salmon \(\*Salmo salar\*\), Inner Bay of Fundy Populations \(2010\)](#)

Atlantic salmon (*Salmo salar*) is an anadromous fish endemic to the northern temperate hemisphere. The "Atlantic salmon, inner Bay of Fundy (iBoF) populations" are considered a 'Designatable Unit' (DU) by the Committee on the Status of ...

## COSEWIC Annual Reports

### [COSEWIC Annual Report - 2006 \(2006\)](#)

2006 Annual Report to the The Minister of the Environment and the Canadian Endangered Species Conservation Council (CESCC) from the Committee on the Status of Endangered Wildlife in Canada....

### [COSEWIC Annual Report 2010 - 2011 \(2011\)](#)

Under Canada's *Species at Risk Act* (SARA), the foremost function of COSEWIC is to "assess the status of eac...

## Permits and Related Agreements

### [Explanation for issuing permit\(#2005-ATL-Fundy-001\), pursuant to the provisions of section 74 of SARA \(2005\)](#)

This project will monitor populations of Inner Bay of Fundy Atlantic Salmon in Fundy National Park of Canada and will involve the capture of wild smolt from park rivers for captive rearing at a facility administered by the Department of Fisheries and...

### [Explanation for issuing permit\(#DFO-MAR-2009-001\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

The work subject to this permit is part of a larger project to assess the relative risks and benefits of inbreeding and outbreeding to individual fitness in endangered Atlantic salmon (*Salmo salar*) populations extirpated from the wild. In the labora...

### [Explanation for issuing permit\(#DFO-MAR-2009-002\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

The work subject to this permit is part of a larger project to assess the relative risks and benefits to individual fitness of inbreeding and outbreeding in endangered Atlantic salmon (*Salmo salar*) populations extirpated from the wild. The objective...

[Explanation for issuing permit\(#DFO-MAR-2009-003\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

The work subject to this permit is part of a larger project to assess the relative risks and benefits of inbreeding and outbreeding to individual fitness in endangered Atlantic salmon (*Salmo salar*) populations extirpated from the wild. The objecti...

[Explanation for issuing permit\(#DFO-MAR-2009-004\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

Conduct a study to understand the environmental physiology of smolting of iBoF salmon, in an effort to explain poor returns from the marine phase of the life cycle. In addition, understanding the effect of freshwater rearing temperature on smolt deve...

[Explanation for issuing permit\(#DFO-MAR-2009-007\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

Field collections will be conducted by electrofishing, the use of smolt wheels, fyke nets, traps, or capture of fish in bypass traps (at Gaspereau); seine net survey work in the Big Salmon River and possibly in the Stewiacke River; adult salmon captu...

[Explanation for issuing permit\(#DFO-MAR-2009-009\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

This is a project to study American eel, and the smolt wheel trap and electrofishing techniques may also result in the capture of iBoF salmon. Salmon will be monitored and handled by experienced crews, in conjunction with DFO Science staff....

[Explanation for issuing permit\(#DFO-MAR-2009-010\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

Yellow eel will be primarily captured in the Upper Salmon River using fyke nets. Fyke nets will contain guards to inhibit the capture of large salmon, however, there is the potential for juvenile (smolt) bycatch. Fyke nets will be used in mark-recapt...

[Explanation for issuing permit\(#DFO-MAR-2009-012\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

Fish will be caught using baited minnow traps and nets, has previously proven to be an effective, although labour intensive, means of sampling mummichog in the Jonathan Creek area of the Peticodiac River. In addition, during previous sampling events...

[Explanation for issuing permit\(#DFO-MAR-2009-013\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

Field techniques will follow the format below. Site reconnaissance: Use of D-Ring Dip net to sample for fishes within shore-edge habitats. Use of small (20') smelt seine to sample shallow (< 1 m habitat), if deemed necessary, avoiding areas of pre...

[Explanation for issuing permit\(#DFO-MAR-2009-015-016\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

Minnow traps are baited and set in small watercourses in the vicinity of the study sites. The summer flow is typically low to negligible. The traps are baited and placed in the water course, typically only partly submerged, and left for approximately...

[Explanation for issuing permit\(#DFO-MAR-2009-017\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

Fish will be collected using the Smith-Root LR-24 backpack electrofisher. Fish species to be tagged are brook trout, white sucker and American eel. If salmon are encountered they will be immediately put into live wells out of the electrofisher's rang...

[Explanation for issuing permit\(#DFO-MAR-2009-018\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

Fish are removed from a construction site by the most safe and effective means possible. Fish may be

captured by means of electrofishing, seining, netting or herding. Fish will be moved to locations upstream or downstream of the construction site. ...

[Explanation for issuing permit\(#DFO-MAR-2009-019\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

Minnow traps will be used to sample fish in the stream. Electroseining may be used in some sections of the brook. All fish captured by both methods will be identified and measured, and released in the stream. All fish are to be handled carefully and ...

[Explanation for issuing permit\(#DFO-MAR-2009-023\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

The fish habitat surveys will be carried out in accordance with the New Brunswick Department of Natural Resources and Fisheries and Oceans Canada stream survey and habitat assessment methodology (Hooper, 1995) and will provide the baseline data. Fis...

[Explanation for issuing permit\(#DFO-MAR-2009-026\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

The work is a reconnaissance electrofishing program to document the locations of wild juvenile Atlantic salmon in the streams draining to Shepody Bay. This work would be conducted in support of a proposed program to establish a live gene bank for re-...

[Explanation for issuing permit\(#DFO-MAR-2009-027\), pursuant to the provisions of section 73 of SARA \(2009\)](#)

The fish rescue will be conducted using standard sweep electrofishing techniques. The stunned fish would be collected by a technician with a dip net and deposited into collection bins. The fish will be released immediately downstream of the work area...

[>> See more Permits and Related Agreements documents](#)

## **Critical habitat descriptions in the Canada Gazette**

[Description of critical habitat of the inner Bay of Fundy Atlantic salmon in Fundy National Park of Canada \(2010\)](#)

The inner Bay of Fundy Atlantic salmon (*Salmo salar*) is a species listed on Schedule 1 of the *Species at Risk Act* as endangered. Critical habitat for the inner Bay of Fundy (iBoF) Atlantic salmon is identified within the Recovery St...

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