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## First Nations Collaborations Aid Fisheries and Oceans Canada Research and Monitoring of the Iconic Wild Atlantic Salmon



Snorkel and pool seining survey to estimate total number of adult smolt returning to Big Salmon River.

The decline of wild Atlantic Salmon stocks on Canada's East Coast has long been a focus of research and conservation efforts. While populations in some areas of Atlantic Canada and Quebec still support recreational fisheries and aboriginal harvests, the inner Bay of Fundy population is listed as Endangered under the *Species at Risk Act* (SARA), and the outer Bay of Fundy population is designated as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Over the years, several measures have been undertaken to try to reverse declining populations including a moratorium on all commercial Canadian fisheries for wild Atlantic Salmon (*Salmo salar*), and the closure of recreational fisheries on some river systems. Where recreational retention angling still occurs, the quota for small salmon (grilse) has been reduced, and there is a limit on the harvest of large fish on most rivers. Aboriginal fisheries have also been greatly reduced or voluntarily suspended in many areas. In the inner and outer Bay of Fundy regions, for example, aboriginal and recreational fisheries have been closed since 1990 and 1998, respectively.

Several factors may have taken a toll on the inner and outer Bay of Fundy populations including: illegal fishing; barriers and challenges affecting downstream passage; aquaculture; ecosystem changes, including changes in predator-prey relationship; and the potential impacts of mortality at sea.

Among the factors listed above, we do not know what specifically led to these population declines; nevertheless, as we try to figure out the causes, First Nations communities have been collaborating with Fisheries and Oceans Canada since the late 1990s on a variety of Atlantic Salmon research and monitoring projects on several key rivers. Similar programs are also underway in other parts of the country, however salmon research coordinated by the Department's Population Ecology Division in the Maritimes Region—led by salmon assessment biologist Ross Jones and biological technician Leroy Anderson—focus on the ongoing survival and recovery of populations in key rivers that flow into the inner and outer Bay of Fundy.



"In an effort to rebuild the stocks back to sustainable levels, we have established strong partnerships with First Nations for whom salmon are a key species of social, cultural and ceremonial importance," says Anderson.

## First Nations collaborations

Fort Folly First Nation plays an integral role in Atlantic Salmon research, monitoring and conservation projects on key New Brunswick rivers that flow into the inner Bay of Fundy. The Woodstock, Oromocto, Kingsclear, and Tobique First Nations collaborate on similar projects in the outer Bay of Fundy region.

"The people of Tobique First Nation have a long history of living with the natural resources on the Tobique and Saint John Rivers. In our lifetime, we have seen a drastic decline of the Atlantic Salmon and other aquatic species," says Johnny Perley, Fisheries coordinator for the Tobique First Nation. "By taking an active involvement in Fisheries and Oceans Canada science programs we can participate in the conservation and recovery of these populations. We owe this to our heritage and ancestors."

## Aboriginal Fishing Strategy

The collaborative fisheries research programs were initiated through the Aboriginal Fisheries Strategy (AFS), which was launched by Fisheries and Oceans Canada in 1992. In cases where there is not yet a fisheries management plan in place, the AFS:

- provides a framework for the management of fishing by Aboriginal groups for food, social and ceremonial purposes;
- provides Aboriginal groups with an opportunity to participate in the management of fisheries, thereby improving conservation, management and enhancement of the resource;
- contributes to the economic self-sufficiency of Aboriginal communities;
- provides a foundation for the development of self-government agreements and treaties; and
- improves the fisheries management skills and capacity of Aboriginal groups.

## Research and monitoring activities

"Our collaborative research involves monitoring salmon abundance in key index rivers, projects to conserve and rebuild stocks such as the live gene bank program, as well as evaluating recovery strategies," says Jones.

Electro-fishing surveys are carried out to estimate densities of fry and parr in the rivers, while young salmon (smolts) are counted and sometimes collected as they leave the rivers for the ocean. Research also involves estimating how many adults return to the rivers. For example, a counting fence on the Nashwaak River and a fishway on the Tobique River are operated from June to October to assess adult abundance.

The work provides vision and support for salmon stocks, important data for fisheries scientists and managers, and valuable experience for Aboriginal technicians who gain a wide range of skills and knowledge including how to monitor and assess existing salmon stocks; install and operate smolt traps and counting fences; operate fishways; collect and release various life stages of salmon; sample fish, including electro-fishing surveys and other techniques; and, monitor the movement of salmon using telemetry. Swift water and wilderness first aid courses are also incorporated into the training. Based on their experience, some First Nations technicians have branched out to work on projects for other organizations.

"Through the AFS program, we are able to have an open dialogue with Fisheries and Oceans Canada and gain a better understanding of the current fish populations, and overall river conditions," says Gabriel Atwin, Chief of the Kingsclear First Nation. "In addition, our science staff has the opportunity to gain knowledge and experience from these science programs that will build capacity for our First Nations community."

## Live gene bank program

The declining abundance of adult salmon in inner Bay of Fundy rivers prompted the Department to initiate a live gene bank program in 1998 using juvenile salmon. First Nations are actively involved in this program, which currently includes populations from five rivers. Fisheries and Oceans Canada leads the program on the Big Salmon, Gaspereau, and Stewiacke rivers, while Fundy National Park leads conservation programs in collaboration with the Department on the Upper Salmon and Point Wolf rivers, which fall within park boundaries.

"Juvenile salmon collected from these three rivers are taken to either the Mactaquac or Coldbrook biodiversity facilities—hatcheries operated by the Department—where they are reared to adulthood and mated" says Jones.

Prior to spawning, DNA-fingerprinting is carried out to determine which salmon to keep as broodstock, and which males and females to pair for spawning. Young hatchery salmon are released to the rivers in the spring and autumn in an effort to maintain the populations until marine conditions improve.

"With some assistance from the Mi'kmaw Conservation Group, Fort Folly staff operates a rotary screw trap on the Big Salmon River from early May to late June to estimate the abundance of smolts and to collect some for the live gene bank program," says Jones. In addition, snorkel and pool seining surveys are carried out on three different occasions each fall to estimate the total number of returning adults. Data from these projects, in combination with genetic analysis, provides information to evaluate the various release strategies used for the live gene bank program.