

Wild Salmon, Wide Ocean

Graham Chafe is a biologist with the Atlantic Salmon Federation in Chamcook, New Brunswick, Canada. He has been tracking salmon using acoustic and satellite tagging methods for four years. Before that, he worked in salmon conservation at the Department of Fisheries and Ocean's Mactaquac Biodiversity Centre.



The Atlantic salmon (*Salmo salar*) is a species of vast cultural, social, and economic importance in Atlantic Canada. While no longer commercially fished, thousands of jobs and significant economic input result from an enormously active recreational fishery. First Nations place particular significance on wild populations for food and ceremonial purposes, but wild Atlantic salmon populations are declining throughout much of their range. Significant effort has been made to discover the reasons, halt the decline, and bring populations back to sustainable levels. The Atlantic Salmon Federation is a non-governmental organization dedicated to the conservation, protection, and restoration of wild Atlantic salmon and the ecosystems on which their well-being and survival depend.

Atlantic salmon are anadromous fish, born in rivers and streams. They spend from one to several years in freshwater before heading to sea. In the North Atlantic, they spend one or more winters growing at sea before returning to their natal rivers to spawn. While riverine factors, such as run-off from farmland or habitat degradation from bridges and culverts, are important, the mortality at sea is generally agreed to be the piece of the puzzle required to reverse the downward trend of many populations. For over a decade, the Atlantic Salmon Federation has been tracking salmon in an attempt

to narrow the search for problem areas. The program began with acoustic telemetry, using receivers in the rivers and bays of two New Brunswick rivers: the Miramichi and Restigouche. A line of receivers was added in the Strait of Belle Isle, between Newfoundland and Labrador, to measure survival and passage time across the Gulf of St. Lawrence.

To further our knowledge of salmon movements and swimming patterns, satellite tags were added

to the program in 2012. We have deployed 43 X-Tags from Microwave Telemetry, Inc. All tags have been deployed on post-spawn salmon adults in the Northwest Miramichi River. In addition to the satellite tags, each fish was also fitted with a small acoustic transmitter, so its passage by receivers would be recorded as well. This double-tagging has proven helpful in that fish that have returned to the river as consecutive-year spawners, after spending less than two months at sea, can be acoustically tracked in-river and the satellite tag recovered where it might not otherwise successfully release and transmit.

To date, we have received data from 28 out of 43 X-Tags. Two tags are currently still deployed and have not reached their programmed pop-off date. Six tags have been recovered over the four years. Of the transmitted tags, there has been an average of 88% data capture. The modelling of the data collected is in progress, and we are beginning to identify potentially critical habitats for Atlantic salmon. Preliminary analysis suggests that consecutive-year and alternate-year spawners follow similar

patterns for the early part of their time in the Gulf of St. Lawrence. By mid-June, the two groups separate, with consecutive spawners returning to the river and the alternates heading through the Strait of Belle Isle and into the North Atlantic. The region that all tagged fish inhabit for the same two to three weeks prior



A 93 cm, 6.1 kg male salmon about to be tagged. This fish swam to near Nuuk, Greenland before its tag released and transmitted on the programmed date.

to returning to the river or leaving for the North Atlantic may prove to be critical feeding and re-conditioning grounds. Once analysis and modelling are complete, we will focus both satellite and acoustic telemetry efforts into the identified areas of concern. Not only will survival issues be explored, but the basis for consecutive versus alternate spawning in these fish may come to light.

Beyond the invaluable data that the satellite tags are providing, further benefits are being gained by the publicity they attract. Both public engagement and involvement in our tracking programs have increased as a result of the X-Tags. In order to deploy the tags, fish are angled in the river, and we have been able to rely upon volunteer anglers to catch the fish we need. The tracking program has been featured in several local newspapers which has increased awareness and interest in our organization and in the salmon in general. In the spring of 2015, two tags from 2014 were found and returned to us. Both had transmitted data and while we will refurbish them for future use, the real benefit has been in the form of publicity. One tag popped off near the west coast of Greenland and was found several months later on a rocky beach. The other tag popped off the coast of Labrador and floated clear to Ireland before being discovered on the shoreline by a vacationing family from England. Local and national news outlets picked up these stories and, in the process, we were able to reach a wide audience with tales of the specific fish's travels as well as information about the program and the need for research in general. The interest and involvement shown by the public is a great tool in our fight to keep wild Atlantic salmon here for future generations.

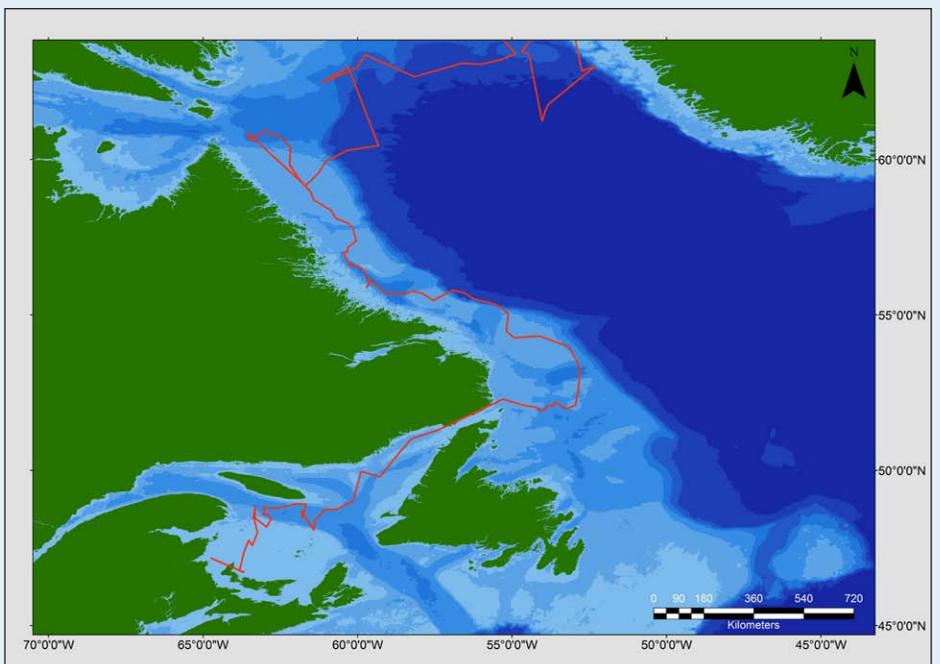
Photo by Graham Chafe



ASF Research Director, Jonathan Carr, releasing a satellite tagged kelt in the Northwest Miramichi River.

Photo by Holly Labadie

Map by Jason Daniels



The preliminary route taken by a tagged kelt from the mouth of the Miramichi River in northern New Brunswick to near Nuuk in Greenland where the tag released as programmed.