



Status of North American Wild Atlantic Salmon in 2006

ATLANTIC SALMON AT THE BALANCING POINT

~ AN URGENCY TO UNDERSTAND MORTALITY AT SEA ~



Since 2001, Atlantic salmon numbers have steadied overall, the general decline is halted, and there is a slight improvement. The number of wild Atlantic salmon destined to return to North American rivers had plummeted from 1,601,000 in 1973 to an all-time low in 2001 of 418,000 (see graph).

The International Council for the Exploration of the Sea (ICES) estimates that there are a potential 700,000 two-sea-winter (2SW) salmon and grilse that could return to the rivers of North America in 2006, but many won't make it. Scientists predict an ocean mortality rate of 3% per month on average - double the rate that prevailed two decades ago.

The Atlantic Salmon Federation (ASF) and our partners have successfully reduced the killing that can be controlled, of wild Atlantic salmon. There is no longer any commercial fishery for Atlantic salmon in North America. We have achieved an interim agreement to suspend the commercial harvest at Greenland where North American salmon go to feed and over winter, are protecting and restoring freshwater salmon habitat, and strongly promoting catch and release of salmon and grilse in the recreational fishery.

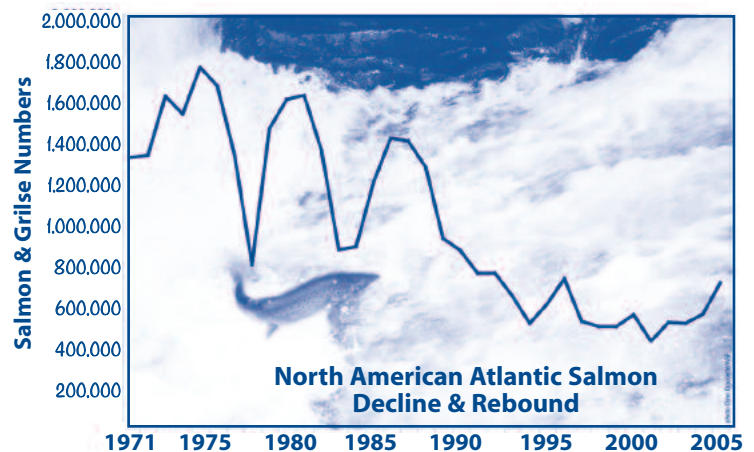
Despite these measures, the full expected rebound in salmon numbers has not occurred, and Atlantic salmon are dying at sea by the thousands. How and why these deaths are occurring are among the mysteries that must be solved to help save the species.

North America's salmon runs are now at a balancing point. Gains realized through the closure of commercial fisheries and improvements in watershed management are being offset by increased mortality at sea, creating an unpredictable situation. Actions in the immediate future will determine whether salmon continue their upward trend or plummet.

As a culture we care about wild Atlantic salmon. They are essential to northeastern North America's rural economy, embody the mystique of our wild rivers, and speak to our hearts. We need to protect our watersheds, and find ways to safeguard our seas.

Whether a river's salmon populations are meeting their minimum conservation limit or are endangered, all suffer to some degree from mortality at sea. Poor sea survival affects all salmon rivers, reducing the benefits that humans draw from the presence of healthy salmon runs.

The Atlantic Salmon Federation (ASF), a leader in tracking salmon at sea, has for 10 years been developing sonic telemetry



ICES Pre-fishery Abundance Estimates 1971 – 2005.
Number of wild Atlantic salmon at left of graph

technology and pushing further out to sea with it to understand the problem of low salmon numbers. Now there is a wider and coordinated international framework called SALSEA, proposed by the North Atlantic Salmon Conservation Organization (NASCO). SALSEA would see an international, collaborative and comprehensive exploration of this mortality at sea – a kind of Salmon CSI, with international databasing and sharing of information.

This year's scientific advice from ICES (International Council for the Exploration of the Sea), based on the best data available throughout the Atlantic salmon's range, is the basis for ASF's report on the salmon runs of North America. Our report explicitly demonstrates the importance of government leadership in funding scientific research into solving the mysterious disappearance of wild Atlantic salmon at sea.

Scientists expect continued low returns of adult salmon over the next few years. The decline is most severe for two-sea-winter (2SW) salmon that migrate to Greenland where they spend two years before returning to home rivers to spawn. These salmon are predominately female and carry the eggs that will sustain future generations. In 2005, in North America, only Newfoundland met its minimum conservation limit (CL) for 2SW salmon. For 2006, scientists predict equal or slightly improved returns of 2SW salmon overall to North America.

North America's Salmon Rivers in 2005-06

Latest Scientific Information

EASTERN CANADA

In Labrador, improvement but continuing uncertainty

Assessment of salmon populations in Labrador by the Department of Fisheries and Oceans is limited to only four rivers. There were definite improvements in some salmon runs, most notably the English River, where small salmon numbers were the second highest in a seven-year series and large salmon were fourth highest. The overall return of an estimated 221,750 grilse to Labrador was very positive, and a 129% improvement over 2004. In addition, the 14% increase in large salmon was positive. However, a sobering long-term problem faces Labrador, as its rivers are only reaching 38% of the minimum established conservation limit. In 2006, the expectation is for stronger returns.

In Newfoundland, cautious optimism and the best performance for a North American region

Newfoundland was the only region to meet its minimum conservation requirement. In fact the province's salmon populations met 132% of its CL, but the situation in individual rivers varied. In several monitored rivers, including the Highlands, Conne River, and Middle Brook, the returns of large salmon overall fell by 40-60% in 2005, and decreases were noted in other rivers. In addition, the numbers of juvenile salmon heading to sea (smolt stage) were down by about 10% in several monitored rivers. Together this brings concern that future adult returns to this region may suffer in the long term. However, for 2006, modest increases may occur.

Quebec may see greater small salmon returns in 2006

Quebec is suffering from reduced reproductive capacity and as a whole reaches only 70% of its conservation limit for large salmon. In 2005, grilse numbers declined by 32% overall, and the returns of large salmon were about the same as in 2004. However, there was greater smolt production in 2005, and this may well lead to greater grilse returns in 2006 and 2SW returns in 2007. The

decline in grilse returning in 2005 probably indicates that fewer large (2SW) salmon may return in 2006 as they are of the same year class. Overall, returns for rivers south of the St. Lawrence are likely to continue reaching conservation minimums, while those north of the St. Lawrence are having greater difficulty in achieving them. Mortality at sea is having an impact greater than in decades past, and overall Quebec only reached 70% of the conservation minimum.

MARITIMES

Cautious Optimism for the Miramichi and Restigouche, N.B.

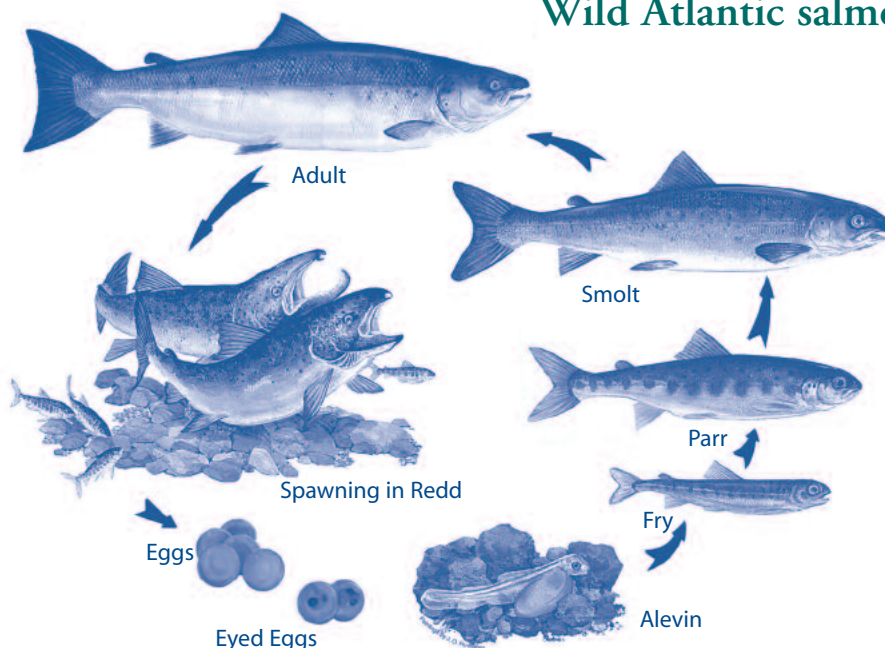
In 2005, large salmon returns were comparable to those of 2004, while small salmon numbers were somewhat lower than the previous year, but close to the five year average. The Miramichi, which produces about 20 to 25% of the entire complement of North American salmon, achieved 85% of its conservation requirement in 2005, and there is optimism for the year ahead. The Restigouche River is considered to have met its conservation limit in 2005.

Overall, in rivers of **Nova Scotia** that empty into the southern Gulf of St. Lawrence (e.g. Wallace, Philip, East), juvenile densities have improved more than 10% since 1985, and this was maintained in 2005. There was also a general increase in grilse returns. 2006 may well see an increase in large salmon numbers.

Deepening Crisis in Bay of Fundy and Atlantic coast of N.S.

Salmon returns to almost all of the Scotia-Fundy region are in great danger, with total returns to all rivers in the area reaching only 6% of the conservation limit. On the Atlantic coast of Nova Scotia (the Southern Uplands), the impact of acid rain continues unabated, with the only encouraging development an improvement in the water quality in the West River at Sheet Harbour, with pH levels being boosted to values favourable for salmon survival due to the lime doser mitigation project pioneered by the

Wild Atlantic salmon – a wondrous life cycle



In North America, the Atlantic salmon spawns in freshwater rivers of eastern Canada and the New England states.

Six-inch salmon, called smolts – undergo an incredible physiological change to leave freshwater and migrate to ocean feeding areas where they feed on sand lance and capelin.

After a year at sea, those that have survived return to the rivers of their birth, when their bodies again change to adapt to freshwater. These first-year returning fish are called grilse, and typically weigh about 2 kg. They are predominantly male. Female grilse produce fewer eggs than larger salmon that remain at sea for another year or more and grow to a weight of 5 to 20 kg. In many rivers, these large salmon are the important brood stock on which the runs depend.

Nova Scotia Salmon Association, ASF and a dozen other conservation partners.

In the **inner Bay of Fundy**, salmon returns continue to be low, with fewer than 200 adult salmon returning to these 32 rivers that have had their salmon runs listed as endangered. In general, habitat and water conditions in the rivers are satisfactory. Again the increased mortality at sea since 1990 is having a disastrous impact. Returns of grilse declined 10% from 2004, while larger salmon declined 28%, a critical decline for populations already in jeopardy. Throughout the region, there were especially low numbers of eggs deposited last year, with 11 of 14 sampled rivers meeting less than 50% of their conservation minimums.

“They disappear from our rivers into the ocean world, and are usually detected months later...”

In the **outer Bay of Fundy** rivers (also known as the Western Fundy Rivers), salmon population status is also critical. In the Magaguadavic River, monitored by ASF, nine wild salmon returned in 2005 compared to a run of 800 to 1000 in the 1980s, while at the St. Croix, only six wild salmon were counted. Prospects remain bleak for the year ahead, although there is a recovery program being implemented on the Magaguadavic system.

The **Saint John River** continues to have critically low returns, with only 1,160 grilse and 349 large salmon returning in 2005, reaching just seven per cent of minimum conservation requirements, but an improvement over the previous year. In addition to mortality at sea, hydro dams pose a serious hazard to both smolt swimming towards the sea and returning adults. Also noteworthy is that relatively few hatchery-raised salmon survived the migration cycle, showing the importance to survival of the special traits of wild salmon in adapting to the river system.

NORTHEAST UNITED STATES

Critically low levels in Maine demand immediate attention

In total, 1,313 Atlantic salmon returned to U.S. rivers in 2005, a 20% decline from 2004 when 1,635 came back. The grilse return of 319 was similar to 2004, while the return of 994 large salmon was significantly lower.

Fewer than 100 adult salmon returned to Maine rivers other than the Penobscot, and overall, the runs will only reach 4% of the minimum conservation requirement. The Downeast rivers continue to be hard hit, with fewer than 25 wild salmon recorded in all the monitored rivers combined.

The Penobscot remains the last best chance for restoring salmon runs in Maine, with 985 returning in 2005. ASF and our partners in the Penobscot River Restoration Trust continue to be leaders in the drive to restore the Penobscot by opening up new spawning habitat and improved fish passage on the lower river.

AT SEA, THE MYSTERY OF SALMON MORTALITY MUST BE SOLVED

There is a long list of potential causes for high ocean mortality, including:

- Predation
- Competition
- Food availability
- Chemical changes in water
- Environmental change
- By-catch
- Disease and Parasites
- Genetic issues for low populations
- Freshwater problems that impact at-sea survival

It may be that several of these factors are acting in unison to endanger the wild Atlantic salmon's survival.

Our knowledge of the Atlantic salmon's life at sea is minimal. They disappear from our rivers into the ocean world, and are usually detected months later at feeding grounds, such as those near Greenland. Monitoring programs indicate that at least 66% of the Atlantic salmon are of North American origin, while most of the remainder are from the southern portion of their European range.



Transmitter above; At left, ASF researcher releases smolt to track its migration to sea.

WHAT WE CAN DO

The North Atlantic Salmon Conservation Organization (NASCO), the international treaty organization for all Atlantic salmon producing and harvesting countries, has conceived, designed and introduced a comprehensive and collaborative research action plan, the SALSEA Project, to be carried out by and through all its member governments, with participation from supporting NGOs and research institutions, under the coordinating direction of NASCO's International Atlantic Salmon Research Board.

ASF has resolved to support and participate in SALSEA as fully as possible. ASF has raised and spent more than \$3 million for smolt tracking and marine research during the past ten years and will spend about \$350,000 in 2006. We are conducting more wild salmon research into ocean mortality than the governments of the United States and Canada, and we urge participation by these governments in contributing research resources and funding at least proportionate to their shared responsibilities with other NASCO members for successful fulfillment of the SALSEA project.

ASF'S LEADERSHIP IN TRACKING ATLANTIC SALMON SEAWARD

ASF, working with private enterprise, VEMCO, DFO, and other partners, pioneered the tracking of Atlantic salmon through sonic transmitter technology:

1994 – 1998

- Developed technology to track post-smolt migration routes and distribution at sea
- Became first to implant post-smolts with sonic transmitters
- Utilized receiver units to track post-smolts, individually, from rivers in southwest New Brunswick into the Bay of Fundy

1999

- Implanted uniquely-coded transmitters into smolts and tracked them from the Big Salmon River into the Bay of Fundy
- Monitored survival and movements of tagged smolts for up to three months over a 50km stretch of the Bay

2000

- Assisted in developing a new live-catch trawl, based on a Norwegian design
- Tested the trawl in Bay of Fundy
- Captured and screened post-smolts for diseases and parasites; none were found
- * Continued using sonic transmitters to track smolt

2001

- Deployed 200 tracking receivers around the Bay of Fundy
- Followed wild salmon smolts for several months at sea
- Captured 127 post-smolts in second trawling season; some had been previously marked by river researchers
- Examined Bay of Fundy smolts for general health, growth, etc. This was the first time this had been done in 30 years

2002

- Tracked autumn Miramichi River pre-smolts through winter, using sonic telemetry
- Determined distances these little-understood fish moved from their home rivers
- Used sonic telemetry to identify habitat where they overwinter during their last year in river

2003

- Tracked Miramichi smolts downstream to saltwater; the first time this had been done. Found that 91% successfully survived from the headwaters to the head of the tide, but only 43% made it through the estuary and out to sea

2004

- Tracked smolt concurrently in the Miramichi and Restigouche
- Tracking confirmed, in the Miramichi, high survival of smolts in freshwater and a major loss in the estuary, resulting in slightly more than half the fish exiting the estuary to the sea

2005

- Expanded smolt tracking research into Quebec's North Shore [the St-Jean- (Côte Nord)], York, Cascapedia and into the Gulf of Maine
- Tracking allowed testing for North-to-South variations in smolt survival
- Deployed receivers in lines across the entire Bay of Chaleur to explore, on the Restigouche, the residence and potential use by post-smolts of the Bay as a nursery area
- Tagging Results: 22% of Restigouche River smolts tagged in the headwaters died before reaching the head of tide; 40% died in the estuary (Baie des Chaleurs): 38% made it to the open sea
- Tagging Results: 90% of Miramichi smolts survived to the estuary, and 64% reached the sea
- Conducted, in eastern Maine, ground-breaking research that for two years used sonic telemetry to document the movements and survival of experimentally "escaped" farmed salmon. The program monitored all salmon rivers draining into the Bay of Fundy and Downeast Maine, and found that escaped salmon quickly dispersed from cage sites and that no released farmed salmon entered monitored rivers during spawning season

2006

- Expanded tracking programs in the rivers of Quebec's North Shore and Gaspé Peninsula, as well as the Restigouche and the Miramichi rivers, and in the Bay of Fundy
- Continuing intensive tracking efforts to explore salmon mortality issues further out to sea. The natural extension of ASF's tracking research includes monitoring the northern exit from the Gulf of St. Lawrence into the Atlantic Ocean (the Strait of Belle Isle).



The Atlantic Salmon Federation (ASF) is an international non-profit organization that promotes the conservation and wise management of the wild Atlantic salmon and its environment. ASF has seven regional councils and more than 140 affiliates, representing 40,000 volunteers.

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