



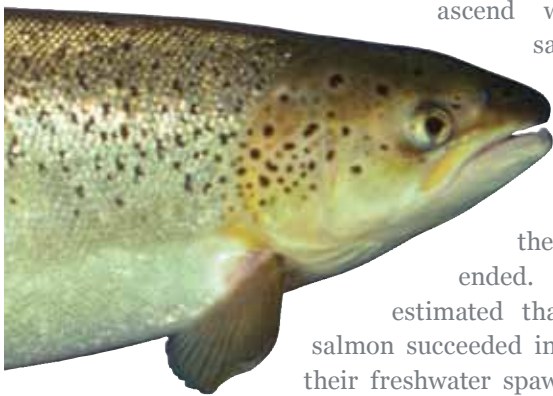
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Snorkel surveys to detect returning adult salmon in Fundy National Park

# Return of the King?

## Saving the salmon of the inner Bay of Fundy

A hundred years ago, the salmon runs in the inner Bay of Fundy were nothing less than a wonder of nature. Each year, 40,000 fish returned from the ocean to three dozen rivers, battling against the current to reach their upstream spawning grounds. With their astounding ability to ascend waterfalls, Atlantic salmon were dubbed the “king of fish.”



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But in recent years, evidence suggested that the king’s reign had ended. By 1999, it was estimated that fewer than 250 salmon succeeded in straggling back to their freshwater spawning grounds each year. In the Point Wolfe and Upper Salmon rivers – both within **Fundy National Park** – a mere ten to twenty individuals were returning annually.

In response, Parks Canada initiated work with its partners to save the genetic diversity of the remaining salmon. Thanks to new strategies that build on 10 years of effort, parks managers believe there is hope for the return of the once-mighty king.



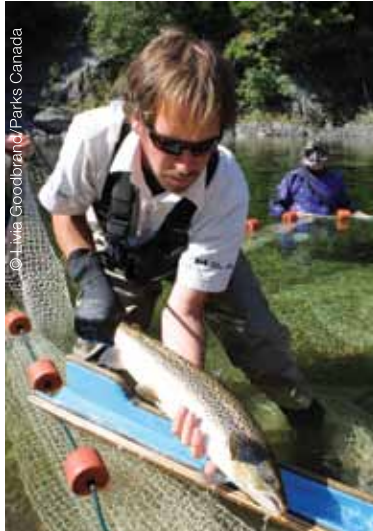
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Releasing salmon

### Cause of death: unknown

The inner Bay of Fundy population of Atlantic salmon was listed as endangered under the Species at Risk Act in 2003. Separated from other Atlantic salmon populations during the last ice age, they are a behaviourally and genetically distinct population. Unlike other Atlantic salmon populations, many of whom winter in the rich feeding grounds off Greenland’s coast, they stay within the Bay of Fundy and northern Gulf of Maine throughout their entire lifecycle.

No one knows why these salmon populations collapsed in the 1980s. Currently, scientists believe the primary cause lies not in the rivers, but in the ocean environment. The possible suspects include large-scale oceanographic and climate changes, changes to the predator population, past exploitation by fisheries, and interactions with farmed salmon.



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**Corey Clarke sampling returning salmon to determine origin**

## Crafting a response

For the past ten years, Fundy National Park has worked with many partners – the province of New Brunswick, the federal Department of Fisheries and Oceans, the Atlantic Salmon Federation, Fort Folly First Nation, the Atlantic Canada Fish Farmers Association and others – to help understand and respond to these threats. For park managers, the goals are clear: preserve the remaining genetic diversity of this endangered

salmon population, and re-establish wild, self-sustaining salmon runs in the Point Wolfe and Upper Salmon rivers.

## Keeping the genes alive

But Parks Canada and its partners couldn't wait for a long-term solution before acting to protect the remaining salmon. Beginning in 1998, as the threat of extinction loomed, a portion of the remnant families of wild salmon were gathered and taken to DFO captive-rearing facilities. And thus, a live gene bank was born.

For over a decade, scientists at the live gene bank reared, protected, and cross-bred salmon from as many different families as possible from the inner Bay of Fundy populations. Every year, adult salmon from the captive-rearing facility were released into the Point Wolfe River to spawn, replenishing the population of wild juveniles. Similarly, captive-hatched juveniles (fry and parr) were released into the Upper Salmon River. When these young salmon transformed into smolts and began their migration to the ocean, ten per cent were recaptured to replenish the captive stock in the live gene bank.

More recently, as evidence grew that juvenile salmon raised in captivity are less likely to survive and reproduce in the wild, Parks Canada began partnering with the Atlantic Canada Fish Farmers Association to rear salmon smolts in saltwater pens. Wild smolts are caught as they migrate down-river, reared in conservation sea cages until maturity, and then released back into the estuaries of their natal rivers to migrate upriver and spawn.

This innovative captive rearing strategy more closely mimics the salmon's natural conditions and most importantly, has the potential to produce large numbers of smolts totally free from captive exposure. This in turn enhances their overall fitness - and their potential survival.



**Fundy National Park of Canada**

## Success in the making

After more than a decade, these recovery efforts are paying off. On a beautiful late summer day in 2012, members of the recovery team snorkeling the Upper Salmon River in search of returning salmon were stunned with the results: more than 40 salmon were spotted, almost 10 times what researchers expected to see. And of the 30 salmon examined, all but one carried a tag – proving that they had survived for a year after being released to the river as adults to spawn.



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**Partners preparing pool seine to sample returning salmon**

This represents a 20-year high in the number of returning adults – an extraordinary and unexpected accomplishment. Combined with smolts from the first release of marine-reared adults, the future looks even brighter for 2014 and beyond. And it demonstrates to park staff the enormous potential of naturalizing the captive rearing experience and promoting natural in-river spawning to the future of the salmon.

This work contributes to Fundy National Park's reputation as a centre of excellence in ecological restoration. Fundy is also actively incorporating the project into their visitor education and experience activities, so that visitors can join in celebrating the possible return of the truly magnificent king of fish.

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