



## Can new technology save Maine's wild salmon?

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MariCal Inc. developed a fish-rearing process that is helping commercial salmon farms improve growth and survival rates of fish that are raised in pens around the world. Now, leaders of the effort to save and restore dwindling populations of Maine's wild Atlantic salmon have hired the company to try the process on the fish that are released into the wild each spring.

"We don't know how this technology will work because it's never been used before" on fish in the wild, said Fred Trasko, manager of the Green Lake National Fish Hatchery in Ellsworth.

"We're trying to partner with any research we can find out there that may have applications for saving salmon in the United States," he said. "Right now, we're basically in a race with time."

Hundreds of thousands of Atlantic salmon once made annual spawning runs from the Atlantic Ocean into New England's rivers, according to historical records. Those numbers have dwindled steadily since the 1800s, due largely to overfishing, pollution and dams that cut off spawning habitat.

The federal government formally listed the salmon in eight Maine rivers as endangered in November 2000, and a federal judge in Portland upheld the listing just last month. The designation provides special legal protections for the fish, which are valued for their role in river and marine ecosystems and, if they can be restored, as a much-sought-after game fish.

The eight Maine rivers where salmon are endangered are the Dennys, East Machias, Machias, Narraguagus, Pleasant, Ducktrap and Sheepscot rivers, and in Cove Brook, a tributary of the Penobscot River. Salmon in the Penobscot River, where the fish released on Tuesday are headed, are not listed as endangered, although the federal government is working to increase the population there.

In 2000, biologists estimated the wild salmon population in all eight of the listed rivers at perhaps 150. Last year, fewer than 10 wild salmon returned to the three rivers where the fish are counted.

In hopes of restoring the populations, federal hatcheries in Maine breed salmon from some of those rivers and release young fish that are old enough to begin the migration to the ocean. Those restocking efforts have an increasingly high failure rate.

Only one-half of 1 percent of the fish released actually return to their native rivers to lay eggs two years later, said John Kocik, a research biologist with the National Marine Fisheries Service. "The survival rate has been declining for a little over the last decade," he said.

Scientists have several theories about the declining survival rate of the fish. One prominent explanation is acid rain that changes the chemistry of the rivers where the fish are born and makes them less able to adjust to the salt water in the ocean.

That's where MariCal's technology may help. "This process may actually increase the fish's ability to make that saltwater transition," Trasko said.

The company has identified proteins in fish that regulate growth and other biological processes, including the physical changes that allow a young salmon - called a smolt - to survive as it swims into the salty ocean. MariCal researchers have also identified factors, such as lighting, water temperatures and feed, that can stimulate the proteins.

MariCal uses the process to increase survival rates at salmon farms, and believes it will also work on fish being released into the wild. "It lends itself to addressing some of the problems these fish face in fresh water and in the

ocean," said Tim Lindley, a research scientist with MariCal.

The company received a \$40,000 contract to prepare 24,600 1-year-old fish for release by manipulating their environmental conditions for the past five weeks. The company also will test and analyze the fish that are captured when they return in two years to spawn.

Another 24,600 fish were released on Tuesday without any special preparation. Both groups of fish were marked so that researchers can identify them later and compare survival rates.

The 7-inch-long fish were released into a small river in Milo, and began swimming toward the Penobscot and, ultimately, the Atlantic Ocean. If the fish prepared by MariCal return to the rivers in two years in greater numbers than the other fish, the company could find itself in the business of helping to save an endangered species.

"That," Lindley said, "is what we're hoping for."

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