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16-year Penobscot River Restoration Project reaches the finish line

BY [JAMES MCCARTHY](#)
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The \$4.8 million **Howland Natural Fish Bypass**, shown at the left of the decommissioned **Howland Dam** near the juncture of the Piscataquis and Penobscot rivers, provides upriver passage for 11 sea-run fish species, including the endangered Atlantic salmon.

For the first time since the 1800s, nearly 1,000 miles of habitat along the Penobscot River are accessible to Atlantic salmon and 10 other fish species that spend part of their lives at sea but return to fresh water for spawning.

The final step making that possible — a natural fish bypass at the Howland Dam that's 1,050 feet long and approximately 200 feet wide — was officially dedicated on June 14, marking the completion of the 16-year Penobscot River Restoration Project.

"It's the last major element in terms of opening up habitat," says Laura Rose Day, who has worked herself out of a job as the \$60 million project's executive director.

Day says a day or two before the June 14 dedication, almost on cue, the first tagged Atlantic salmon swam through the Howland fish bypass. "That's big news," she says. "It really marks the beginning of the recovery of the river."

Day is quick to add that the river restoration project isn't just about salmon, notwithstanding its status as a revered and endangered fish species. It's also about realizing the full potential of the region's waterfront communities, with a restored river ecosystem opening up new opportunities for eco-tourism and a revival of

the region's traditional sport-fishing heritage.

A prime example: For the second year in a row, the American Canoe Association held its annual whitewater canoe competition on a nine-mile stretch of the Penobscot between Old Town and Eddington that previously was blocked by two dams. The four-day event, hosted by the Penobscot Nation, attracted 149 competitors from 14 states and two foreign countries.

"It is a watershed, and it's big — from the headwaters in the mountains to the Gulf of Maine," she says. "We're impacting an entire region. It's not just about fish."

Kleinschmidt Associates, a Pittsfield-based energy and natural resource consulting firm, worked with what would have once been opposing sides in the Penobscot River Restoration Project. It helped the hydropower companies (formerly PP&L, then Black Bear Hydro Partners and now Brookfield Renewable Partners) relicense and actually increase the power generation at several remaining dams. But it also worked closely with the Penobscot River Restoration Trust — a coalition of conservation groups and the Penobscot Nation that purchased three dams from PP&L in 2010 for \$24 million — helping with the decommissioning and eventual removal of Great Works (2012) and Veazie (2013) dams and the decommissioning of the Howland Dam, which remains in place but is no longer generating power.

"We've been involved in this for more than 10 years," says Alan Haberstock, vice president of ecological services for Kleinschmidt Associates, describing its work on the \$4.8 million Howland natural fish bypass. Funding came from variety of public-and-private donations and grants, including a \$650,000 donation from the Atlantic Salmon Federation.

Besides Kleinschmidt, companies involved included Hood River, Ore.-based Inter-Fluve Inc. (which has an office in Damariscotta), Portland-based Haley & Aldrich, Brewer-based CES Inc. and Salem, Mass.-based SumCo Eco-Contracting.

Haberstock, who has worked for Kleinschmidt for 20 years, says the firm's work with both the hydro companies and the conservation groups involved in the Penobscot restoration reflects its evolution from being a "very industrially focused, very utility focused" company to one with a more balanced perspective and portfolio.

"If we have the know-how to enhance the hydropower operations and generate more electricity [i.e., at the Orono, Stillwater and Milford dams], that's what gives the owners more money to address environmental issues, including fish passage, maintaining habitat and enhancing recreational access," he says. "Hydro is our core, our genesis as a company. But the skills that lent themselves to working on hydropower projects have led us to be successful in the ecological science projects as well."

Haberstock says a representative of the federal government described the Howland project as "the largest and most complex natural fish bypass in the United States." He modestly adds, "That depends on how you define 'largest.' So we're describing it as one of the largest natural fish bypass channels ever constructed in the eastern United States. It's really cutting edge."

Engineering a natural fish bypass, he says, in many ways, presents greater technical challenges than constructing the more traditional man-made fish ladders or fish lifts. "You don't have an off-the-shelf template," he says. "It's extremely complicated. Small things can make a big difference. Whenever you remake one thing it affects another. It's the epitome of a multi-disciplinary project."

Brandon Kulik, a senior fisheries biologist who's in his 30th year at Kleinschmidt, says the Howland fish bypass was designed to mimic a natural river channel. Some areas have boulders clustered together, other areas are more open, and still others offer narrow channels. "All those things are not randomly placed," Kulik says.

Haberstock adds, with a grin: "You can't put in rocks that are so small they will actually sweep downstream when the river is running high. It's also part of our thinking that the rocks should not stand out as 'different': It would look weird if we had imported white marble from Vermont. Finally, our client wanted a proven system, one that if left alone would function naturally. That was an important design objective."

Since 11 species of migratory fish use the Penobscot River as a spawning or nursery area, designing the bypass had to take into consideration how each fish species would be impacted by water-flow velocity and depth, particularly during the spring and early high-water seasons when the spawning runs are happening. Ironically, the needs of the endangered Atlantic salmon posed fewer design problems than those of smaller, weaker fish, such as blueback herring.

"Salmon are fairly easy," says Haberstock. "They can leap up to 12 feet and swim around tough conditions. We wanted to restore the historic runs of shad and blueback herring, so we had to consider their needs as well."

Kulik says the Howland natural fish bypass, which connects the Piscataquis River with the main channel of the Penobscot, includes resting places for the weaker fish. He also notes that its design factored in seasonal variables such as water temperature that can impact the leaping strength of fish swimming upriver.

Both Haberstock and Kulik take pride in what's been accomplished at Howland, a feeling shared by some 300 people who attended the dedication ceremony.

"I've worked on other fish passage projects around the country," says Kulik. "In most other states, if there even is a ceremony, barely anyone would come to it. But most other states lack the way fish resources are woven into the culture of Maine, not just for the Penobscot Nation, but for the entire state. There's an economic value to these fisheries, not only for the towns along the river but also for the coastal fishing communities [that use alewives as lobster bait]. It's just a tremendous project to be a part of."

Andrew Goode, vice president of the Atlantic Salmon Federation's programs in the United States, says the Howland fish bypass is an important piece of the international effort to save the endangered Atlantic salmon.

"This is a critical part of the project," he says. "The Howland Dam used to kill over 20% of the Atlantic salmon smolt run every year. There also was enormous mortality of adult fish as well. So it was important to decommission this dam."

Roughly one-third of Atlantic salmon in the Penobscot want to go up the Piscataquis, which enables them to reach prime spawning habitat in western Maine, he adds, making Howland an important juncture for spawning adults that now have unimpeded access to those upriver waters. Early fish counts compiled by the Maine Department of Marine Resources at Milford show 7,846 shad, 287 mature Atlantic salmon and 215 grilse (salmon spawning for the first time), 1.26 million river herring, 1,149 striped bass and 3,833 sea lamprey within now-opened stretches of the river as of Aug. 8.

Yet, even though ASF's mission is to protect the Atlantic salmon, Goode echoes Day and others in saying the Penobscot River's restoration is just as important for the other 10 native sea-run species benefiting from

open access to 1,000 miles of habitat that were largely inaccessible for most of the past 200 years.

"They all evolved together and depend on each other," he says, noting that more than 1.2 million river herring have been recorded so far this year at the Milford fish lift. "It was essentially zero there five years ago."

For John Banks, director of the Penobscot Nation's Department of Natural Resources, a snapshot taken last summer conveys well more than 1,000 words the impact of the restoration project on the river the tribe has lived on for more than 10,000 years.

"I have a great photo of a young fellow who caught a striped bass on the river about a year ago," he says. "It had six alewives inside its stomach. That, to me, tells the whole story."

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