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Water tests | A new approach to hydropower on the Penobscot creates more energy from fewer dams

BY [JAMES MCCARTHY](#)
9/3/2012

Other benefits tied to river's rebirth

Laura Rose Day, executive director of the Penobscot River Restoration Trust, doesn't need any studies to tell her that restoring fish access to 1,000 miles of upriver and tributary spawning grounds will quickly revive the populations of Atlantic salmon, shad, alewives, blueback herring and other species blocked by dams on the lower river. She's already witnessed the year-by-year increase in fish populations on the Kennebec River since the 1999 dismantling of the Edwards Dam, and it's made her a believer in the amazing resilience of nature.

"We're opening a 'superhighway' here," she says, watching the dismantling of the Great Works Dam, the first of two dams that will be demolished as part of the 2004 Penobscot River restoration agreement.

If salmon, river herring and shad return near the numbers that were recorded in Colonial times before the Penobscot was dammed, she says, the benefits will extend up the river in the form of tourism and downriver and out to sea as the traditional feed fish for cod that might benefit Maine's beleaguered ocean fishing industry.

Benefits have already been felt by David Carney, R.F. Jordan & Son's project manager of the Great Works Dam demolition and excavation. The \$3.5 million job represents steady work for him and more than 15 workers of the Ellsworth company from June until mid-November.

Upriver, in Howland, where a dam now owned by the Penobscot River Restoration Trust is being decommissioned, Town Manager Jane Jones is hopeful that the demolition and removal of a nearby abandoned tannery — a project due to be completed this fall — will become the catalyst for economic development that will dovetail with the trust's plans to build a new fish passage around the Howland powerhouse.

"It's so desperately needed in this community," she says, noting that the 2010 Census showed a 16.1% decrease in Howland's population, primarily in the 20-to-45 age bracket. "We need to find a way of reversing that trend."

Holding up an architect's rendering showing how the cleared tannery site could be developed — with space for recreation fields, a riverfront walking path that would follow the new fishway, a boat launch and a DEP-certified site suitable for light manufacturing or mixed-use — she says "Nirvana" would be having all those goals fulfilled in five years, a thriving center to a town on the upswing. "This 'visioning' was paid for in part by the trust," she says. "The town and trust

A lot of cheering took place on June 11, when a massive excavator's percussion hammer broke through the concrete of the defunct fishway for the 1,020-foot Great Works Dam. A small trickle and then a flow of golden-brown water rushed through, creating the first opening in the 19-foot-tall barricade across the Penobscot River between Old Town and Bradley that has blocked passage of Atlantic salmon and other fish to their upriver spawning grounds since the late 1800s.

Not everyone, though, felt as jubilant about the historic breaching of the dam.

For Dick Fennelly and Scott Hall of Black Bear Hydro Partners LLC, it was a bittersweet moment — notwithstanding the key role both played in the decade-long process to restore fish access to almost 1,000 miles of spawning grounds in the Penobscot River and its upriver tributaries. Both grew up in Maine and share many of the conservation and outdoor recreation values held by proponents of the Great Works Dam removal. But they're also staunch advocates of hydropower as a renewable energy source so the sight of a dam coming down, no matter the reason, was a tough pill to swallow.

"I've been involved in these assets directly since 1995," says Fennelly, Black Bear's vice president of generating and business assets, in an interview at Black Bear's headquarters, several miles upriver from Old Town at the Milford hydroelectric power station. "You put a lot of time and effort into these dams and powerhouses ... You hate to see any of them go."

Hall, Black Bear's vice president of environmental and business services, offers a similar view on the demolition of the Great Works Dam, which will be followed next summer by the demolition of the Veazie Dam downriver and the decommissioning of the trust-owned Howland Dam at the Penobscot's juncture with the Piscataquis River.

"There's one thing important to note," he says. "Black Bear Hydro Partners have not removed, and will not remove dams. The dams being removed are owned by the Penobscot River Restoration Trust. So the way I view that is that they acquired a business asset and they made a decision to dispose of those business assets."

As Hall and Fennelly see it, the pivotal point of the historic Penobscot River restoration agreement reached in June 2004 and now coming to fruition is this: Not one megawatt of electricity will be lost when the demolition or decommissioning of three dams on the Penobscot River is complete. From their perspective, striking a balance between the river's energy-making capacity, its ecological value to various fish species and its cultural significance to the Penobscot Nation is a pragmatic business decision, albeit one reflecting a new environmental stewardship model for the hydropower industry in Maine.

"It's not 'all or nothing,'" Hall says of the 2004 agreement. "It grew out of a common willingness by all the parties to find a way to balance a whole host of interests [along the Penobscot River]."

Hall, Fennelly and Laura Rose Day, executive director of the Penobscot River Restoration Trust, cite Bangor Hydro's long, divisive and ultimately unsuccessful effort to build the Basin Mills 38-megawatt hydroelectric dam in the 1980s and 1990s as a turning point in the hydropower industry's long history on the Penobscot River. The Penobscot Nation and various environmental and fishing groups prevailed, arguing that the dam would further diminish the river's migratory fish populations, which had long been in decline due to difficulties reaching their spawning grounds.

Shortly after the Federal Energy Regulatory Commission's 1998 denial of its license application to build the Basin Mills Dam, Bangor Hydro, in response to deregulation of the electricity industry in Maine, divested its power-generating assets to focus solely on power transmission. In 1999, it sold all of its hydropower facilities on the Penobscot — the Veazie, Orono, Stillwater, Milford, Howland, West Enfield and Medway dams — to the Pennsylvania-based PPL Corp. A year later, PPL purchased the Great Works Dam from Ft. James Operating Co. Inc., giving it sole ownership of all the dams on the lower Penobscot River.

By that time, as PPL employees, Hall and Fennelly already were engaged in exploratory talks with the numerous stakeholders who had vigorously opposed Bangor Hydro's failed Basin Mills effort.

"When Bangor Hydro sold its assets to PPL, that's when Scott and I decided to do business in a different way," Fennelly says of talks they initiated in 1999 with other Penobscot River stakeholders. "We tried to understand their interests from a fisheries standpoint, and they tried to understand our interests from a business

will be cohabiting on that site for years and years to come."

standpoint."

Hall says PPL's corporate leaders came to embrace the new perspective, which he summarizes as: "Let's try to resolve these differences and put time, energy and interest into things that matter ... instead of engaging in a long, confrontational regulatory process."

"For the most part, PPL gave us a good bit of autonomy to manage the process and do what we thought was appropriate," adds Fennelly. "PPL deserves a lot of credit [for the restoration agreement]. A lot of corporations would have said, 'No way!'"

From an initial stakeholders meeting in which upwards of 30 people were seated at the table, Hall says talks continued for four-and-a-half years, eventually involving a core group of eight to 10 negotiators. By then trust had been established. So when Hall and Fennelly put on the table the Howland Dam, located on the Piscataquis River at its juncture with the Penobscot, as a generating asset PPL might be willing to sell, they didn't immediately cry foul when a counterproposal came back that perhaps the Veazie and Great Works dams should be added to the list as well.

"They asked us if we would be open to a bigger picture understanding," Fennelly says, one that took into consideration the entire lower Penobscot watershed and, dam by dam, balanced the formerly opposed interests of "fish passage" and "energy generation."

The June 2004 agreement signed by PPL and stakeholders that had joined together as "The Penobscot River Restoration Trust" was immediately hailed as a river restoration project of national significance. Under the agreement:

The trust agreed to buy three dams from PPL Corp. for \$24 million, a purchase completed in December 2010 through a mix of public and private funds. Two dams closest to the ocean, Veazie and Great Works, would be demolished at an additional cost. The third, at Howland, would be decommissioned but not torn down. Instead, a fishway would be built, enabling fish species such as the endangered Atlantic salmon, shad and river herring to reach spawning grounds along the Piscataquis River. Total cost of fulfilling its part of the agreement is pegged at \$62 million.

PPL was allowed to increase hydropower generation at six remaining dams — Ellsworth (on the Union River), Orono, Stillwater, Milford, West Enfield and Medway — which effectively replaced all of the power lost at the three dams it was giving up.

PPL, with the approval of the U.S. Fish and Wildlife Service, also agreed to improve upriver fish passage at four dams.

Laura Rose Day, director of the trust, says all parties involved took a leap of faith in signing the agreement: The Penobscot Nation and the various nonprofit environmental groups by agreeing to raise \$24 million to buy three dams as well as the roughly \$36 million of additional funding needed for removal of two dam, creation of a new fish bypass at Howland and other restoration costs; and PPL, by its willingness to sell three of its assets in exchange for a promise that adding power-generating capacity at its other dams would not trigger a protracted and costly legal challenge.

"When doing business, your 'word' is key," she says. "They kept their word, and we've kept ours."

That holds true, as well, for Black Bear Hydro Partners LLC, which in November 2009 purchased PPL's six power-generating dams for \$81 million. With Hall and Fennelly moving from PPL to Black Bear, the restoration project was assured of having hydropower advocates who embraced the major commitments made by PPL in the 2004 agreement.

The upgrading of hydropower facilities retained by Black Bear already has begun, with two new turbines being installed at the Milford powerhouse, increasing its generating capacity from 6.4 megawatts to 7.8 megawatts. In addition, Black Bear will be adding a new fish lift at the Milford Dam by the end of this year.

Similar energy upgrades have been completed or are under way at Black Bear's other facilities on the Penobscot, with some awaiting regulatory approvals that Hall anticipates could arrive "any day."

Most of the energy upgrades will be invisible to the general public since they'll be taking place within existing powerhouses; only the Orono and Stillwater energy upgrades involve new powerhouses. In general, Hall says, the upgrades capture "excess power" that had been spilling over the dam untapped. "Now we can use that power," he says.

All told, the 2004 river restoration agreement gives Black Bear the ability to recapture all of the power lost due to the demolition of the Great Works and Veazie dams and the decommissioning of the Howland Dam. (For a breakdown, see accompanying map on page 21.)

"We expect all of the energy lost to decommissioning will be replaced with energy that's new," says Hall, adding that if Black Bear exercises its options for additional upgrades, the new power-generating capacity might even exceed what was lost.

The power generated at Black Bear's Penobscot dams is sold to ISO New England, the regional power transmission company serving 6.5 million households and companies in the six New England states. But as Hall quips, "the electrons are used locally" — since the company is tied to Bangor Hydro's distribution network. It's in the ballpark of 25,000 homes.

Black Bear will invest about \$20 million on the power upgrades at Orono and Stillwater, and another \$15 million improving or installing fish passages and completing power upgrades at its other facilities. Fennelly acknowledges he's heard from some who question the whole approach agreed to by PPL and now being fulfilled by Black Bear, arguing that it would have been better to seek the energy enhancements and not tear down any dams. His ready answer?

"That's not a reality that would have taken place," he says. "It never would have happened."

Instead, Hall says, what Black Bear gains from the 2004 Penobscot River restoration agreement — as a hydropower company that's in it for the long haul — is the stability of knowing what its operating requirements will be for many years to come without the threat of legal challenges from the Penobscot Nation, numerous environmental groups, or state and federal authorities.

Underscoring how hydropower is uniquely suited to that "long haul" perspective, Hall notes the three older power generators at Milford were installed more than 80 years ago. They'll keep running, "as long as you maintain them," he says.

The gentle thrumming sound of those spinning turbines is ever-present at Black Bear's Milford headquarters, a tangible reminder of how the river's energy flow is being translated into electricity flowing through the Bangor Hydro transmission lines to power Maine homes.

"That's the hum of money — the hum of our business, the sound of our business," Hall says.

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