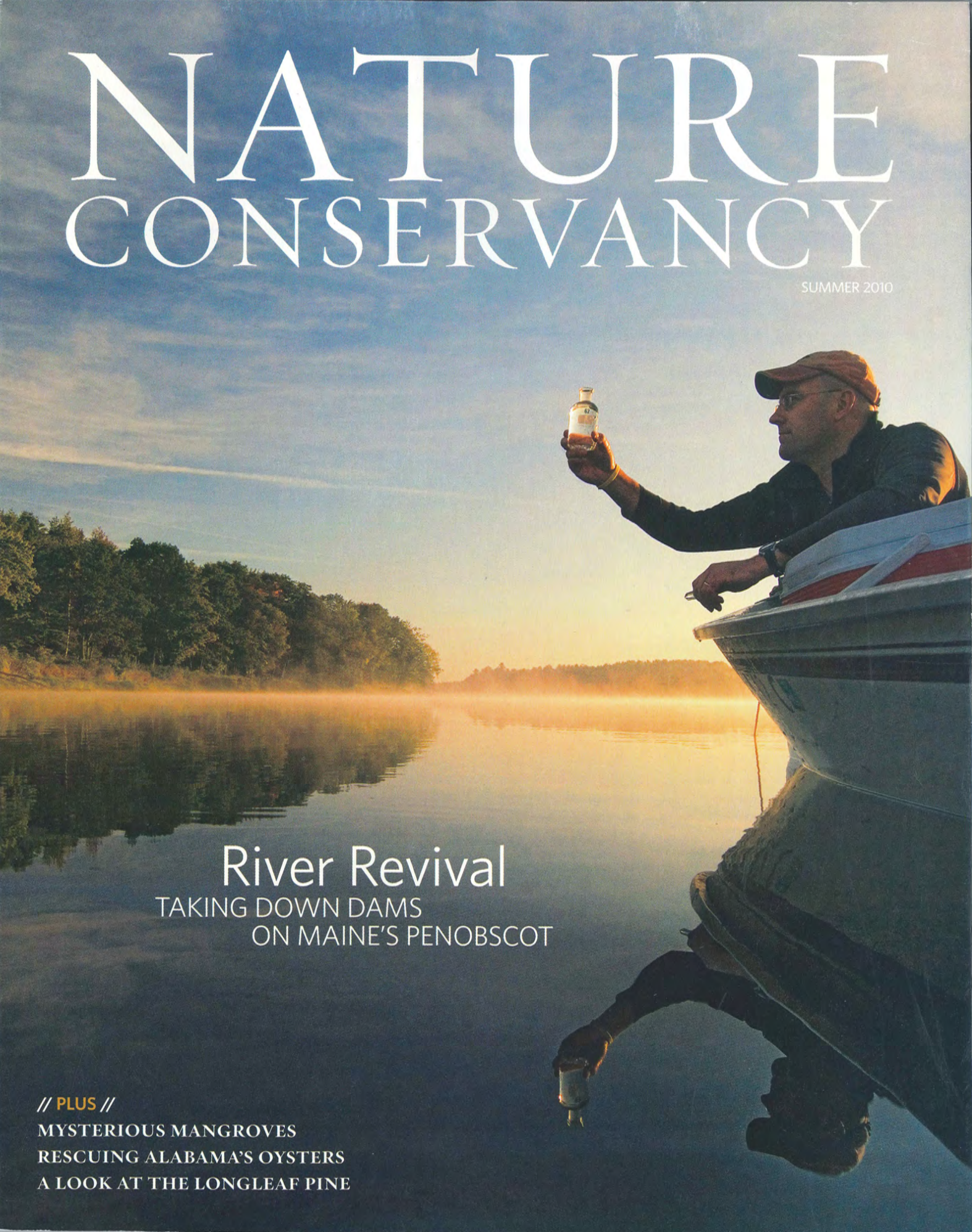
NATURE CONSERVANCY

SUMMER 2010



River Revival

TAKING DOWN DAMS
ON MAINE'S PENOBSCOT

// PLUS //

MYSTERIOUS MANGROVES

RESCUING ALABAMA'S OYSTERS

A LOOK AT THE LONGLEAF PINE

EBB AND FLOW: An angler works a section of the Penobscot River near Maine's Mount Katahdin. The Conservancy is working to tear down several dams on the river's main stem to restore populations of Atlantic salmon, shad and other fish.

FREEING THE RIVER

To save endangered Atlantic salmon, conservation groups are buying up dams on Maine's Penobscot—and tearing them down.

BY MADELINE BODIN

Photographs by Bridget Besaw

IN THE CHILL OF A LATE SUMMER MORNING, Jan Paul leans over the gunwale of a small boat and submerges a plastic jar into Maine's Penobscot River. In the stern, Dan Kusnierz drops a gauge over the side. The two water-resource technicians, who work for the Penobscot Indian Nation, are reading the river's vital signs, gathering data to record its temperature, pollution levels and clarity.

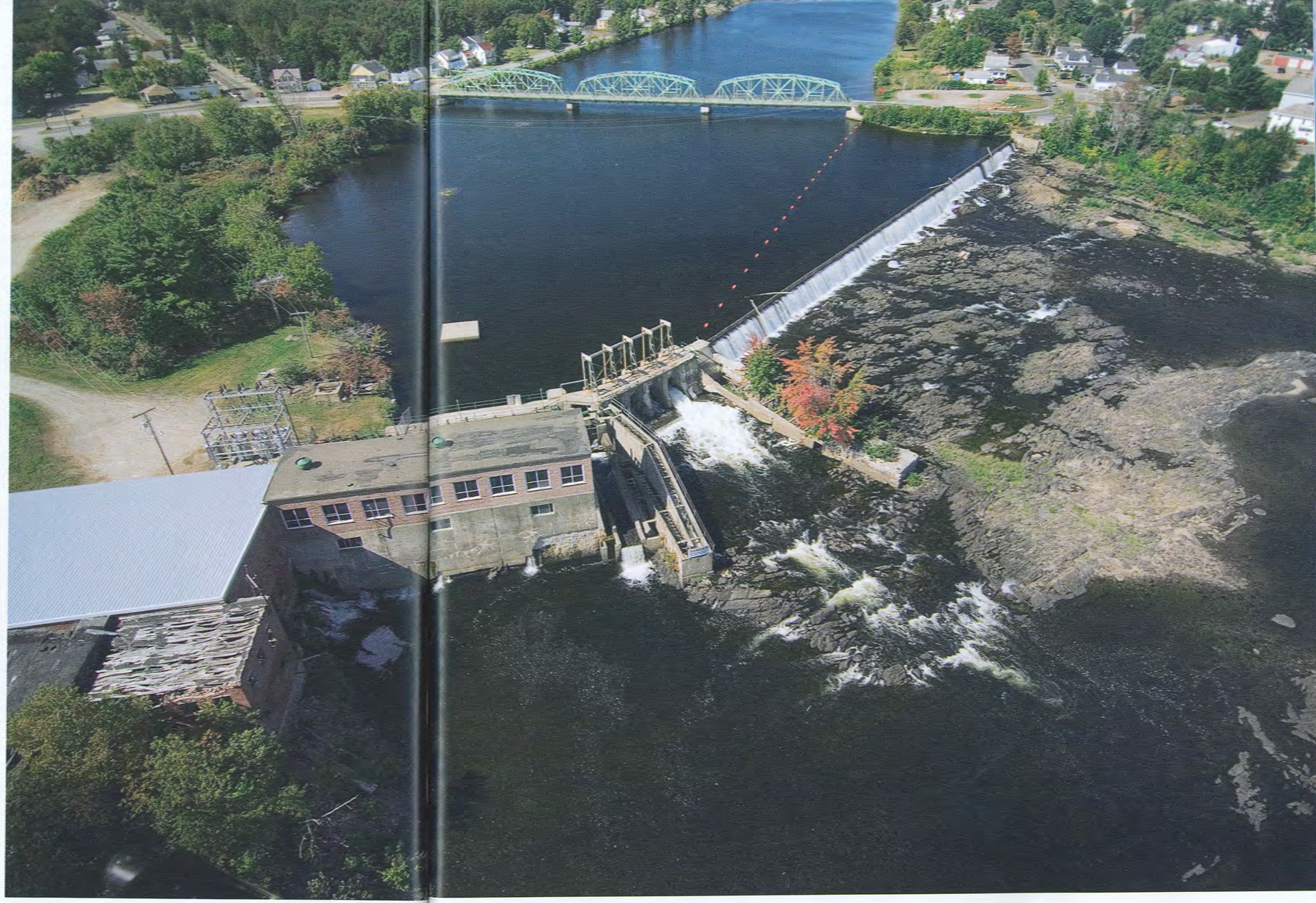
Their efforts are part of an environmental and cultural restoration along the river, where the Penobscot people have lived for thousands of years. The river was once the tribe's medicine cabinet, its water supply, highway and supermarket. Despite a century of changes, the tribe hopes to revive the river's central role in its life again. "The river is the lifeblood of the Penobscot nation," says tribal elder Butch Phillips. "We are a river people."

Standing in the way of this revival, however, are several large hydroelectric dams—including the Veazie, the Great Works and the Howland—which plug the Penobscot and block the fish runs that once sustained the Penobscot people. Starting just 30 miles upriver from the Atlantic, the dams cut off thousands of miles of river and spawning grounds from millions of fish each year, including alewives, shad and Atlantic salmon.

For years, the tribe has been working to restore the fish runs and realize fishing rights promised by a centuries-old treaty. And while it has won a series of court battles to clean up the river from decades of industrial pollution, its legal fight against the dams has made little headway.

"We [have] been banging our heads against the wall for several decades at least," says John Banks, director of the Department of Natural Resources for the Penobscot Indian Nation.

But things began to change in August 2008, when the tribe, together with The Nature Conservancy and other



UP AND OVER:
Two of the three dams purchased by the Penobscot River Restoration Trust will be demolished beginning in 2011. The third dam, the Howland (above), will receive a new fish-friendly stream channel.

MAP: © XNR PRODUCTIONS

The power company will produce at least as much electricity as it did before it sold the dams, and the partners in the trust will restore a thousand miles of freshwater habitat and spawning areas.

On the verge of becoming the first coalition of conservation groups to own a portfolio of three operating hydroelectric dams, the team now needed to raise an additional $30 million to pay for the actual removal of the dams.

WILD AND SCENIC: **The Penobscot flows through some of the least-developed lands in North America, fed by an 8,600-square-mile watershed of mostly forested lands.**

partners in the Penobscot River Restoration Trust, exercised the option to purchase the dams outright for $25 million from the power company. The unprecedented deal, which is still awaiting federal approval, is a carefully negotiated win-win for all the parties involved.

When the project is completed, the power company will produce at least as much electricity as it did before it sold the dams (the company will be allowed to produce more electricity at the other dams it still owns upriver). And the partners in the trust will get the chance to restore a thousand miles of freshwater habitat and spawning areas for sea-run fish such as the endangered Atlantic salmon.

The deal is a rare pragmatic victory for both conservation and industry, one that required years of painstaking work to negotiate and years more to raise funds to buy the dams. While the challenges are not over—it turns out that tearing down a series of dams is complicated and expensive work—the trust's successes may help demonstrate the potential for restoring other rivers around the world.

Now, with funding recently secured to begin tearing down one dam, the project is moving forward with the hope of reviving the Penobscot and revitalizing a culture.

The Penobscot River drains New England's second-largest watershed, yet it is obstructed by only 119 dams. That may sound like a lot of dams, says Josh Royte, the Conservancy's conservation planner in Maine, but it's a small number compared to many U.S. rivers. The Connecticut River—New England's largest watershed—has more than 1,000 dams.

The Penobscot's 8,600-square-mile watershed is also one of the least-developed areas in the Northeast. This mostly forested landscape is crossed by relatively few roads. Already, more than 22 percent of the watershed has been protected against further development.

That's why the restoration of the Penobscot River is not some last-ditch attempt to save a dying river, says Royte. The river anchors one of the most vital, intact ecosystems in the eastern United States. And removing the dams on the main stem is expected to pay a huge return in conservation value for generations to come.

The end result will give endangered Atlantic salmon access to 100 miles of the river's main stem, as well as open up over a thousand miles of tributaries for spawning. And while endangered salmon will benefit—their numbers are expected to increase from fewer than 1,000 to 12,000—as many as 11 other species of sea-run fish may flourish, as well. The number of American shad is expected to increase from a few thousand to 2 million. Alewives, whose sheer numbers protect the salmon as they travel upstream by filling the bellies of predators instead, are expected to increase from around 1,000 to several million. The

numbers of Atlantic sturgeon and the endangered shortnose sturgeon are expected to increase, as well.

This profound abundance will feed not only the Penobscot people but also the entire ecosystem along the river, including creatures such as turtles, river otters, bald eagles, ospreys and herons.

The revival of the fish runs will be felt beyond the river system, too. In the ocean, surging populations of salmon, shad and other fish will help feed tuna, bluefish and striped bass. The work may even help restore a struggling nearshore cod fishery in the Gulf of Maine.

The Veazie, Great Works and Howland dams have been a longtime source of contention for the Penobscot nation, which has spent decades fighting to restore the river's fisheries with the hope of using fishing rights that were granted by a past treaty. Years of legal battles yielded little progress. Then in 1999, conditions finally fell into place when a new power company, PPL (formerly Pennsylvania Power and Light), purchased the region's eight hydroelectric dams.

"When PPL bought the [dams], they knew the history of fighting on the river," says Kate Dempsey, the Conservancy's senior policy advisor in Maine. "So they were looking for a solution, not for more of a fight." Besides, the dams were nearly up for their 50-year relicensing under federal regulations, and the Penobscot nation and other groups were promising to challenge the dams every step of the way.

Two local men who had run the dams for years suggested to their new managers at PPL that the company should try to talk to the local community about the river's future, rather than continue the fight. Those men, Scott Hall and Richard Fennelly, thought it would help to negotiate around a conference table rather than argue in front of a judge's bench.

"Scott approached the tribe and said, 'We want to do business in a different way,'" says John Banks. The Penobscot nation saw in this gesture an opportunity that was bigger than the tribe. It asked the Atlantic Salmon Federation and the Natural Resources Council of Maine to join the negotiations with PPL. More conservation groups joined in the process, including American Rivers, Maine Audubon and Trout Unlimited. These groups and the tribe formalized their coalition as the Penobscot River Restoration Trust.

The Conservancy wasn't an original member of the trust. "It was an ongoing conversation," says Dempsey. "We were already working closely with many of the partners."

Over time, it became clear that the Conservancy could offer a lot to the partnership, and the organization joined the trust in 2006. "We saw that we could bring our science ability, our ability to coordinate work among federal, state and NGO [nongovernmental organization] partners," says Dempsey. "We have a lot of experience accessing public and private funds to complete complex conservation projects."

Under the deal hammered out with PPL, the trust had to raise the $25 million to purchase the dams by mid-2008 or face annual $1 million increases in the sales price. Support began to trickle in from private and public donors, including the U.S. Fish and Wildlife Service. A turning point came at the end of 2007, when the National Oceanic and Atmospheric Administration (NOAA) committed $10 million toward the purchase of the dams.

In August 2008, after a multiyear fundraising blitz, the trust exercised its option to purchase three of the dams on the lower Penobscot—the first, second and fourth dams upriver from the ocean. The papers were signed just inside the five-year deadline as provided for in the original agreement, thereby avoiding a $1 million price spike. Helping to seal the deal, says Dempsey, was the Conservancy's experience in working with federal agencies and the support of Maine's congressional delegation.

The trust was on the verge of becoming the first coalition of conservation groups to own a portfolio of three large, operating hydroelectric dams. Nonetheless, it seemed the work had just begun. The team estimated that it now needed to raise an additional $30 million to pay for the actual removal of the dams.

In June 2009, NOAA came through for the Penobscot trust once again when it awarded $6.1 million of federal stimulus money to help jump-start work on tearing down the dams (see also "The Reef Makers," page 56). That means sometime soon—possibly as early as 2011—a backhoe equipped with a jackhammer will pound one of the dams to bits while bucket loaders carry the rubble away.

The Great Works Dam—the second on the river—will be the first to go. When additional funds are secured, the first dam, the Veazie, will then be removed. The trust plans to install a state-of-the-art fish passage at the fourth dam, the Howland. During the negotiations, residents of the town of Howland raised concerns about losing the lakelike stretch of river created by the Howland Dam, so the new fish channel—which will look like a stream with cascading pools—promises to be an effective compromise.

For its part, the power company (PPL sold the dams to Black Bear Hydro in 2009) will install a high-tech fish lift, significantly improving passage at Milford Dam. Milford Dam is the third dam upriver from the ocean and, under the plan, will soon be the first. To maintain its energy production capacity, the power company will remove several of the 28 turbines from the soon-to-be-demolished Veazie and Great Works dams and install them at other dams farther up the river or on tributaries. It will also raise the level of its

CATCH AND RELEASE: **Using federal stimulus funding, the trust is tagging sturgeon and other species to measure the effects of dam removal on fish in the Penobscot.**

The end result will give salmon access to 100 miles of the river's main stem, as well as open up over thousand miles of tributaries for spawning.

headponds, which are similar to reservoirs, at three of the remaining dams, and reroute some of the river's flow away from Milford Dam toward dams on the Stillwater branch of the river. All this maneuvering will allow the company to produce 100 percent of the energy that it did before.

Most of the $6.1 million from the NOAA grant will go toward removing the Great Works Dam. There are many reasons for taking this middle dam out first, says the Conservancy's Royte, but the most important reason is that it has been the biggest obstacle for migrating fish.

The fish passage at Great Works has never worked well, says Royte, while the ladders at dams above and below it are modestly more effective. In fact, for the time being, scientists plan to use the fish passage at the first dam on the river, the Veazie, to count the number of salmon entering the river.

The Penobscot River restoration, says NOAA's John Catena, a restoration supervisor for the northeast region, "is the largest project we're working on in the northeastern United States, and one of the largest in the country." The project's appeal to NOAA, a federal agency charged with managing many ocean issues, is the recovery of a significant population of sea-run fish.

The project will also boost local employment. But the other reason this project was chosen as one of 50 to receive funding out of more than 800 applicants was the inherent power in the coalition that created it. "The sheer number of organizations that had come together to put this project forward showed political will and allowed this project to float to the very top," says Catena.

More than $1 million of the NOAA funding has been designated for scientific monitoring of the river before, during and after the dam-removal process. This intense scrutiny will help create a road map for other, similar projects.

The project is tracking data in six major research areas: water quality, channel geography, composition of the fish community, changes in the food web, impact on biodiversity

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BEFORE AND AFTER: Three generations of the Penobscot Indian Nation—Butch, Sage and Scott Phillips (left to right)—paddle a birch-bark canoe on the river they have worked to restore.

and effectiveness of the dams' fish passages as well as the presence of spawning sturgeon. Water-quality manager Dan Kusnierz, technician Jan Paul and the Penobscot nation will lead efforts on water-quality monitoring, thanks to the tribe's ongoing work and expertise.

When the Great Works Dam is finally brought down, a lot of work will remain to revive the Penobscot's fisheries and bring the river back to life. Money still must be raised to remove the Veazie Dam and to build the fish passage at the Howland Dam. And after the main-stem dams are successfully breached, work will still need to be done to open up many of the Penobscot's tributaries. "It's death by a thousand culverts," says Royte, who is concerned about streams that remain cut off from the river's main stem by poorly placed culverts and other obstacles.

Despite the challenges ahead, the restoration of the Penobscot is already inspiring new thinking about freshwater conservation around the world. "We are telling the Penobscot story in southern Africa, in China and in Colombia," says Brian Richter, co-director of the Conservancy's Global Freshwater Program. "It shows how you can use rivers to generate electricity and still sustain important fisheries."

While the Penobscot is not the only example of large-scale river restoration, says Richter, it is one of the most extraordinary. "The great news is that there are literally hundreds of dams being removed these days, particularly around the United States," he says. But two things set the Penobscot apart. The first, says Richter, is the level of scientific study that will monitor every major aspect of the recovery before, during and after the dam removals. The second is that the level of energy production on the river will remain constant after the dams are removed.

There is still a long way to go before the Penobscot is completely restored. But that hasn't stopped local communities from thinking ahead to what life will be like on a newly vibrant Penobscot. People along the river envision a renewed salmon fishery, with anglers traveling from all over to hook the king of fish. And they are anticipating the revitalization of the region's venerable salmon clubs, which in decades past would send the first salmon of the season to the president of the United States.

For many in the Penobscot nation, hopes for the river go beyond fish and renewed financial opportunities.

"I picture myself fishing alone and at night, holding a birch-bark torch as the ancestors did," says tribal elder Butch Phillips. "And when I do that, it won't be about harvesting a fish. It will be a celebration for me personally of the restoration of a natural ecosystem, and the restoration of a part of our culture which had been asleep, and is now being awakened." ▪