



Town of Phippsburg Citizen Science and Engineering to Improve Fish Passage at Center Pond

"I have been involved with the Phippsburg Center Pond River Herring Committee by attending meetings and observing the committee members conduct the tagging and counting of alewives as well as observing the tidal effects on the fishway. I am very impressed with the dedication of the committee to get the project going. Members of the committee took the time to go to the location and explain the mechanics of the rebuild and the necessity for it, as this was all new to me. The engineering design is just the first step in bringing back a very important fishery and we are committed to seeing the rebuild through to completion."

Julia M. House, Phippsburg Selectman 2015



PARTNERS

Fish habitat restoration projects typically benefit greatly from project teams representing a diversity of member types and levels of experience. Our growing list of project partners includes:

- Town of Phippsburg Center Pond River Herring Committee
- Maine Department of Marine Resources
- Maine Coastal Program
- U.S. Fish and Wildlife Service
- National Oceanographic and Atmospheric Administration
- Wright-Pierce Engineering
- Local Landowners and Volunteers

We have also approached Kennebec Estuary Land Trust, The Nature Conservancy, Phippsburg Land Trust and Manomet (Downeast Fisheries Partnership) to see if they will partnership with us for the construction phase.

ISSUE AREA

Maine's dams and culvert crossings often block access between important habitats for fish spawning rearing and refuge from extreme temperatures. Alewives are especially vulnerable to migration "barriers" like dams and roads that block access to freshwater and marine habitats required for reproduction and growth to adulthood.

COASTAL COMMUNITY GRANTS: Coastal Habitat Restoration

PROJECT DESCRIPTION (completed December 2015)

The overall goal of this project was to improve alewife (river herring to include alewife and blueback herring) passage into Center Pond. Alewives were once harvested at the site, but due to concerns about the run and fishway performance, the harvest was closed. Improving passage at the fishway would improve the run and again provide a local revenue source and local source of bait for area lobstermen. Additionally, alewives are a forage fish for very important commercial species, especially cod, which have been in the limelight as a dwindling fisheries resource. They are also important food for many other predators of public interest, such as osprey, seals, eagles, cormorants, etc. Alewives are a “species of interest” to agencies such as the Atlantic States Marine Fisheries Commission (ASMFC) and others because their population decline along the Atlantic Coast, especially south of Maine. Anything that can be done anywhere to improve watersheds, such as Center Pond, for breeding will benefit the overall population dynamics of the species. Another species which uses the fishway is the American Eel which enter the pond as juveniles (elvers) and spend time in the pond maturing before returning to the Kennebec River.

Our approach for this project relied on citizen science, participatory planning, and engineered solutions. This grant funded engineering designs and regulatory permitting that will allow implementation of improvements to the fishway.

THE CHALLENGE TAKEN

The Town of Phippsburg gained rights to alewife fishing in the early 1800’s. Anecdotal records describe alewife harvesting at the stream that flows into the Kennebec River where Center Pond is located. The dam at Center Pond was built sometime in the mid 1800’s for ice harvesting, and without fish passage into the freshwater area the alewife run subsequently deteriorated. Since that time, the Center Pond dam has mainly functioned to impound the waters of the highly regarded local swimming area and to maintain upstream residential shorefront surface water elevations.

In 1981, the current Denil style fishway at Center Pond was built in order to rebuild the alewife run. Since the construction of this fishway, the run has returned with the help of stocking by the DMR and also likely by some natural recolonization by neighboring runs. Since the fishway was constructed, the town and local community members have been active stewards of the run with hopes of restoring the run to the size where it can be commercially harvested. Unfortunately, the run size is constrained because the fishway has not performed as anticipated. A small commercial fishery was attempted at Center Pond from 1999 to 2012, but no fish were harvested because of concerns about few returning adults. Since 2012, the run has been under a conservation closure. The Center Pond River Herring Committee has remained highly engaged by performing annual alewife counts and biological sampling and making almost daily manual adjustments at the fishway to optimize passage.



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Efforts to determine how passage at the fishway may be improved at Center Pond were provided a kick-start in 2003 when USFWS performed a rapid assessment of the fishway. The assessment identified several major problem areas, but lacking more extensive engineering resources, only some of the recommendations could be implemented. These included adding baffles in the upper portion of the fishway to control water flow and sealing a portion of the spillway so that fish did not become stranded in a dead-end area of the dam.

Other shortfalls of the original fishway design have likely limited the run from reaching its potential. For reasons unknown, the fishway was constructed so that it is “hanging”, where the entrance to the fishway on the tidal side is does not reach the tidal stream bed below. This limits the passage efficiency of the fishway. It is currently only accessible to alewives migrating into the pond 42% of the time (report from J. McLean, Wright-Pierce, 2013). Furthermore, the current “hanging” configuration of the fishway can also be detrimental to adult alewives when they migrate back into marine waters from the pond, as well as for juvenile alewives when they migrate out of the pond. Because the fishway does not extend to the tidal stream base elevation, fish can be injured as they fall downstream from the end of the fishway onto the stream surface below.

In order to address this problem, the Town and the Center Pond River Herring Committee designed and installed an aluminum chute to the entrance of the fishway, on the tidal side, in 2010. This chute has been beneficial for adults returning to marine waters from the pond and for juveniles as they migrate out of the pond. The chute, however, provides little benefit to adults migrating into the pond to spawn, and may interrupt the freshwater outflow of the pond, thereby impairing the fishway’s ability to attract spawning alewives into the fishway entrance.

In 2013, the Phippsburg Town Administrator, members of the Center Pond River Herring Committee, engineers from Wright-Pierce, the Maine Coastal program (MCP), DMR, and USFWS met at the request of the River Herring Committee to identify more permanent steps that could be taken to improve passage at the fishway. Wright-Pierce had subsequently worked with the Town *pro bono* to provide topographic and hydrologic analysis and identified problems limiting passage including:

- Water control at the pond side of the fishway needs to be changed to maintain adequate flow in the fishway while managing pond levels
- The emergency spillway portion of the dam needs to be addressed to limit seepage and to ensure that fish do not become trapped
- The fishway entrance is available to alewives migrating upstream only 42% of time during the spring migration
- Hydraulics in the fishway are not optimized to attract fish into the fishway or for alewives to ascend the Denil fish ladder most efficiently.



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Together, fish passage monitoring results, assessments of two respected fish passage engineers in the northeast, and the observations of local citizens all demonstrated that a prompt and comprehensive engineering design study leading to fishway improvements was required if the health of the Center Pond alewife run is to be improved.

With strong local support, an experienced technical advisor team, and possible local economic gain from the project's successful completion, this project represented an excellent restoration investment and ranked as one of the highest priority alewife restoration projects in Maine's Coastal Zone. Likewise, the town's Comprehensive Plan specifically emphasized the importance of the alewife run at Center Pond.

THE APPROACH TAKEN

The Town Center Pond River Herring Committee applied for and received a Coastal Community Planning Grant to conduct a study and design a "ready for bid" improved fish passage. Project participants met in September 2014. It was decided to contract directly with Wright-Pierce Engineering to redesign the fishway without going out to bid because the company had been working with Phippsburg on this project already and they had an outstanding track record with other municipalities in fishway design. They immediately started collecting historical, subsurface, hydrologic, hydraulic wetland and survey data for design improvements.

The project participants met every other month until February 2015 when they started meeting every month. Wright-Pierce Engineering attended most meetings and presented any new analysis and data. He revised the plans each time based on the continuation of his data gathering as well as input from the Center Pond River Herring Committee, Claire Enterline, Marine Scientist from DMR and Slade Moore, Contracting Restoration Coordinator to the Maine Coastal Program. He also reached out to the USFWS and the Army Corps of Engineers for design comments and to address their concerns.

While the engineer worked on the fishway plans the Center Pond River Herring Committee continued to perform maintenance on the fishway and make adjustments to it. During the spring alewife run they tended the fishway daily to count fish and tag them as per the approved DMR monitoring plan. They also worked with Slade Moore to identify how they were going to fund the construction. The possibility of fundraising and grant opportunities was discussed at each meeting. Committee members also reported that they had attended a Midcoast Maine River Herring Monitoring Field Workshop hosted by Claire Enterline in the Towns of Phippsburg, Woolwich and Bristol.

Claire assisted the town with the development of a monitoring plan for fish counts and providing environmental data. She also installed a Passive Integrated Transponder System (PIT) system at the fishway.



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In January 2016 the Phippsburg Center Pond River Herring Committee hosted a public informational meeting which was advertised in the local newspaper, on the town's community access TV channel and website. Other organizations such as the Kennebec Estuary Land Trust and The Nature Conservancy were invited to attend with the hopes of creating partnerships for the construction phase. Wright Pierce Engineers gave a presentation on the life cycle and importance of the alewife, a history of the Center Pond fishway and reviewed the final plans. It was well received and those in attendance were very supportive.

THE RESULTS

The project resulted in engineered fishway design plans featuring the following improvements:

- Improved attraction via combining the main spillway discharge with the fishway discharge.
- Extension of the fishway and added turning pool to improve effectiveness throughout the tide cycle.
- Improved internal hydraulics by eliminating compounding vertical/horizontal bends.
- Improved Pond level and flow management by incorporation of additional baffles.
- Addition of monitoring platform and trapping channel.

Wright-Pierce prepared engineering plans, a bid package of specifications, a detailed cost estimate for the rebuild \$286,825 (12/2015) and submitted permit applications to the Army Corps of Engineers and Maine DMR.

In a show of deep commitment to the Project, the Town of Phippsburg allocated \$20,000 to help start a capital campaign for construction of a new fishway.

NEXT STEPS AND OPPORTUNITIES

Next steps for the project consist of the following activities:

- Continue to work with the Army Corps of Engineers and National Marine Fisheries Service (NOAA) concerning the endangered species that may be present in the Kennebec River and around the work area during the construction period as it relates to the cofferdam/dewatering plan.
- Obtain an easement from Maine Inland Fisheries and Wildlife, who own the property adjacent to the run, to expand the area of the fishway.
- Work with existing partners to acquire funds for the construction phase. This will include requesting additional town funding, fund raising and applying for grants such as the NOAA Coastal and Marine Habitat Restoration program.
- Work with the owners of property on Center Pond concerning the necessity of lowering the water level pond during the construction phase.
- Continue to monitor the fishway, including the tagging and counting of the fish, throughout the fundraising and construction process.
- Initiate practices and make modifications to improve fish passage until the long-term and sustainable solution of a rebuilt fishway can be implemented.



NEEDS

Our needs at this point are fairly straight forward.

- We need construction funding for the fishway which includes the availability of an experienced grant writer who has the ability and fisheries knowledge to apply for appropriate grants on behalf of the Town.
- We need continued support from Maine DMR, which we know is shorthanded at this time.
- We need a solid and knowledgeable engineering firm to provide contract administration and support.
- We need to continue growing support from volunteers, stakeholders and other interested parties.

LESSONS LEARNED

- Start the review process with the agencies early in the process.
- It is tough balancing a proper project with prospective funding.
- Public support is very important because it can be a tough sell to spend funds on a project such as this that is not on the same priority level as other funding needs such as roads and public safety.
- Account for every minute of in-kind match.
- No matter how much time you think it will take to complete a grant timeline – add more. The timeline looks great on paper but unforeseen issues will crop up and slow down the progress.

APPLICABILITY TO OTHER MUNICIPALITIES

This case study would apply to any municipality that has problems with a fishway which is not performing well. They can learn from our experience in this process and are welcome to contact us.

RECOMMENDATIONS TO THE MAINE COASTL PROGRAM

We would not be where we are now if it was not for Claire Enterline from Maine DMR who was responsible for anadromous fisheries management statewide with a focus on river herring and Slade Moore who contracted with Maine Coastal Programs as a habitat restoration coordinator. They helped us with the application process and attended almost every meeting of the Center Pond River Herring Committee to give input and guide us along the way. This plan would not have come together without their help. We strongly encourage Maine DMR and Maine Coastal Programs to fill these positions as soon as possible for the benefit of other communities.

We need to continue having the support of Maine DMR to ensure efficient and proper operation and management of the fishway in the years to come.



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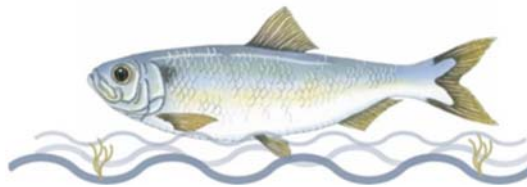
New sustained and streamlined funding solutions for fishway passage would greatly help towns and complement the considerable investments of state and federal agencies on recovery of fisheries over the past decades. More funding with less paperwork. Many municipalities, especially those without planning personnel, shy away from grants because of the complexity of the application process, expertise required, reporting requirements and documentation, and the overall time involved with the process.

FOR MORE INFORMATION

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