



Monitoring of upstream migrating fish in the Penobscot River, Maine

1. Determine the rate, timing and efficiency of upstream passage of Atlantic salmon, American shad and alewife through major dams in Penobscot River.
2. Provide near real time information to cooperating agencies as to the effects of fishway operation on migratory success.
3. Provide a quantitative assessment of the effect of dam removal on the migratory success of migratory fish in the Penobscot River.

The Penobscot River watershed is Maine’s largest and hosts a number of anadromous species including the largest remaining run of Atlantic salmon in the USA. For many species, however, the majority of high quality spawning and rearing habitats are located upstream of lower river dams. By the fall of 2013, the two most downstream dams were removed as part of the Penobscot River Restoration Project (PRRP). Ultimately, benefits of dam removal for Atlantic salmon and other species will depend on the degree and fashion by which remaining dams facilitate fish passage success.

In order to assess migratory success, we are using passive integrated transponders (PIT tags) to remotely track fish through nine major dams in the lower Penobscot River. Beginning in 2013, PIT tagging of fish occurred at the lower most dam (Milford) requiring an antenna installation at the new fishway in coordination with Maine Department of Marine Resources. This work will incorporate and build on recent research that demonstrated migratory behavior and passage efficiency of Atlantic salmon in the Penobscot River. The long term scope of this project is to monitor the effects of the PRRP with respect to Atlantic salmon in accordance with the State Operational Plan for the Restoration of Anadromous Fishes to the Penobscot River. This study requires coordination with USGS, NOAA, DMR, the Penobscot River Restoration Trust (PRRT), the Penobscot Indian Nation, USFWS, and the various dam operators.

The project was initiated September 2009 and has included an M.S. student, a Ph.D student and a post-doctoral associate over the years. By spring of 2010, PIT arrays were installed at all targeted lower mainstem dams and preliminary passage data were collected from more than 1,000 tagged fish. By spring of 2011 eight sites were fully functional and were maintained through the 2011 adult salmon season. Coordination with Department of Marine Resources allowed the successful tagging and tracking of 2,429 adult Atlantic salmon in 2011. Efforts were continued in 2012 and priorities will shift to data analysis and "near real time" coordination with management agencies for the optimization of fish passage. A Ph.D. student began this work in spring of 2013 and low Atlantic salmon returns have necessitated a shift in focus to other species. In addition to a limited number of Atlantic salmon in 2014, hundreds of alewife, sea lamprey and American shad have been tagged and tracked. Additional efforts to radio tag and track adult American shad in 2014-17 have provided an improved picture of habitat use post-dam removal. The presence of iteroparous river herring in the Penobscot River was documented for the first time in recent history as individuals that were PIT tagged in 2014 were tracked upstream in 2015 -16. Radio telemetry of Atlantic salmon was made possible in 2016 by a donation of tags from Brookfield Renewable Power. This work will conclude in the spring of 2018.



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Duration: September 2009—March 2018

Cooperators:
American Recovery and Reinvestment Act (ARRA)
Maine Department of Marine Resources
U.S. Geological Survey – Maine Cooperative Fish and Wildlife Research Unit
National Oceanic and Atmospheric Administration
Penobscot River Restoration Trust
U.S. Fish and Wildlife Service – Craig Brook National Fish Hatchery
Brookfield Renewable Power