

Swimming Against the Current: Multiple challenges face a declining river herring population

By Dave Kellam, Project Manager
Piscataqua Region Estuaries Partnership
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Two herring species, alewife(top) and blueback herring (bottom) comprise the group River Herring. Photo by Michael Waine



A variety of predators, such as this osprey, rely heavily on river herring for food. Photo by Keith Carver

During the last five years, the number of people living in the Seacoast has risen about six and a half percent, however the number of native river herring in most coastal rivers has gone dramatically in the opposite direction. Overall, the number of river herring being counted is down 46 percent.

River herring (a group of fish comprised of alewife and blue-backed herring) are medium-sized silver fish that migrate from the sea up coastal rivers to spawn in freshwater each spring. They are a vital link in the food chain that provides food for both saltwater and freshwater predators, such as cod, great blue herons, seals, and striped bass.

All of New Hampshire's six major coastal rivers have dams that block river herring migration. The dams closest to the ocean in these rivers are equipped with fish passages, also called fish ladders, which provide a way for river herring to swim around the dams. Returning river herring are counted at the fish passages in the Seacoast by NH Fish and Game Department biologists.

A NH Fish and Game Department report published in March 2009 notes that the overall number of river herring successfully climbing fish ladders on the Cocheco, Exeter, Oyster, Lamprey, Taylor, and Winnicut rivers, decreased from roughly 883,000 fish between 1999 - 2003 to 476,000 fish between 2004 -2008. The biggest declines were in the Exeter and Taylor rivers which both experienced a 97 percent decline in river herring passing the first dam upstream from the sea.

What is happening? Researchers point to a combination of factors that are weighing on the herring population: possible overfishing (direct and bycatch) in the Atlantic Ocean, overharvesting during their spawning run in bays and rivers, increased numbers of striped

bass eating returning and young herring, degradation of spawning and nursery habitat, low levels of dissolved oxygen in dam impoundments, spring flooding, and loss of access to spawning areas due to dams and restrictive culverts.

To help improve access to spawning areas, fish passages are often installed at dams. The dominant type of fish passage in the Seacoast is the denil-type fish ladder, which is typically constructed of concrete, aluminum, or wood, and is designed to mimic sloped riffle areas within a stream and provide resting pools. In other parts of the country “nature-like” fish passages, which are basically engineered creeks around dams, have been successful.

It is important to note that fish ladders do not erase all the challenges that dams pose for river herring. Water flow conditions through a fish ladder need to be just right to enable fish to swim in it and to convince them to take the detour. Flooding in the spring can make fish ladders impassable. This has been the case for the last several years. The NH Fish and Game Department report identified high water in 2005, 2006, and 2007 as the most significant reason the number of fish passing through the ladders were so low.

Research has not been conducted to determine the efficiency of New Hampshire fish passages, but it is clear that some fish never make it by a dam, even if it has a fish passage and water conditions are stable. Some fish may follow a stream of water that leads to a dead end waterfall spilling over the dam while others may waste time trying to ascend a current originating from a nearby stormwater pipe.

River herring can not wait forever to get around a dam. Their biological clocks keep ticking and once the water temperature reaches the upper 70s, spawning stops. Some fish do spawn downstream of the dams but some simply do not spawn if they can not reach suitable habitat. Typically, there is only a window of four to six weeks when optimal spawning can occur.

Restoring river herring populations is a daunting task. Restoration ecologists generally agree that the chances of bringing back a healthy river herring population greatly increase if natural, undammed connections are made from the sea to freshwater spawning areas. Dams at the head-of-tide eliminate the natural, gradual transition between salt and freshwater.

Free-flowing rivers also improve water quality and enable natural riverine processes, such as nutrient and sediment transport.

Where dam removal is not an option, well-planned fish passages are an alternative that provide access for some fish to upstream habitat. This can be a good alternative when upstream water quality will support the native migratory fish.

Allowing a river to adapt to changing weather conditions instead of constricting it will, over the long term, improve the ecology and resiliency of the region. This is a good thing for both river herring and people.

Eye on Estuaries is an educational column initiated by the Piscataqua Region Estuaries Project (PREP) about coastal watershed issues. PREP is a collaborative program involving governmental agencies, universities, nonprofit organizations, businesses and the public to protect, enhance and monitor the environmental quality of the state's coastal bays and rivers. PREP is funded in part by a grant from the U.S. Environmental Protection Agency. For details, visit www.prep.unh.edu.

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