Indicator: Migratory Fish Restoration

Question

How many miles of main stem freshwater rivers are accessible to river herring in the Piscataqua Region?

Short Answer

As of 2016, 42% of the historical distribution for river herring in the rivers of the Piscataqua Region has been restored. Additionally, removal of the Great Dam in Exeter in July 2016 has improved/enhanced river herring passage on the Exeter River.

PREP Goal

Restore native migratory (diadromous) fish access to 50% of their historical main stem river distribution range by 2020 (from the PREP Comprehensive Conservation and Management Plan, PREP 2010).

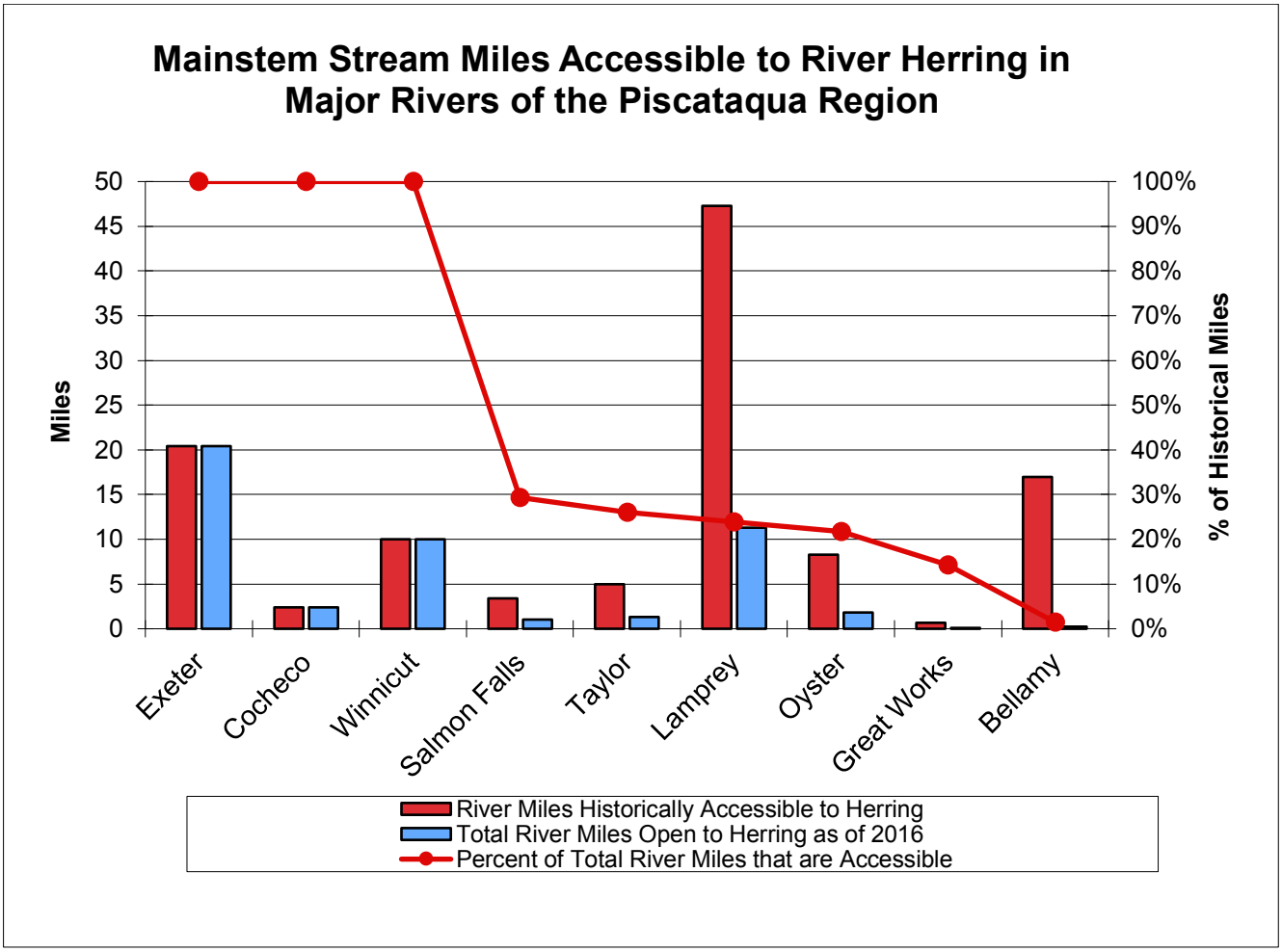

Figure MFR-1. Mainstem Stream Miles Accessible to River Herring in Major Rivers of the Piscataqua Region. River miles historically accessible to river herring and total river miles open to river herring as of 2016. Data Source: NH Fish and Game.

Why This Matters

Physical barriers such as dams and culverts can prohibit the movement of migratory fish between up-stream and downstream areas. Migratory fish – such as river herring – live mostly in saltwater, but travel upstream to freshwater to reproduce. Limiting passage to freshwater upstream can limit populations.

Explanation (from the 2018 State of Our Estuaries Report)

Coastal rivers of the Piscataqua Region historically supported abundant fish returns for river herring (alewife and blueback herring) and American shad. However, during the 19th century the construction of dams along coastal rivers limited access to freshwater spawning habitats (NHEP 2000). To support recovery of river herring populations in the 1950s, NH Fish and Game began efforts to restore access to historically accessible freshwater streams and ponds. Figure MFR-1 shows the historically accessible miles of freshwater in the main stem of each major river, and how many miles of freshwater habitat are currently accessible. For this indicator, fish ladders are considered to provide limited access for migratory fish, however, fish ladders on the Winnicut Dam in Greenland and former Great Dam in Exeter are inefficient at passing river herring to upstream spawning habitat.

For the Exeter, Cocheco, and Winnicut Rivers, 100% of freshwater miles historically accessible are once again open for fish passage as of 2017, assuming fish ladders provide limited access. Less than 30% access is open for the remaining main stem rivers. Overall, freshwater access for river herring has been restored to 42% of historical distribution within the main stems of the region's major rivers (Figure MFR-2).

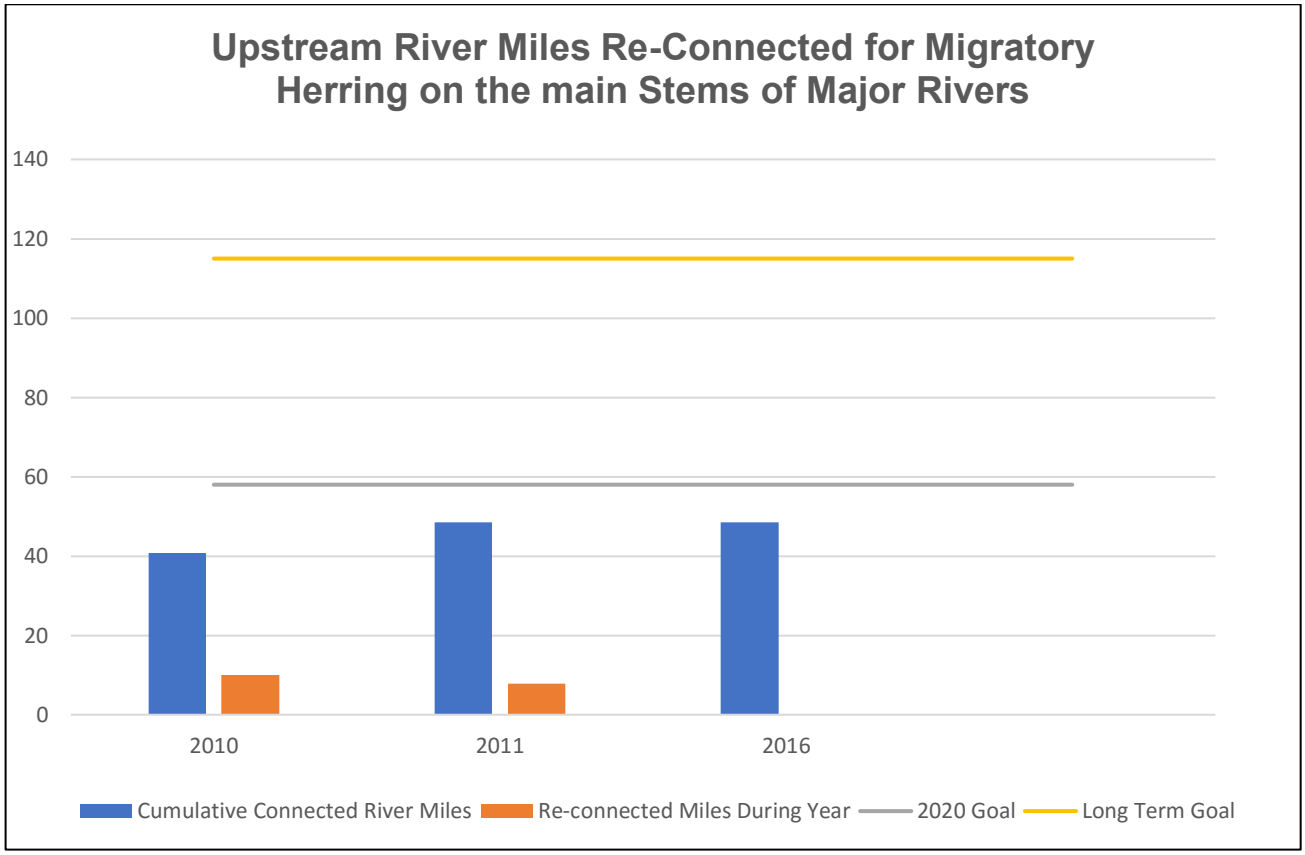

Figure MFR-2. Upstream river miles re-connected for migratory herring on the main stems of major rivers. The 2020 Goal is 58 miles: 50% of the historical extent, which is the long-term goal of 115 miles. Data Source: NH Fish and Game.

Methods and Data Sources

The cumulative mainstem river miles restored to date was calculated and compared to the historical river mileage baseline estimate of 114.5 miles. Restored river miles within the mainstem were divided by the historic mileage and reported as a percent completed.

Historical distribution of river herring along the mainstem portions of the region's major rivers was estimated and reported in the Great Bay Estuary Restoration Compendium (Odell et al. 2006) and Hampton-Seabrook Estuary Restoration Compendium (Eberhardt and Burdick 2009). These reports summarized data about the location of mainstem dams and the status of fish passage at these dams. Estimates of mainstem river miles were adjusted such that the location of head-of-tide was treated as river mile zero. This was done to acknowledge that herring have unobstructed access to the tidal portions of the rivers (which are part of the estuary), and to ensure that "upstream" river miles are reported as strictly the freshwater portions of the major rivers above head-of-tide. The historical distribution estimates are treated as the baseline mileage against which future improvements in fish passage around dams will be measured against. This indicator does not tally stream miles opened along tributary streams and does not account for obstructions to passage from dams and culverts located along tributaries or non-major river segments. This indicator considers dams with fish ladders to provide access for migratory fish although access is limited by the presence of the dam.

Data Sources

Data on upstream mainstem river miles restored for river herring access are obtained by PREP from NHF&G, the NH Coastal Program, and other fish passage restoration practitioners in the coastal watershed that have completed work on the mainstem segments of the major rivers.

The quality of the information for this indicator depends on the accuracy of the river mileage estimates reported for both historical distribution extent of river herring as well as the estimate for river mileage restored for upstream passage of river herring. The historical distribution estimates from Odell et al. (2006) and Eberhardt and Burdick (2009) are considered the best available estimates. These estimates are likely conservative in some cases, especially with regard to the historical extent of river herring within the Salmon Falls and Great Works river systems.

Additional Results (Beyond the Data Reported in the SOOE)

Major efforts are underway to restore river herring access to their historical freshwater ranges in order to support recovery of their populations. The Great Dam on the Exeter River was removed in the summer of 2016. In 2011, on the Lamprey River, a dam in Epping was removed. However, a partially breached dam at Wadleigh Falls between Wiswall and the former Bunker Dam site is not passable by river herring. Therefore, improvements at the Wadleigh Falls location are necessary for fish to take advantage of the passage opportunities in Epping. In 2012 on the Lamprey River, a new fishway was built at the Wiswall Dam, which is the next barrier upstream from the NHF&G owned fishway at the head-of-tide dam in Newmarket, NH. The Town of Durham built, maintains and operates the new fishway with technical assistance and monitoring provided by NHF&G.

Improvements to the fishway trap on the Cocheco may have increased returns for that river. In addition, NHF&G staff have been working with state, federal and other partners to initiate the removal of the Gonic Dam (in Rochester, NH) on the Cocheco River. New strategies are also currently being developed to address problems at the Taylor and Winnicut Rivers. In 2016, on the Taylor River, modifications to the existing fishway were implemented. At the same time, partners are determining whether to remove or modify the existing dam complex. On the Winnicut River, the dam was removed in 2009 in an attempt to restore access to 10 miles of upstream habitat. However, the resulting fish passage is now considered too narrow, creating water velocities that prevent fish from accessing upstream habitat. Solutions are in the process of being developed to address this issue.

For additional information, see the indicator "Migratory Fish" in this report as well as the 2016 NHF&G "Diadromous Fish Investigation" report (NHF&G 2017).

References Cited

Eberhardt AL, Burdick DM. 2009. Hampton-Seabrook Estuary Habitat Restoration Compendium. PREP Publications. 102. http://scholars.unh.edu/prep/102

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