Appendix 7

Response from US Fish and Wildlife to SFR Hydro's Request for a list of Diadromous Fish historically present in the Piscataqua River Basin Watershed

Subject: Re: Fwd: Diadromous species historically present in the Salmon Falls River near Milton, NH re LIHI application for SFR Hydro's South Milton Hydroelectric project
From: <John_Warner@fws.gov>
Date: 8/16/2012 3:07 PM
To: Stephen Hickey <sjh@essexhydro.com>

Steve - check out pages 35-37 of the Great Bay Estuary Restoration Compendium (link below) for species list and some historic information you can use - JW

http://des.nh.gov/organization/divisions/water/wmb/rivers/cocheco/documents/nhep_great_bay_restoration-tnc-06.pdf

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John P. Warner
Assistant Supervisor, Conservation Planning Assistance and Endangered Species
New England Field Office, U.S. Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, NH 03301
(603) 223-2541 - ext.15
(603) 223-0104 - FAX

www.fws.gov.northeast/newenglandfieldoffice
Stephen Hickey <sjh@essexhydro.com>

Stephen Hickey <sjh@essexhydro.com>
08/16/2012 09:08 AM

To John_Warner@fws.gov
cc
Subject Fwd: Diadromous species historically present in the Salmon Falls River near Milton, NH re LIHI application for SFR Hydro's South Milton Hydroelectric project

-------- Original Message --------
Subject: Diadromous species historically present in the Salmon Falls River near Milton, NH re LIHI application for SFR Hydro's South Milton Hydroelectric project
Date: Mon, 06 Aug 2012 14:52:54 -0400
From: Stephen Hickey <sjh@essexhydro.com>
To: John_Warner@fws.gov, john.a.magee@wildlife.nh.gov, "Henderson, Carol" <Carol.Henderson@wildlife.nh.gov>

Dear John, John and Carol:

Would you be able to provide me a comprehensive list of each diadromous species that historically but no longer uses the Salmon Falls River as well as confirmation that the South Milton hydroelectric dam located on the Salmon Falls River in Milton, New Hampshire is not responsible for the extinction or extirpation of the species? Condition 2.a. of the South Milton project's application for certification by the Low Impact Hydropower Institute requires such a statement in order to qualify the project as low impact.

For your reference I have attached to this email the project's FERC Exemption issued June 30, 1981.

Thank you and please contact me with any questions or concerns.

Sincerely,

Stephen Hickey
Hydro Management Group, LLC
as agent for SFR Hydro, INc. owner and operator of the South Milton Facility (FERC Exemption No. 3984)
55 Union Street, 4th Floor
Boston, MA 02108
tel: 617-367-0032
fax: 617-367-3796

[attachment "FERC Exemption P-3984_Milton Hydro.pdf" deleted by John Warner/R5 /FWS/DOI]

Attachments:

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Diadromous Fishes

Years ago there were so many salmon that, as an enthusiastic old friend once assured me, "you could walk across on them below the falls;" but now they are unknown, simply because certain substances which would enrich the farms are thrown from factories and tanneries into our clear New England streams. Good river fish are growing very scarce. The smelts, and bass, and shad have all left this upper branch of the Piscataqua, as the salmon left it long ago, and the supply of one necessary sort of good cheap food is lost to a growing community, for the lack of a little thought and care in the factory companies and saw-mills, and the building in some cases of fish-ways over the dams. I think that the need of preaching against this bad economy is very great. The sight of a proud lad with a string of undersized trout will scatter half the idlers in town into the pastures next day, but everybody patiently accepts the depopulation of a fine clear river, where the tide comes fresh from the sea to be tainted by the spoiled stream, which started from its mountain sources as pure as heart could wish. Man has done his best to ruin the world he lives in, one is tempted to say at impulsive first thought; but after all, as I mounted the last hill before reaching the village, the houses took on a new look of comfort and pleasantness; the fields that I knew so well were a fresher green than before, the sun was down, and the provocations of the day seemed very slight compared to the satisfaction. I believed that with a little more time we should grow wiser about our fish and other things beside. Sarah Orne Jewett. 1890

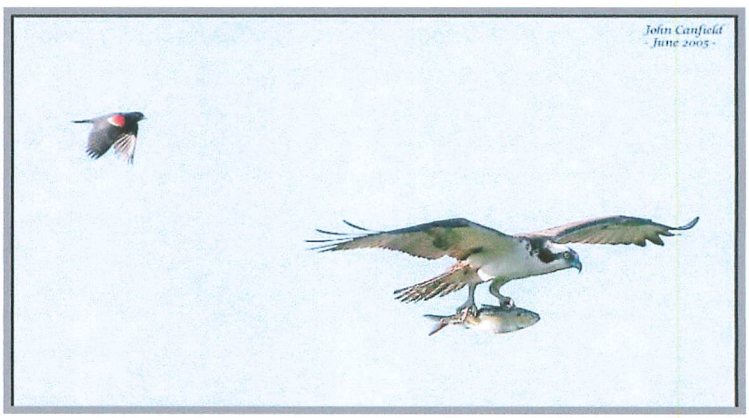
Juvenile Atlantic salmon spend up to three years in freshwater habitats. Eric Aldrich/TNC photo.

Diadromous fishes are those that migrate between fresh and salt water in their life cycle. These species are further classified as either anadromous, those fishes that live predominantly in saltwater and move to freshwater to reproduce (*e.g.* alewife, blueback herring, American shad, rainbow smelt, Atlantic salmon, Atlantic sturgeon, and sea lamprey) or catadromous, species that spend the majority of life in freshwater and migrate seaward to spawn (*e.g.* American eel). Within both riverine and coastal environments these species have specific habitat requirements for feeding, spawning and refuge. These requirements and stress associated with the physiological changes required to transition between fresh and salt water render these species extremely vulnerable to habitat impacts within freshwater and marine migratory corridors. In particular, juvenile salmonids, shad, and river herring are very sensitive to low dissolved oxygen levels, with altered behavior and severe stress at levels around 5 ppm, with near total mortality possible as levels approach 3 ppm. Low oxygen levels in impoundments behind dams that have fish ladders may currently be limiting diadromous fish populations in the Great Bay system. Low oxygen conditions can occur due to excessive nutrients and are exacerbated by low flow conditions that occur in part because of freshwater withdrawals for diverse human needs. In addition to the negative impacts of high water temperature and subsequent lowered oxygen levels, reduced summer flows

can also leave juvenile fish trapped in small impoundments and unable to migrate downstream to the estuary.

While quantitative data on historic distributions are scarce, there is more than ample anecdotal information to indicate that diadromous fishes were very abundant within the tributaries of the Great Bay estuary prior to the construction of dams. A pamphlet by Christopher Leavitt to England in 1623 cites abundant fish resources as the primary reason the region was settled by colonists in the early 17th century. Shad and herring were reported to be so abundant that settlers not only dried and smoked them for food over winter, but also used them as fertilizer for corn fields and were almost certainly found in every river system and nearly every large brook connected to the estuary. There are numerous historical records that attest to the former abundance of Atlantic salmon. Jackson (1944) writes "All accounts are in agreement that these early settlers found the rivers teeming with fish…should those settlers return now they would face real hardship in getting enough food from the river to carry them through a New England winter…Gone are the salmon which once crowded the mouth of the Salmon Falls, Exeter, and Lamprey Rivers…only a vestige of the shad, herring, and other fishes remain." Historic reports from C. F. Jackson and others also indicate that Atlantic sturgeon were once common in the Great Bay estuary. Jackson reported that they were harvested in abundance in the early 1800s, occasionally in the late 1800s and were only "accidentally" found at the time of writing, 1948. Town histories of Great Bay communities refer to the abundance of salmon in the Cocheco, Salmon Falls, and Lamprey Rivers and the drastic decline in this species following the installation of head of tide dams on each of the rivers. In addition to the construction of mill dams on New Hampshire waterways as early as the 17th century, other sources cite the abundant sawdust input from mills, sewage, agricultural runoff, other fish passage constraints such as culverts, fishing pressure and habitat alteration as causes of the decline of diadromous species.

Many dams still exist today, blocking fish movement between upstream and downstream areas. Restoration of diadromous fishes began in the 1960s and 1970s with the construction of fish ladders to facilitate fish movement across dams. Runs of several diadromous fish species currently move through fish ladders at seven dams on tributaries of Great Bay including alewives and blueback herring, American eels, lamprey, and, at some sites, American shad. While fish ladders improve access to upstream areas for some species, overall conditions are far from optimal. Salmon and sturgeon populations are virtually extinct in the region



Diadromous fish are an important part of Great Bay's web of life. John Canfield photo.

due to degraded habitat and fragmentation.

Dams are not the only barriers to fish passage. Many culverts used for road-stream crossings serve as barriers because of inadequate size, shape, design, installation, and maintenance. Historical stressors combined with rapid development and associated water and habitat quality issues threaten all diadromous species in the Great Bay region.

Both new and continuing efforts are being made to restore diadromous fishes to the region. American shad are transported from the Connecticut and Merrimac Rivers in Massachusetts and stocked above the Pickpocket dam on the Exeter River; this program has been in place since 1972. Intra and inter-basin transfers of river herring occur in the Lamprey, Cocheco, Winnicut, and Salmon Falls river systems. Projects to remove dams are in various stages on multiple rivers. The Bellamy IV dam was removed on the Bellamy River in 2004 opening up 0.25 miles of potential habitat to alewives, blueback herring, American eels, and rainbow smelt. The construction of a nature-like bypass channel is currently in the planning stages for the Wiswall dam on the Lamprey River. The Gonic Sawmill dams on the Cocheco River and the Winnicut River dam are currently under consideration for removal.

Diadromous Fish Restoration Methods

Dam Removal

Dam removal involves the removal or breach of an instream structure that diverts or impounds water. Dam removal can benefit all fish species that use riverine habitats. In addition to restoring fish passage to upstream areas, dam removal can increase fish habitat quality by restoring water flows, and in turn, sediment and nutrient flow. It may also restore a brackish salinity region that is important to the life histories of many fishes, including rainbow smelt. Furthermore, dam removal is a permanent restoration that will not require ongoing maintenance or attention.

Dam removal requires a large investment of resources, including time and money. Due to the changes in streamflow and sedimentation patterns that follow dam removal, such a project may not be feasible in developed areas due to adjacent and downstream land and/or water use. The resuspension of sediments that accumulate behind dams, which may contain toxins, can cause significant alteration and contamination of downstream habitats. The presence of rare or endangered species must be evaluated prior to dam removal. Increased flow rates downstream and lowered water levels upstream following dam removal may remove habitats important to the persistence of rare species.

Nature-Like Fishways

Nature-like fishways (NLF) have been constructed in Europe, Canada, Australia, and Japan and have recently become more accepted as a dam removal alternative in the United States. Each NLF is carefully designed to mimic the natural conditions in the river reach that has been blocked. Unlike fish ladders, successfully designed and