Jun 20th, 3:15 PM - 3:30 PM

Penobscot II: Penobscot Indian Nation: Land Management and Stream Connectivity

Daniel McCaw

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Merle Haggard
1937 - 2016
Penobscot Indian Nation: Land Management and Stream Connectivity

Fish Passage 2016
Amherst, MA
June 20, 2016
- Largest Watershed completely within the State of Maine
- Home of the Penobscot Indian Nation
- Long standing Atlantic Salmon Restoration efforts
- Historically little to no restoration of any other diadromous fish

- Alewife
- Blueback herring
- American shad
- American eel
- Brook trout
- Atlantic tomcod
- Striped Bass
- Atlantic Salmon
- Shortnose Sturgeon
- Atlantic sturgeon
- Rainbow smelt
- Sea lamprey
Recent Happenings in the Penobscot River...

• Penobscot River Restoration Project

*The Penobscot River Restoration Project* is one of the largest, most creative river restoration projects in our nation's history. In an unprecedented collaboration, hydropower company PPL Corporation, the Penobscot Indian Nation, six conservation groups, and state and federal agencies, are working together to restore 11 species of sea-run fish to the Penobscot River, while maintaining energy production. Successful implementation of the project will revive not only native fisheries but social, cultural and economic traditions of New England's second largest river- the Penobscot.

www.penobscotriver.org
Great Works Dam, removed 2011/2012

Bridget Besaw photos

Veazie Dam removed 2013/2014

Cheryl Daigle photos
“NOAA has chosen two sites in the North Atlantic—the Penobscot River watershed in Maine and the Choptank River watershed in Maryland and Delaware—as the next Habitat Focus Areas under NOAA’s Habitat Blueprint” 2014

Projects Underway
NOAA is currently working with partners and local communities on efforts such as:
- Identifying priority areas for fish passage
- Removing dams
- Constructing fishways to allow access to thousands of acres of spawning habitat for alewives
- Replacing culverts in habitat for endangered Atlantic salmon and eastern brook trout
- Conducting pre- and post-monitoring of restoration projects to look at ecological results—to assess impacts on fisheries, water quality, and changes in water surface elevations
Also happening…..

• Two new fishways being evaluated (Milford, Orono)
• Howland bypass complete 2015
• Weldon Dam relicensing, complete in 2018
• Upcoming West Enfield Dam relicensing, starts in 2018
• University of Maine research projects
• Maine DMR alewife stocking
• Etc, etc, etc, ….

• …………..so, ……….Momentum!!
Tribal Projects

- Three lake outlet “rebuilds”
- Many culvert projects
- Alewife stocking/”seeding”
- Atlantic salmon egg planting
Mattamiscontis Lake Outlet

- Real issues at low flows
- Water sieving through the rocks
- Alewife juveniles stuck and dying
Completed project in 2012

-Weirs are started to crumble in 2014

Potential issues

-channel too wide

-weirs had no footers
Upper Two Weirs have failed  
Bank erosion, gravel filling

However, still have defined channel, juvenile alewives were pouring out in 2015, and many lessons learned!
East Branch
Lake outlet
-47 CFS
-12-15 feet/second
-Velocity Barrier!!
-2016?
1. The intent of this project is to maintain a summer low flow reach in water surface elevation of 94.5 ft. Based on collected data logger information as well as hydraulic modeling efforts. For this reason, the USFWS recommended widening the streambed width to 25 ft in order to reduce the stream power in the backwatered area as well as construction of the three rock weirs. A distance of 15 ft apart to break up the 8% slope into three. The hydraulic drops that are conducive for upstream and downstream fish passage.

2. Rock weirs shall be shaped as an arch with an arm angle of 20-30 deg from the bank in order to concentrate flows towards the center of the channel as well as ensure stability by adjacent rocks supporting each other.

3. Footer rocks will descend below final grade and just downstream of the weir rocks. Their purpose is to prevent scour below the weir rocks. They should not be positioned too far downstream of the weir rocks to create a splash pad that could impede fish passage.

4. In cross-section, the top of the weir rocks will slope towards the apex at a 3-5% slope. This slope is to be extended into the bank at least to bankfull elevation to prevent outflanking.

5. Seal material (gravel) will be placed upstream of each weir as well as geotextile fabric (see sheet 7) in order to prevent permeability and leakage.

6. Selected boulders to construct the weirs should be blocky in shape with all dimensions approximately 2-3 ft. As shown below. Construction of all six weir structures will be approximately 35-40 rocks per weir, a total of 105-120.

Recommended General Boulder Shape:

- Elevation, ft
- Scale

Typ Cross-Section:

- Existing Streambed
- Low Flow Notch Invert (±2' width by 1.5' height)
- Footer Rocks
- 3-5% Arm Slope

Area to Cut (~80 cubic yards)

Grade Banks to 2H:1V

Existing Pool

Existing Edge of Water

Footer Rocks

Low Flow Notch (~2.0 ft Width)

BOULDERS TO PREVENT OUTFLANKING

25' = Bank Full Width

1/3 Bank Full (~8 ft)

Notes:

- Measurements and dimensions are approximate and subject to change based on site conditions.
- Suggested modifications may be necessary to ensure compliance with environmental regulations.
- Consult with local authorities for proper permits and certifications.

Proposed Conditions 1

Site:

- Last Branch Lake, ME
- Proposed Conditions 1

Engineer:

- Hite, P.E., Fish Passage Eng., USFWS
South Branch Lake Outlet

-No defined zone of passage

-Lake level issues and concerns

-2016 Construction
Culverts and more culverts!
- Three were replaced in 2015
- Three in 2016......rinse and repeat.
Three arched culverts installed in August and September of 2015.

Designed at 1.2-1.8 Bankfull width

Floodplain relief culverts

On September 30th, 4-6” of rain in 24 hours.

All three culverts survived and the road was not over topped.

Victory was ours!!
Many thanks to the following for their help and support!!!!

-USFWS
-NMFS/NOAA
-USDA/NRCS
-MDMR
-ASF
-TNC
-PRRT
-TML
-ACDC
-NWA

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