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Session C3 - Pullen Mill natural Constructed Pool and Weir Fish Passage Project

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Pullen Mill Natural Constructed Pool and Weir Fish Passage Project

Presented by;

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USDA/Natural Resources Conservation Service
Bangor, Maine

National Conference on Engineering and Ecology for Fish Passage
June 5, 2012 – University of Massachusetts Amherst
Speepscot River Watershed Basic Information

- 360 square miles (including Sheepscot bay)
- 58 miles long (west branch 15 miles long)
- 40 lakes and ponds
- Atlantic salmon (2000 ESA DPS watershed)
- Striped bass, shortnose sturgeon, American shad, eel, and alewife
- 42 total dams
Pullen Mill Site

Project sponsor:
Sheepscot River Watershed Council
Pullen Mill Site

NRCS financial and technical assistance provided through the Wildlife Habitat Incentive Program (WHIP)
Pullen Mill Dam
Operational Saw Mill
1850s
Fishway proposed around left side of remnant mill dam
Preconstruction Location of Proposed Fishway
Lower End/Inlet of Proposed Fishway
Design Criteria and Considerations

• Limited access, remnants of historic dam
• Pool and weir fishway
• Bypass main channel, use “natural” onsite material
• Total capacity approx. 20% May mean monthly flow (determined by nearby gauging stations) \((Q = 7 \text{ cfs})\)
• Low flow weir 50% August mean flow \((2.5\text{ cfs})\)
• 6 inch pool drop \((h)\) (total drop 2.5 to 3.0 ft.)
• Pool size based on EDF \((yQh/V) = 3.6\) \((V = 60 \text{ cu. ft}; 5 \text{ ft. long}, 6 \text{ ft. wide}, 2 \text{ ft. deep})\)
TOP OF WER A AT THE BEGINNING SHALL BE AT THE SAME ELEVATION AS THE EXISTING DAM ACROSS THE STREAM.

TOP OF WER A

TOP OF WER B

WATER LEVEL 7/20/2010

WER 1

WER 2

WER 3

WER 4

WER 5

LEAVE AREA TO ALTER FOR WERS

WER 1

WER 2

WER 3

WER 4

WER 5

CREATE 6 POOL/WEIRS BY SHAPING EXISTING LEDGE OR USING BOULDERS AND GRAVEL FOUN DSITE. 5' VERTICAL DROP AND 5' SPACING BETWEEN POOLS.

PROPOSED FISHWAY CENTERLINE PROFILE.

THE FINAL LOCATION OF THE POOLS AND WEIRS WILL BE DETERMINED DURING CONSTRUCTION BASED ON SPECIFIC SITE CONDITIONS.

72' POOL WIDTH

60' WER WIDTH

12'

9'

9'

9'

12'

TYPICAL POOL WER CONFIGURATION—CROSS SECTION

NO SCALE

SINCE EXCAVATION OF BEDROCK OR THE USE OF EXISTING "ON-SITE" ROCK WILL BE NEEDED TO CONSTRUCT THE WEIRS, THE CONSTRUCTED SHAPE AND DIMENSIONS OF THE WERS MAY VARY FROM WHAT IS SHOWN ON THE DRAWING. THE LOW FLOW WEIRS MAY HAVE AN UNEVEN CREST BUT SHOULD NOT VARY MORE THAN 3 INCHES VERTICALLY. THE DRAWING SHALL BE USED AS A GUIDE ONLY - THE CONSTRUCTED WERS SHALL BE "FIT IN THE FIELD" AS APPROVED BY THE NRCS.

<table>
<thead>
<tr>
<th>WER NUMBER</th>
<th>ELEVATION CREST WER B</th>
<th>ELEVATION POOL BOTTOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>97.8</td>
<td>95.8</td>
</tr>
<tr>
<td>2</td>
<td>97.3</td>
<td>95.3</td>
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<tr>
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<tr>
<td>4</td>
<td>96.3</td>
<td>95.3</td>
</tr>
<tr>
<td>5</td>
<td>95.8</td>
<td>94.8</td>
</tr>
</tbody>
</table>
**Sediment Basin Construction Notes:**

- Sediment basin should be sized to a minimum of 8 standard straw bales per level, stacked 2 bales high or sized according to pump flow capacity.
- Should be placed a minimum of 100 ft from the nearest flowage and out of wetland area.
- Discharge shall be directed towards a well-vegetated buffer zone.
- Straw bales shall be staked at each level to secure the sturdiness of the basin walls.
- Ensure that the filter fabric material is draped over entire structure and secured outside of basin.
- Place stones or weights along the apron of the geo-textile fabric to keep the fabric in place while water from pumped out is filtered.

**Construction Notes:**

- Turn the ends of the straw bale sediment trap up slope 1-2 feet in elevation to prevent flanking.
- The straw bales shall be placed together as tightly as possible.
- The first anchor stake shall be driven toward the previously anchored bale to create a tight fit.
- Discharge shall be directed towards a well-vegetated buffer through sheet flow and should be located the furthest distance from a water resource as possible.

**Note:** Sediment and erosion control and dewatering plans shall be pre-approved by the NRCS prior to the start of construction. They shall follow Maine DEP erosion and sediment control BMP's. The controls shall be installed before any soil moving activities are started and shall be inspected regularly for effectiveness during construction. The examples shown here are typical drawings only and are intended to provide the client with an idea as to what may be required at the construction site.
Approximate spring migration flow rate
Pullen Mill Bypass Dedication Ceremony

Sheepscot River Watershed Council
Pullen Mill By-pass

Dedicated on May 18, 2012 to the Memory of

Dr. Melissa Laser

Her work with the Department of Marine Resources is a source of inspiration for all who care about Maine’s rivers and the creatures that rely upon them, in her words:

“Atlantic Salmon are creatures of the Forest”
Natural fishway pool and weir design
Questions??

Photo Courtesy Jim MacDougall