



Poorfarm Brook Large-Wood Restoration Project Gilford, NH

Review Completed by: Joel DeStasio
Major Catchment: Lake Winnepesaukee

Project Completion Summary

During the 2018 summer field season, Trout Unlimited field staff completed instream large-wood habitat restoration work on Poorfarm Brook in Gilford, NH. This project was initiated by the Belknap County Conservation District with the assistance of grants provided by The New England Forests and Rivers Fund and the New Hampshire Conservation & Heritage License Plate Program (Moose Plate). We would like to thank Belknap County, Gunstock Ski Resort, the Gunstock Acres Common Property Trust, the Gunstock Village Water District, and The New Hampshire Department of Natural and Cultural Resources for their cooperation, permission, and assistance in completing this restoration of Poorfarm Brook. We would also like to thank The New Hampshire Department Fish & Game for their support and assistance with monitoring the local fish population of Poorfarm Brook prior to the implementation of this project.

The total 2.9-mile project reach of Poorfarm Brook extends from the Gunstock reservoir dam (N 43.541815°, W -71.351621°) to the Lake Shore Road (Rt. 11) crossing (N 43.572230°, W -71.355603°). Along this reach of Poorfarm Brook, a total of 96 instream large-wood structures were installed with the goal of creating and enhancing instream habitat for the local fish population, slowing water velocities, and trapping sediment.

Included in this report are a description of the methods used for this project, as well as a selection of photographs of instream large-wood structures that were installed along the 2.9-mile project reach of Poorfarm Brook. Maps included in this report indicate the locations where large-wood structures were installed along this reach.

Project Area Map



The above map shows the entire 2.9-mile project reach of Poorfarm Brook, extending from the Gunstock reservoir dam to the Lake Shore Road (Rt. 11) crossing.

Methods & Strategies

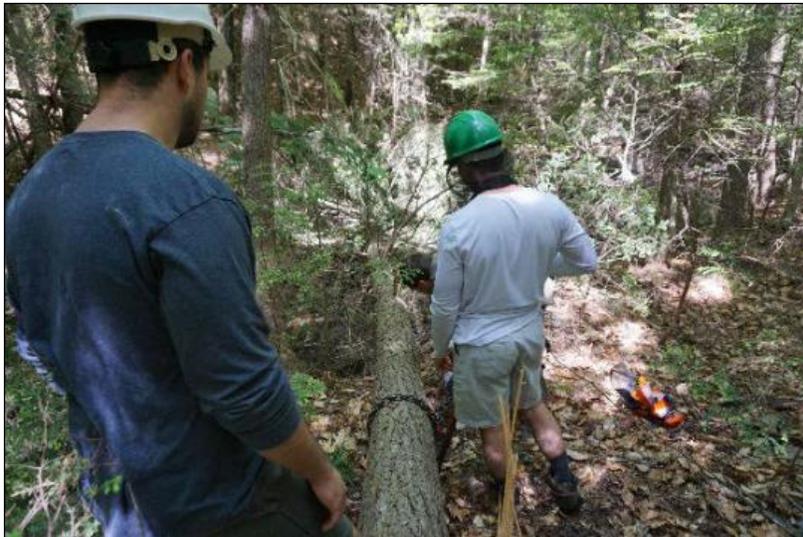
Restoration work began on Poorfarm Brook on June 12th, 2018 and was completed on July 13th, 2018. For this project, Trout Unlimited employed a field team of six (6) crew members, consisting of two (2) sawyers and four (4) field technicians. This group was divided into two (2) individual teams, with each team consisting of one (1) sawyer and two (2) field technicians. To construct instream large-wood structures, trees within the riparian area were felled by team sawyers directly into the stream channel using Husqvarna Rancher 455 chainsaws. No trees with rootwads forming/securing the streambanks were felled; the purpose of this was to maintain bank integrity and to prevent bank erosion. After trees were felled, team field technicians used a Tractel TU-17 griphoist to move and maneuver trees into position. This was done to secure added wood into the stream channel and prevent wood mobility during high flow events.

As mentioned earlier, the goal of this project was to enhance aquatic habitat for eastern brook trout and other native fish species by increasing the hydraulic and morphologic complexity of Poorfarm Brook. Constructed instream large-wood structures

have the ability to control flow energy expenditure, sediment transport, and channel morphology, creating greater habitat diversity. A lack of instream large-wood can result in increased flow energy, which moves sediment out of the system and has the potential to erode the streambed and streambanks. This can lead to channel incision, which interrupts floodplain connectivity, and poor habitat conditions.



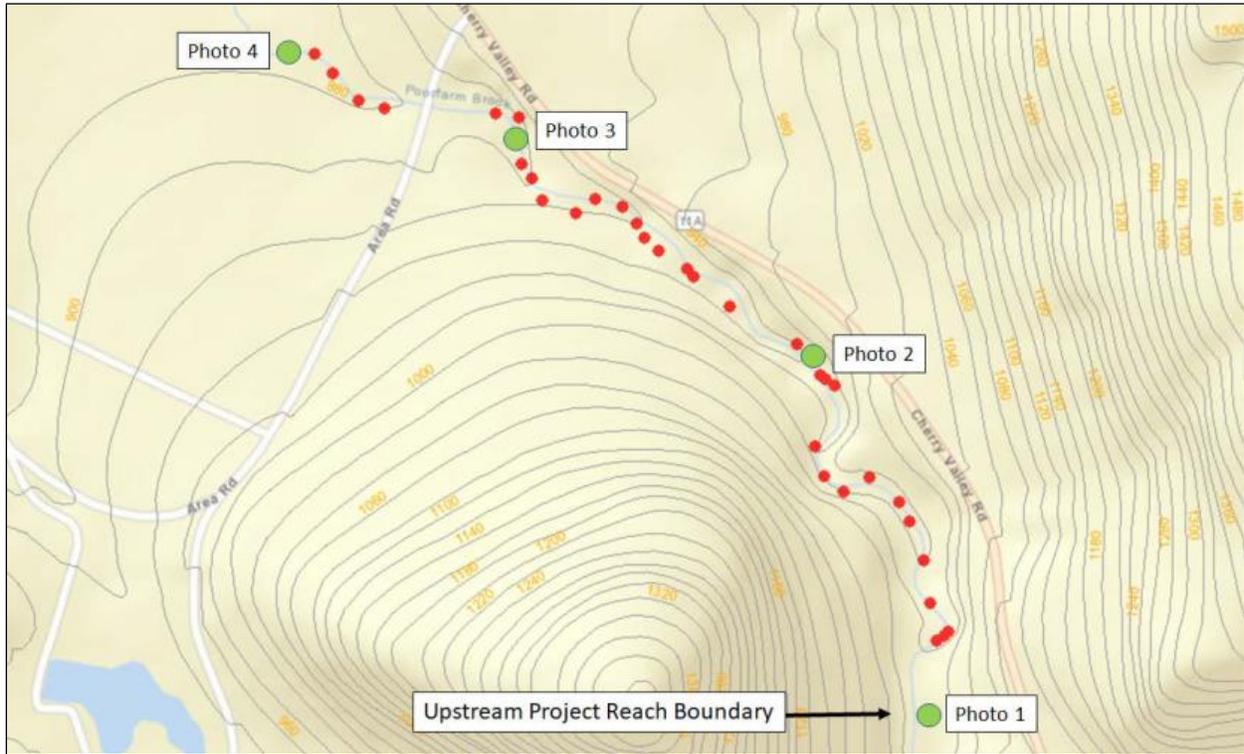
Team sawyer Joel DeStasio felling a tree into the stream channel.



Field technicians Luca Trotta & Drew Dunlap setting up the grip hoist to move a felled tree into position.

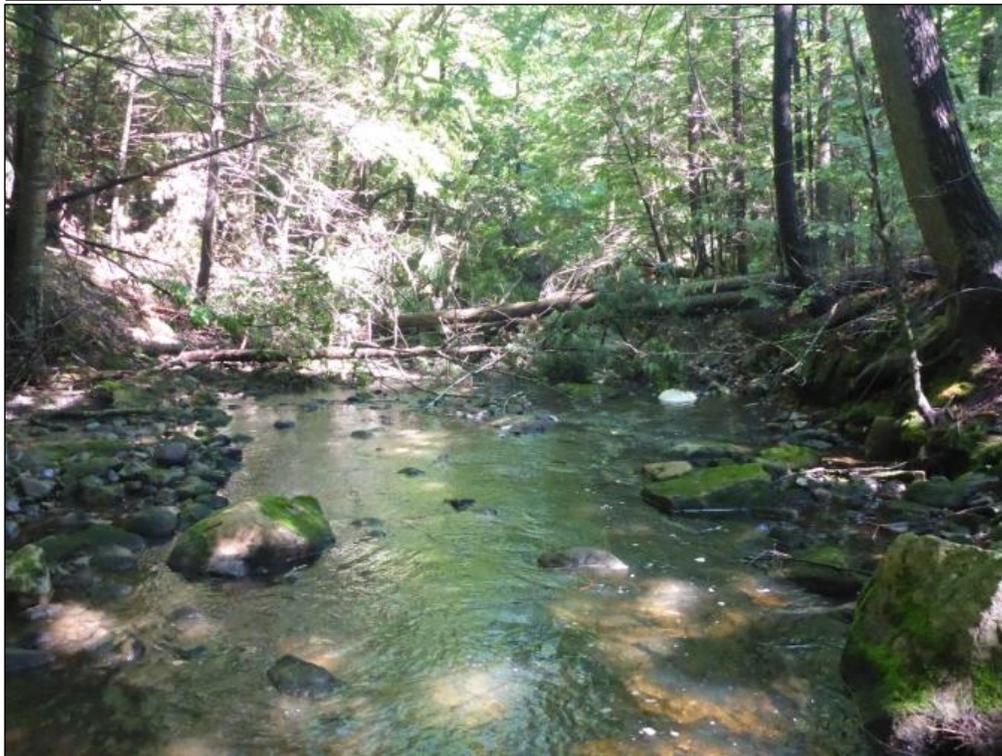
Added instream large-wood structures are not intended to act as impervious/non-porous barriers. Wood was added to the stream channel with the intention of allowing for the passage of both water and aquatic organisms. As these structures develop over time, they will sequester sediment and organic matter, which may create a step/pool hydraulic and encourage the formation of downstream riffle reaches but should not prevent aquatic organism passage (AOP).

Reach 1: Gunstock Reservoir Dam to North-Western Belknap County Property Boundary



The above map shows the locations of installations 1-37 (red & green dots), located on the Belknap County (Gunstock ski resort) property reach of Poorfarm Brook. Green dots correspond to the below photographs.

Photo 1:



Installation Site 1: N 43.54228°, W -71.35165°. Three eastern hemlocks were added to this location.

Photo 2:



Installation Site 16: N 43.54673°, W -71.35358°. One eastern hemlock, one beech, and one red maple were added to this location.

Photo 3:



Installation Site 30: N 43.54919°, W -71.35808°. One eastern hemlock and one red maple were added to this location.

Photo 4:

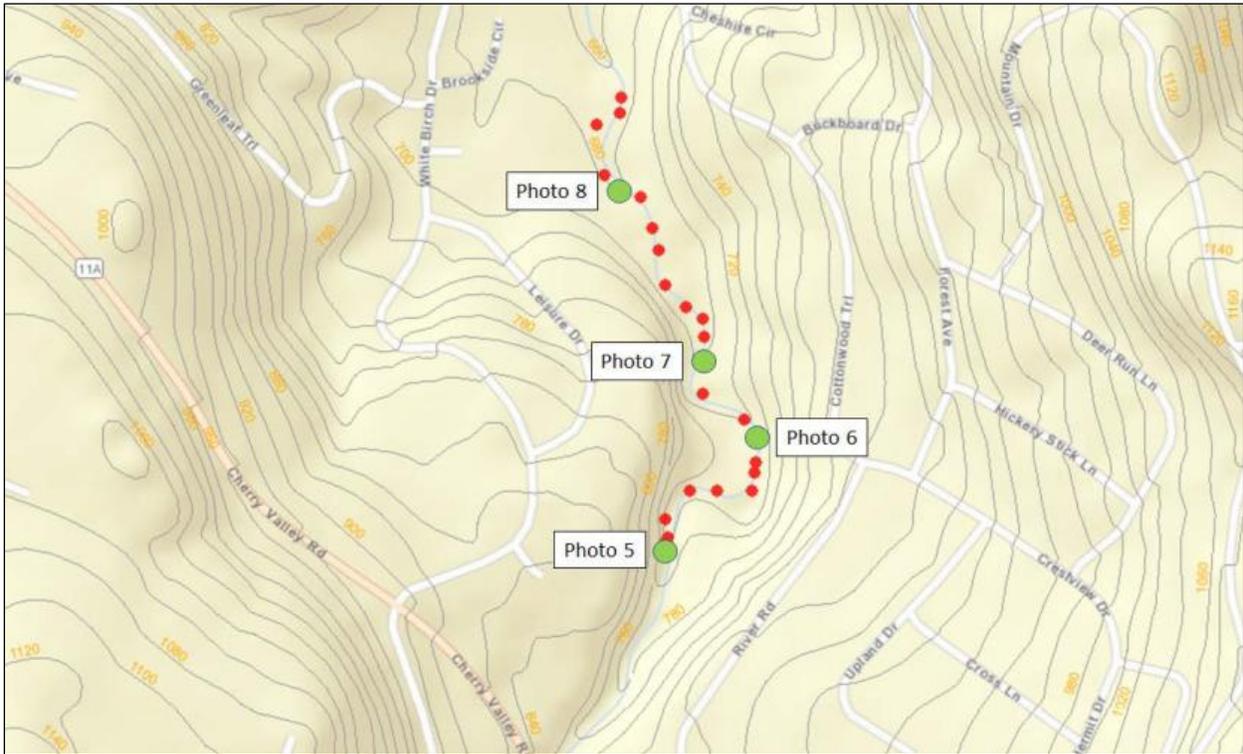


Installation Site 37: N 43.55024°, W -71.36188°. One eastern hemlock, one yellow birch, one linden, and one american elm were added to this location.

Reach 1 Summary:

This 6,300-foot reach of Poorfarm Brook is located on the Belknap County (Gunstock Ski Resort) property, with an average bankfull width of 23.4 feet. Along this reach, a total of 37 large-wood structures were installed, using trees with an average diameter at breast height (DBH) of 18.4cm. With concern regarding the possibility of wood mobilization during high-flow events within this section of Poorfarm Brook, large-wood structures were not installed within 500 feet upstream of the Panorama Drive (Gunstock entrance road) crossing. Added large-wood to this reach will encourage the formation and deepening of pools and scour banks, which are used by fish as refuge from high water velocities and shelter from overhead predators. Additionally, added large-wood to the lower section of this reach will facilitate reengagement with overflow chutes, which will decrease water velocities during high-flow events as well as reengagement with surrounding floodplains. Hiking/snowshoeing trails that run along a large portion of this reach will provide easy access for future monitoring of added large-wood.

Reach 2: Cherry Valley Road (Rt. 11A) Crossing to Silver Street Crossing



The above map shows the locations of installations 38-62 (red & green dots), located on the Gunstock Acres Common Property Trust property reach of Poorfarm Brook. Green dots correspond to the below photographs.

Photo 5:



Installation Site 38: N 43.55814°, W -71.36194°. One eastern hemlock was added to this location.

Photo 6:



Installation Site 47: N 43.55946°, W -71.36046°. One eastern hemlock and one beech were added to this location.

Photo 7:



Installation Site 50: N 43.56034°, W -71.36129°. Three eastern hemlock were added to this location.

Photo 8:



Installation Site 58: N 43.56243°, W -71.36277°. Two eastern hemlock were added to this location.

Reach 2 Summary:

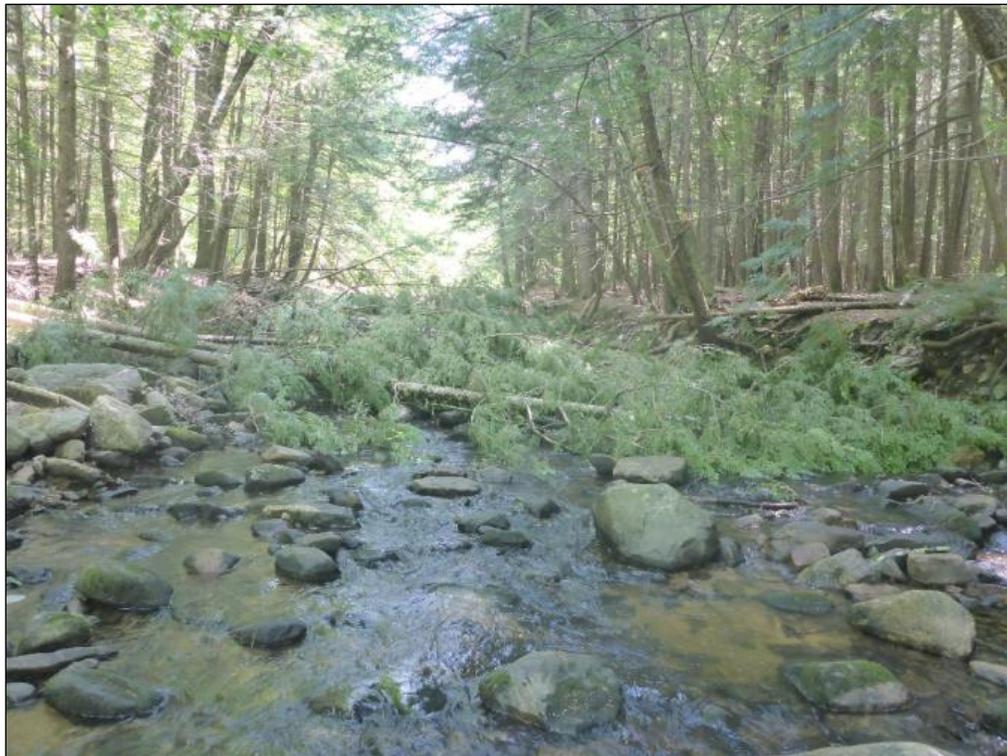
This 4,700-foot reach of Poorfarm Brook is located on the Gunstock Acres Common Property Trust property, with an average bankfull width of 30.1 feet. Along this reach, a total of 25 large-wood structures were installed, using trees with an average DBH of 21.7cm. With concern regarding the possibility of wood mobilization during high-flow events within this section of Poorfarm Brook, large-wood structures were not installed within 500 feet upstream of the Silver Street crossing. Large-wood structures were added to this reach beginning approximately 1,000-feet downstream of the Cherry Valley Road crossing, due to a steep cascade and private parcels directly abutting the brook. The substrate of this reach consists of a mix of boulders and large cobbles, which create natural step-pool hydraulics. Large-wood structures were added to sections devoid of large-wood, with the goal of creating aquatic habitat and reengagement with surrounding floodplains during high flows.

Reach 3: Silver Street Crossing to Lake Shore Road (Rt. 11) Crossing



The above map shows the locations of installations 63-96 (red & green dots), located on the Gunstock Village Water District property & Ellacoya State Park reach of Poorfarm Brook. Green dots correspond to the below photographs.

Photo 9:



Installation Site 65: N 43.56625°, W -71.36320°. Four eastern hemlock were added to this location.

Photo 10:



Installation Site 73: N 43.56759°, W -71.36213°. One eastern hemlock and one red maple were added to this location.

Photo 11:



Installation Site 83: N 43.56861°, W -71.35796°. Two eastern hemlock were added to this location.

Photo 12:



Installation Site 94: N 43.57103°, W -71.35706°. One eastern hemlock and one black birch were added to this location.

Reach 3 Summary:

This 4,300-foot reach of Poorfarm Brook is located on the Gunstock Village Water District & Ellacoya State Park property, with an average bankfull width of 30 feet. Along this reach, a total of 34 large-wood structures were installed, using trees with an average DBH of 21.3cm. With concern regarding the possibility of wood mobilization during high-flow events within this section of Poorfarm Brook, large-wood structures were not installed within 500 feet upstream of the Lake Shore Road (Route 11) crossing. Although lacking, this reach of Poorfarm Brook featured the most naturally occurring instream large-wood. Additional large-wood was added to existing natural instream structures with the goal of increasing beneficial hydraulics, encouraging the development of pools and riffle reaches.