Eastern Brook Trout Joint Venture

Completed Project Report Form

Project Title: 'Chop and Drop' in the Sunday River, Maine: A NFHAP project for an EBTJV intact status subwatershed

- **Partners Involved:** U.S. Fish & Wildlife Service, University of Maine, Maine Department of Inland Fisheries & Wildlife, Town of Newry, Maine Department of Conservation – Bureau of Parks & Lands, Androscoggin Valley Council of Governments, Maine Department of Transportation, Trout Unlimited, private landowners

- **Project Costs:**

1. Total Cost: $326,928
2. Non-federal amount: $261,400
3. Federal amount: $65,538

- **Funding Sources:** Eastern Brook Trout Joint Venture, Town of Newry, Trout Unlimited, Maine Department of Transportation

- **Action strategy implemented in the project (according to EBTJV range wide, regional, or state level habitat strategies).** The project addressed the following strategy identified in Maine's Brook Trout Species Plan: "Environmental degradation from streamside cutting, development, and pesticide/herbicide application threaten some stream fisheries." (Bonney 2001). The associated strategy calls for "Continue[d] cooperation with other state and federal agencies charged with evaluating and enforcing these areas of degradation…[and to] inform the public and encourage interest and participation in addressing these issues." (ibid.)

  Our project was wholly consistent with many of the Priorities, Goals and Strategies outlined in EBTJV's Conservation Plan for Maine. For Priority 1 (Assessment), our plan monitored trout current status and future responses, which helped "maximize the contribution of wild brook trout stocks to the fishery" (Goal 1.3), via Strategy 4 ("continue annual monitoring of wild brook trout streams for fishery independent estimates of population status, fish condition, and size/age structure").

  For Priority 2 (Habitat), our activities helped "restore degraded brook trout habitats" (Goal 2.4) via Strategy 1 ("increase collaborative partnerships with State, Federal, Tribal and private entities to implement stream restoration projects") and Strategy 2 ("monitor efficacy of implemented projects for ecological responses and indicators of success"). Furthermore, our activities "prevent continued degradation of brook trout habitats" (Goal 2.5) via Strategy 1 ("work with landowners to…protect or restore streambank stability, eliminate erosion and sedimentation concerns, maintain shading and thermal regimes, and reduce rapid precipitation runoff").

For Priority 3 (Outreach), our project "raises awareness of Maine's wild brook trout resources" (Goal 3.1) and, by involving private landowners, helped "foster public/private collaborative stewardship of brook trout resources" (Goal 3.2) by "inform(ing) the public and encourage(ing) interest and participation in addressing environmental issues" (Strategy 1). Results from this project will "contribute toward public policy that includes brook trout population health and sustainability as positive indicators toward improving or enhancing environmental quality" (Strategy 3).

Expected increases in brook trout abundance and mean size should also contribute to "optimizing angling opportunities for wild brook trout" (Priority 4, Goal 4.1)

Aside from the on-the-ground benefits of our project towards meeting the above goals and priorities set by the State of Maine and by EBTJV as a whole, our project also is consistent with the "Research Strategies" set forth in the range-wide EBTJV Conservation Plan. Specifically, our project used "effectiveness monitoring when cause-and-effect relationships between habitat improvement and brook trout population responses are being established. The design of effectiveness monitoring requires data be collected simultaneously at both treatment and control sites before and after treatment", which was a strength of our project.

- **Priority score of the sub-watershed where the project took place:** Both the Sunday River and Bear River Watersheds (which are sub-watersheds of the Androscoggin River) have priority ratings of 1.66, and the brook trout status is "intact" for each.

- **Describe any additional species of greatest concern or the state wildlife action plan listed habitat conservation goal(s) supported by the project:** Historically, the Androscoggin River Watershed provided spawning and nursery habitat for sea-run Atlantic salmon. The Maine Department of Marine Services stocks Atlantic salmon fry and smolts in tributaries to the Androscoggin, and small numbers of adults return to the river annually.

  Recently, the Androscoggin River from the sea up to Rumford Falls was designated as critical habitat for Atlantic salmon. Habitat restoration for brook trout will also benefit current and future spawning and nursery habitat for anadromous Atlantic salmon.

- **Description: project objective(s):** The following quotation in italics is from the original grant proposal in 2006: *"We are proposing to evaluate the effects of the large woody debris additions of 2007 in low order streams for attenuating flows. We recognize that, if this experiment proves successful, additional sites will need to be treated to achieve basin-wide flow moderation. We also anticipate that pool creation and nutrient-trapping will enhance brook trout habitat in the immediate treatment area as well as downstream."*

- **Methods used:** Initially, two half mile-long reaches of two Sunday River headwater tributaries were treated by adding coarse woody material. A nearby tributary was not treated and was used as a control. When two Bear River headwater tributaries were added to the study in December 2008, a half mile reach of each stream (Branch Brook and Chase Hill Brook) was treated by adding coarse woody material.

After treatment with coarse woody material, annual monitoring was undertaken at all treated reaches in the Sunday River and Bear River Watersheds, as well as at the control site. Monitoring included surveying longitudinal profiles and cross-sections, pebble counts, water level measurement, and biological monitoring of brook trout, aquatic insect and amphibian populations.

- **Project outcomes: Describe outcomes and whether or not the objectives were met. If not why? What lessons were learned?** The objective of evaluating the impacts of adding CWD to streams in order to attenuate flows was successful; it appears that stream response where CWD was added is showing positive trends in reducing flashiness of flows, improving brook trout habitat, and trapping sediment. However, one of the lessons learned seems to be that a longer monitoring period than the three-year life of the project is needed. For example, brook trout populations just now are reaching pre-treatment levels following the disruptions caused by chop and drop addition in 2007. (Refer to the section below that describes trout response.) It is thought that this positive trend will continue in future years after this project ends. Likewise, surveying indicates there is a trend toward increased brook trout habitat complexity, sediment trapping, and water level attenuation, all of which are desirable, but the process will take longer than the three-year life of the project. During this project, ARWC staff observed several things: 1) It appeared to take about two years after cutting for the CWD to settle and "sort itself out" to form distinct and well-defined dams; and 2) Where there is more leaf litter, it really helps to "pack" the debris dams. This was noticeable when contrasting treatment sites #1 and #2 on the Sunday River: treatment site #2 has more hardwood trees along the banks and showed a greater degree of leaf-packing, dam development, habitat creation, and sediment deposition, whereas treatment site #1 has more evergreens along its banks and consequently less leaf-packing. This treatment site did not show the response that neighboring treatment site #2 did. Overall, it appears chop and drop can be a relatively inexpensive and simple method to attenuate variability in flows, create, improve and restore brook trout habitat, and trap sediment. These are all important objectives in the sub-watersheds that were studied, as well as elsewhere throughout northern New England. However, in-depth monitoring needs to be continued longer than a period of three years and is paramount to the future plans for continued brook trout habitat conservation efforts in these sub-watersheds and elsewhere.

- **What is the Brook trout population response to the project outcome?** The following is from the 2010 biological monitoring report submitted by the University of Maine: "*The extremely low abundance of naturally-derived CWD in streams is probably typical of the region, and most likely results from intensive past logging and current lack of large trees available to recruit naturally into the stream. Clearly, adding CWD as part of a restoration effort provides a stronger but briefer pulse of physical disturbance than does natural recruitment of trees into the stream channel. Many felled trees do not even reach the stream channel immediately after treatment, and even those that do seem to move considerably before reaching a constriction point at which they can begin forming debris jams and redirecting flows. Because large quantities of unstable CWD are present immediately after addition and take some time to "settle", it is not surprising that brook trout did not respond positively immediately, or even responded negatively initially, to treatment. If CWD addition does benefit brook trout, we wouldn't expect to see responses*

until several years after treatment. ***For example, both treatment tributaries in the Sunday River (SRTCWD1South and SRTCWD2North) showed high initial values in abundance and biomass of adult brook trout, then dramatic declines immediately after treatment, and then a steady increase over time, with our final estimates approaching or exceeding pre-treatment values. This would seem to indicate that the treatment itself acted as a catastrophic disturbance to trout in the stream, and trout populations have been recovering since."*** (Emphasis added for purposes of this report.)

- **If applicable, what is the number of stream miles and or acres of brook trout habitat?:**

A. Protected: N/A

B. Restored/Enhanced: 2 miles

- **If applicable what is the number of stream miles and or lake/pond acres of brook trout habitat gained access to as a result of removing a fish barrier. Include the # of fish barriers removed?** N/A

- **If applicable, what is the number of stream miles and or lake or pond acres of brook trout habitat with sediment, phosphorous, or nitrogen inputs that were rehabilitated to within 25% of natural or other desired levels such as numeric state water quality criteria?** N/A

*****<u>*Please include before and after photos of the project.*</u> *****

U.S. Fish & Wildlife Service

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Product Description (image number, subject, horizontal/vertical, location, title, etc.): 5 photographs 1) Branch Brook, view upstream @ twitch road xing 9/6/08; 2) Chase Hill Br. up stream from bridge 12/16/08; 3) EBTJV Branch Brook 121608 001; 4) EBTJV Chase Hill Brook 12/16/08 001; 5) flow logger upper #2 (a) 06 27 08. All photos vertical.

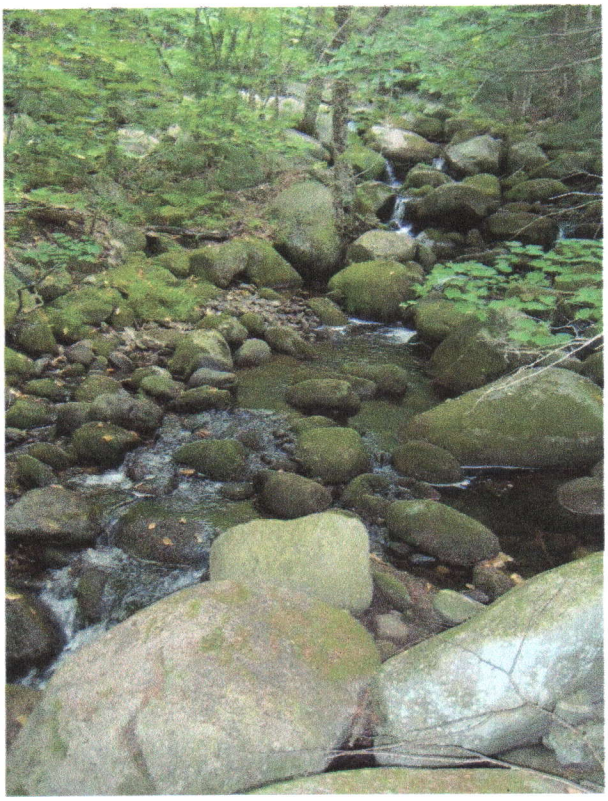
Name: Jeff Stern, Androscoggin River Watershed Council

Address: P.O. Box 1541, Bethel, ME 04217

Phone: 207-583-2723

Signature: Jeff Stern Date: 1/12/11

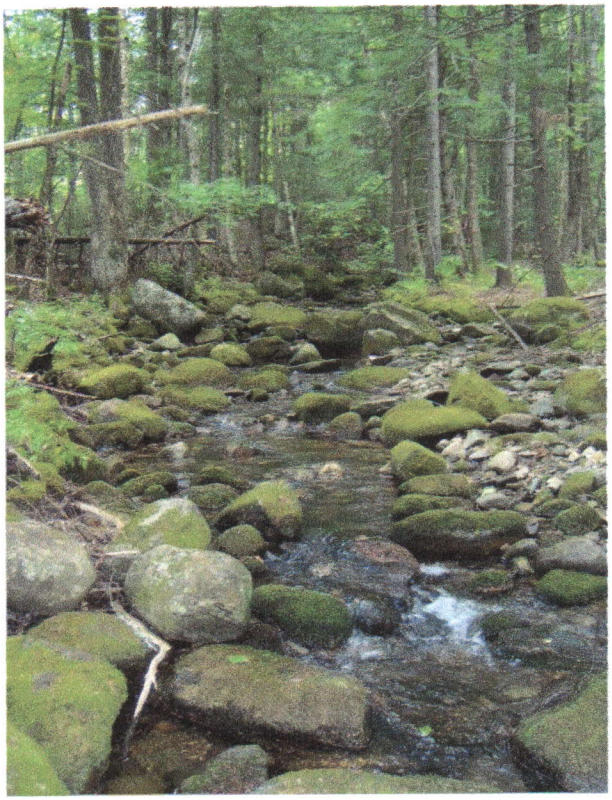
FWS Form 3-2259 / 10/03



9/6/08. Chase Hill Brook before treatment with chop and drop. View upstream. Photograph by Jeff Stern, Androscoggin River Watershed Council.

12/16/08. Chase Hill Brook after treatment with chop and drop. Photograph by Jeff Stern, Androscoggin River Watershed Council.

6/27/08. Installation of a stilling well for a water level logger, Sunday River treatment site #2 above chop and drop area. Photograph by Jeff Stern, Androscoggin River Watershed Council.



9/6/08. Branch Brook before treatment with chop and drop. View upstream. Photograph by Jeff Stern, Androscoggin River Watershed Council.

12/16/08. Branch Brook from similar vantage point as the above photo after treatment with chop and drop. Photograph by Jeff Stern, Androscoggin River Watershed Council.