Application for FY2014 Project Funds in Support of the National Fish Habitat Action Plan

Submitted by: Eastern Brook Trout Joint Venture

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Section 1. Justification for Stable Operational Support

Wild Brook Trout serve as excellent indicators of clean water and healthy aquatic systems. Unfortunately, poor land and water use practices and the establishment of competing non-native fish species have impacted and changed the landscape, greatly diminishing wild Brook Trout throughout its native eastern range. Based on an unprecedented range-wide status assessment the partnership completed in 2005, the Eastern Brook Trout Joint Venture estimates that less than twenty-four percent (24%) of the watersheds that historically supported wild Brook Trout remain intact. However, the plight of wild Brook Trout is being reversed by the Eastern Brook Trout Joint Venture's collaborative efforts across the region to protect, enhance, and restore the aquatic habitat that sustains them.

Our Fish Habitat Partnership is firmly committed to its mission of facilitating integrated approaches to conserving healthy coldwater aquatic resources and fishable wild Brook Trout populations, which we are achieving by building partnerships among citizen groups, agencies and scientists to address priority conservation needs, creating valuable decision-support tools, and funding mission-focused projects.

Eastern Brook Trout Joint Venture Projects (FY2010-2012) and Activities (2011-2013)

For federal fiscal years 2010 through 2012, the Eastern Brook Trout Joint Venture directed Fish and Wildlife Service – National Fish Habitat Action Plan funding towards twenty-six Brook Trout conservation projects that were distributed among eleven eastern states (GA, MA, ME, NC, NH, NY, PA, TN, VA, VT, and WV). Fifty-four percent (54%) of these Brook Trout conservation projects were implemented in subwatersheds (6th level Hydrologic Unit) designated as high priority (priority score >1.00) by the Eastern Brook Trout Joint Venture. All twenty-six projects addressed at least one of the Eastern Brook Trout Joint Venture's conservation priorities as 81% of the projects enhanced recreational fishing opportunities; 77% reconnected fragmented habitat that had a high likelihood of supporting stable Brook Trout populations; 42% improved Brook Trout spawning habitat and/or enhanced habitat that support Brook Trout early life stages; 35% preserved Brook Trout genetic diversity; and, 12% conserved unique Brook Trout life history strategies. The total cost of the twenty-six Brook Trout conservation projects was just under $7.9 million, with $1.6 million being provided by FWS-NFHAP funds and $6.3 million in partner match, a 3.9 to 1 match ratio. Collectively, these Brook Trout conservation projects enhanced 36 miles of lotic habitat and 157 acres of lentic habitat; restored 6 acres of riparian habitat; and, removed 43 fish barriers that resulted in opening access to 101 miles of stream. The socioeconomic benefits derived for these project outputs are estimated to be $76 million. Links to supporting documents:

- http://easternbrooktrout.org/resources/maps/priority-watershed-maps
- http://easternbrooktrout.org/resources/resources-inbox/ebtjv-conservation-priorities-and-common-state-level-objectives/view

- http://easternbrooktrout.org/funding-opportunities/ebtjv-fws-nfhap-funding-applications/fy-2010-2012-ebtjv-project-data/view
- http://easternbrooktrout.org/resources/holdings/socioeconomic-benefits-derived-from-brook-trout-conservation-projects/methodology-for-estimating-the-socioeconomic-benefits-derived-from-brook-trout-conservation-projects/view

The Eastern Brook Trout Joint Venture has also been successful in obtaining two Multi-State Conservation Grant Program grants over the past three years (2011-2013); one in 2012 and another in 2013. These two grants supported a collaborative project undertaken with the Atlantic Coastal Fish Habitat Partnership and the Southeast Aquatic Resources Partnership. The purpose of the 2012 project (Conserving Fish Habitat from Whitewater to Bluewater – Phase I) was to advance the coordinated implementation of strategic plans and habitat assessments of the Atlantic Coastal Fish Habitat Partnership, Southeast Aquatic Resources Partnership, and Eastern Brook Trout Joint Venture and to promote a more cohesive implementation of National Fish Habitat Partnership Conservation Strategies and Targets across 27 states.

The purpose of the 2013 project (Promoting Strategic Fish Habitat Conservation through Regionally-Coordinated Science and Collaboration, aka Conserving Fish Habitat from Whitewater to Bluewater – Phase II) was to support and enhance the communication and outreach, steering committee operation, and scientific assessments of the Atlantic Coastal Fish Habitat Partnership, Southeast Aquatic Resources Partnership, and Eastern Brook Trout Joint Venture, and to provide for increased coordination within and between Partnerships, and with the National Fish Habitat Board and its Science and Data Committee. This grant allowed the three eastern Fish Habitat Partnerships to build upon tasks initiated or completed under their 2012 MSCGP project.

The funding the Eastern Brook Trout Joint Venture received from the 2012 and 2013 Multi-State Conservation Grant Program grants totaled $79,224 and $65,000, respectively. Links to supporting documents:

- http://easternbrooktrout.org/resources/ebtjv-operational-grants/2012-mscgp-grant
- http://easternbrooktrout.org/resources/ebtjv-operational-grants/2013-mscgp-grant

The Eastern Brook Trout Joint Venture has an active and engaged Steering Committee that serves as the decision-making body for the partnership and over-sees the work of several Standing Committees (Conservation Strategy, Science and Data, Outreach and Education, and Business Planning). To facilitate its responsibilities, the Eastern Brook Trout Joint Venture Steering Committee has held ten teleconferences and three in-person meetings over the past three years (2011-2013). The Eastern Brook Trout Joint Venture has sponsored two “all partners” meetings that provided forums for partners to learn about recent brook trout conservation activities and allowed the partnership’s standing committees to address their slate of tasks. The partnership also held a workshop on several on-going science and data-related projects. Links to supporting documents:

- http://easternbrooktrout.org/groups/steering-committee/conference-call-notes/2011-steering-committee-conference-calls
- http://easternbrooktrout.org/groups/steering-committee/conference-call-notes/2012-steering-committee-conference-calls

- http://easternbrooktrout.org/groups/steering-committee/conference-call-notes/2013-steering-committee-conference-call-summaries
- http://easternbrooktrout.org/resources/partnership-meetings/ebtjv-meeting-2012/
- http://easternbrooktrout.org/resources/partnership-meetings/ebtjv-assessment-meeting-november-29-2012/
- http://easternbrooktrout.org/resources/partnership-meetings/ebtjv-partnership-meeting-june-12-13-2013

The Eastern Brook Trout Joint Venture completed its initial range-wide status assessment of Brook Trout, conducted at the subwatershed scale (6th level Hydrologic Unit), in 2005, which served as the foundation for establishing the partnership's strategic plan (first version completed in 2007; last updated in 2011) and its conservation priorities. However, this assessment has been deemed too large a scale to deal with many on-the-ground resource management needs effectively and so the Eastern Brook Trout Joint Venture is in the final stages of completing a Book Trout status assessment at the catchment scale for the northern states (CT, MA, ME, NH, NY, PA, RI, and VT), which will be combined with an assessment that has already been completed for the partnership's mid-Atlantic and southern states (GA, MD, NC, NJ, SC, TN, VA, and WV). The results of the Brook Trout status assessment at the catchment scale will serve as the basis for refining the partnerships conservation priorities. Links to supporting documents:

- http://easternbrooktrout.org/reports/eastern-brook-trout-status-and-threats/view
- http://easternbrooktrout.org/reports/ebtjv-conservation-strategy/view
- http://easternbrooktrout.org/reports/ebtjv-roadmap-to-restoration/view

The Eastern Brook Trout Joint Venture is striving to enhance its operational capacity by participating in a project that is focused on providing organizational development training to Fish Habitat Partnerships, particularly in the areas of enlisting non-traditional partners, including businesses, landowners, and local communities, in supporting fish habitat conservation projects and increasing leadership and management skills of Fish Habitat Partnership governance boards and coordinators. This project is funded by a 2012 Multi-State Conservation Grant Program grant awarded to the National Fish Habitat Board and is being administered by the Association of Fish and Wildlife Agencies. The Eastern Brook Trout Joint Venture also had an assessment of its operational structure and functions, conducted by River Network and Water Words That Work, which resulted in recommendations aimed at enhancing the effectiveness and capacity of the partnership to achieve its missions and goals. These recommendations have been incorporated into the Eastern Brook Trout Joint Venture's five-year business plan and the annual work plans of its Standing Committees. Link to referenced assessment document:

- http://easternbrooktrout.org/resources/ebtjv-briefing-reports-with-recommendations/ebtjv-organizational-and-communications-assessment_2013/view

The Eastern Brook Joint Venture has established strong collaborative working relationships with the Appalachian Land Conservation Cooperative, the North Atlantic Land Conservation Cooperative, and the Chesapeake Bay Program in an effort to address mutual landscape level priority conservation needs. The collaborative work with the Appalachian Land Conservation Cooperative is focused on development of a data management system for regional fish population and aquatic habitat data, decision support and web-based mapping tools, and

processes for evaluating and reporting the benefits of Brook Trout conservation projects. The Eastern Brook Trout Joint Venture involvement with the North Atlantic Land Conservation Cooperative is centered on the development of decision support tools needed to prioritize Brook Trout conservation actions, while the partnership with the Chesapeake Bay Program is aimed at aligning and coordinating priority Brook Trout conservation actions between the two organizations. Link to supporting document:

- http://applcc.org/research/dst-restoration-under-climate-change-group
- http://applcc.org/research/bringing-people-data-and-models-together-addressing-impacts-of-climate-change-on-stream-temperature
- http://www.northatlanticlcc.org/projects/downstream-strategies-project/decision-support-tool-to-assess-aquatic-habitats-and-threats-in-north-atlantic-watersheds
- http://www.chesapeakebay.net/groups/group/habitat_goal_implementation_team
- http://easternbrooktrout.org/groups/whitewater-to-bluewater/library/ebtjv-related-science-and-data-projects_2013/view

Anticipated Eastern Brook Trout Joint Venture Projects and Activities (2014-2016)

To continue the partnership's commitments to facilitating integrated approaches to conserving healthy coldwater aquatic resources and fishable wild Brook Trout populations, the Eastern Brook Trout Joint Venture has established the following four conservation priorities that will drive its efforts during the next three years.

1. Eliminating anthropogenic fish passage barriers in catchments where habitat fragmentation is the primary threat to wild Brook Trout.
2. Implementing best practices in catchments where poor management of riparian and in-stream habitat is the top stressor for wild Brook Trout.
3. Establishing a long-term monitoring program that tracks wild Brook Trout population trends across its historic eastern range.
4. Raising awareness on the plight of wild Brook Trout among targeted audiences.

The Eastern Brook Trout Joint Venture has developed action strategies for each of these conservation priorities.

Fish Barrier Removal Strategy: Habitat fragmentation strongly influences the perseverance of wild Brook Trout populations by limiting dispersal, thereby reducing gene flow, and preventing access to critical habitats that support different phases of their life history. The Eastern Brook Trout Joint Venture will collaborate with key partners to establish a priority list of catchments where anthropogenic fish passage barriers are identified as the primary threat to conserving wild Brook Trout and we will facilitate the elimination of the impassable barriers within these priority catchments by providing support to regional and local groups willing to undertake the work.

Riparian and In-Stream Habitat Improvement Strategy: Poor management of riparian and in-stream habitat is a significant stressor to wild Brook Trout as it can result in warmer water temperatures, higher rates of sedimentation, and greater nutrient loading. The Eastern Brook Trout Joint Venture will collaborate with key partners to establish a priority list of catchments where poor management of riparian and in-stream habitat is identified as the primary threat to

conserving wild Brook Trout and we will facilitate the implementation of best practices within these priority catchments by providing support to regional and local groups willing to undertake the work.

Wild Brook Trout Monitoring Strategy: The Eastern Brook Trout Joint Venture has identified the need to detect wild Brook Trout population trends across its eastern U.S. range since it provides insights to their proclivity for persistence and resilience. Recent research into the use of patch-based metrics in conjunction with a monitoring framework that combines fixed annual "sentinel" patches and a rotating panel design for other patches has the potential to be a cost effective tool for managers to detect trends in wild Brook Trout populations. The Eastern Brook Trout Joint Venture will collaborate with the Chesapeake Bay Program to establish a pilot program that further tests this monitoring protocol in those states that are active in the Eastern Brook Trout Joint Venture and the Chesapeake Bay Program.

Wild Brook Trout Awareness Campaign Strategy: Building awareness, ownership, and empowerment leads to stewardship behavior. To further this process, the Eastern Brook Trout Joint Venture will lead an integrated education and outreach campaign that raises awareness about the plight of wild Brook Trout among anglers and outdoor/environmental reporters. We will develop a "state of the species" report and a public "dashboard" that measures the impacts of implementing each of the partnership's priority conservation strategies.

The Eastern Brook Trout Joint Venture intends to use the operational funding it receives from the Fish and Wildlife Service to support our efforts to assist in implementing these four priority Brook Trout conservation strategies, which are described in more detail in our partnership's five-year Business Plan (see link below) and in the top priority Project listed in Section 3 of this application. Link to the Eastern Brook Trout Joint Venture's Business Plan (2014-2018):

- http://easternbrooktrout.org/resources/resources-inbox/ebtjv-business-plan/ebtjv-business-plan-2014-2018/view

Section 2. Eastern Brook Trout Joint Venture Accomplishment Report (FY2010-2012)

1. Habitat Assessment:

   The Eastern Brook Trout Joint Venture has filled data gaps and refined habitat assessments, including climate change considerations, for incorporation into the Science and Data Committee's national assessment.

   The Eastern Brook Trout Joint Venture completed its first range-wide assessment of the status and threats to Brook Trout in the east in 2005 (http://easternbrooktrout.org/reports/eastern-brook-trout-status-and-threats/view). However, quantitative data on brook trout status was lacking for 19% of the subwatersheds known to have Brook Trout present so the Eastern Brook Trout Joint Venture developed a model that accurately predicts the status of Brook Trout at the subwatershed scale (http://easternbrooktrout.org/resources/science-publications/assessment-and-predictive-model-for-brook-trout-salvelinus-fontinalis-population-status-in-the-eastern-united-states/view). The Brook Trout status data has also been used to identify priority subwatersheds for conservation action, which is determined by how many of a subwatershed's ten closest neighboring subwatersheds are classified as Intact (Brook Trout occupy $\geq$ 50% of the available habitat), essentially building out from core areas of strong population status (http://easternbrooktrout.org/resources/maps/priority-watershed-maps). The Eastern Brook Trout Joint Venture has also been devoting resources (personnel and financial) towards the development of climate change models that assists in identifying priority conservation actions needed to address this type of stressor on Brook Trout resiliency (http://easternbrooktrout.org/groups/whitewater-to-bluewater/library/ebtjv-related-science-and-data-projects_2013/view). In 2011, the Eastern Brook Trout Joint Venture began refining its range-wide Brook Trout status assessment by completing one at the catchment-level scale. This catchment-level assessment has been completed for the partnership's mid-Atlantic and southern states and is in the final stages of analysis for northern states, which is expected to be completed by June 2014 (http://easternbrooktrout.org/resources/workshops/ebtjv-assessment-data). All of the Eastern Brook Trout Joint Venture assessment data is made available to the National Fish Habitat Board's Science and Data Committee at the appropriate time.

2. FHP Priority Areas / Species:
   What percentage of projects initiated in the past three years were focused on FHP defined priority species or priority areas?

   One hundred percent (100%) of the twenty-six conservation projects the Eastern Brook Trout Joint Venture recommended for FWS-NFHAP funding during the past three years (FY2010-2012) were focused on Brook Trout (an Eastern Brook Trout Joint Venture defined priority species) and each of these projects also addressed at least one of the partnerships Brook Trout conservation priorities (http://easternbrooktrout.org/funding-opportunities/ebtjv-fws-nfhap-funding-applications/fy-2010-2012-ebtjv-project-data/view).

3. FWS Priority Species / Trust Species:
   What percentage of projects initiated in the past three years addressed habitat issues for FWS priority or trust resources?

   One hundred percent (100%) of the twenty-six conservation projects the Eastern Brook Trout Joint Venture recommended for FWS-NFHAP funding during the past three years (FY2010-2012) addressed habitat issues for Brook Trout (*Salvelinus fontinalis*), a FWS priority species in regions 3, 4, and 5(http://easternbrooktrout.org/funding-opportunities/ebtjv-fws-nfhap-funding-applications/fy-2010-2012-ebtjv-project-data/view) .

4. Project Completion and Success:
   What percentage of projects, funded in whole or in part, with FWS NFHAP funds in the past three fiscal years have been completed consistent with the project design?

   Eighty-one percent (81%) of the projects funded in whole or in part with FWS-NFHAP funds in the past three fiscal years have been completed consistent with the project design (http://easternbrooktrout.org/funding-opportunities/ebtjv-fws-nfhap-funding-applications/fy-2010-2012-ebtjv-project-data/view).

5. Monitoring and Evaluation:
   What percentage of projects initiated in the past three fiscal years included a monitoring and evaluation plan?

   One hundred percent (100%) of the twenty-six conservation projects the Eastern Brook Trout Joint Venture recommended for FWS-NFHAP funding during the past three years (FY2010-2012) included monitoring and evaluation plans (http://easternbrooktrout.org/funding-opportunities/ebtjv-fws-nfhap-funding-applications/fy-2010-2012-ebtjv-project-data/view).

6. Leveraging of Project Funds:
   Over a three year period, the FHP leveraged FWS funding by a ratio of?

   The twenty-six conservation projects the Eastern Brook Trout Joint Venture recommended for FWS-NFHAP funding during the past three years had a partner match leveraging ratio of 3.9:1(http://easternbrooktrout.org/funding-opportunities/ebtjv-fws-nfhap-funding-applications/fy-2010-2012-ebtjv-project-data/view) .

Section 3. Eastern Brook Trout Joint Venture Work Plan (1-year planning horizon)

Rank	FY2014 Project Title	FONS #	Funds Requested	Partner Contributions	NFHP National Conservation Strategies Addressed	FWS Climate Change Strategies Addressed
1	Eastern Brook Trout Joint Venture Coordination and Operations FY14	53374-2014-393	$ 128,571	$ 90,000	3 & 4	1.1, 3.1, 3.2, 3.3 & 4.3
2	Restoring Habitat Connectivity, Machias & Saint Croix River tributary streams ME EBTJV NFHAP FY14	53371-2014-283	$ 59,286	$ 160,700	3 & 4	3.1 & 3.2
3	Mill Creek Large Woody Debris Chop & Drop, Tygart River, Kumbrabow State Forest, WV EBTJV FY14	53374-2013-386	$ 71,429	$ 100,000	2 & 4	3.1 & 3.3
4	Aquatic organism passage, Chastain Creek, Cullowhee, NC	42330-2014-171	$ 65,000	$ 118,750	3 & 4	3.1, 3.2 & 3.3
5	Dam Removal, Wells River, Groton, Vermont EBTJV	53330-2014-094	$ 71,429	$ 105,000	2, 3 & 4	3.1, 3.2 & 3.3
6	Turner Dam Removal, Nissitissit River, Pepperell, MA Permitting & Deconstruction Phase NFPP FY14	53340-2012-317	$ 71,429	$ 213,000	2, 3 & 4	3.1, 3.2 & 3.3
7	Restoration of Habitat Connectivity in Branch Brook, Kennebunk, Maine EBTJV NFHAP FY14	53371-2014-384	$ 71,429	$ 56,193	3	3.1 & 3.2
8	Dirt and Gravel Road Stabilization, Twomile Run, Westport, PA NFHAP EBTJV FY14	52230-2014-375	$ 50,736	$ 84,534	4	3.1 & 3.3
9	Large Wood Material Workshop, East Fork of the Greenbrier River, Thornwood, WV EBTJV FY14	53374-2014-388	$ 16,286	$ 52,250	4	3.1 & 3.3
10	Spring Brook Dam Removal & Culvert Replacement, Sterling, MA NFHAP EBTJV NFPP FY14	53340-2013-328	$ 40,000	$ 30,000	2, 3 & 4	3.1, 3.2 & 3.3
11	Constructing Four Stream Smart Road Crossings in Washington County, ME EBTJV NFHAP FY14	53371-2014-386	$ 71,429	$ 67,200	2 & 3	3.1, 3.2 & 3.3
12	Patten Stream Fish Passage Construction, Surry, ME EBTJV NFHAP NFPP	53371-2014-385	$ 64,286	$ 82,666	3	3.1 & 3.2
13	McQuesten Brook Dam Removals, McQuesten Brook, Manchester, NH NFHAP EBTJV FY2014	53340-2014-335	$ 43,857	$ 205,727	2, 3 & 4	3.1, 3.2 & 3.3
14	Upper Savage River Restoration Project, Garrett County, MD EBTJV FY2014	51320-2014-065	$ 35,714	$ 199,962	2 & 4	3.1 & 3.3
15	Modification of two culverts for fish passage in Big Run Watershed, Graham Township, PA EBTJV NFPP FY14	52230-2013-374	$ 27,163	$ 19,434	3	3.1 & 3.2
16	Potential for accelerated recovery of brook trout populations in acidified streams of the Adirondack Mountains	52270-2014-151	$ 65,714	$ 46,000	4	3.1 & 3.3
17	Tack Factory Dam Removal, Third Herring Brook, Norwell, MA Design Phase NFPP FY2014	53340-2012-312	$ 71,429	$ 56,640	2, 3 & 4	3.1, 3.2 & 3.3

7. Strategic Implementation:

   One hundred percent (100%) of the seventeen priority ranked projects listed in the table above have measurable goals/objectives that address FHP priority species or priority area(s); and/or habitat issues for FWS priority species or trust resources. Each priority project's goals/objectives are listed in Appendix I.

8. Conservation Actions and Project Outcomes:

   One hundred percent (100%) of the seventeen priority ranked projects listed in the table above contain conservation actions that will produce the desired conservation outcomes and achieve the project goals/objectives. Each priority project's conservation actions/project outcomes are listed in Appendix I.

Appendix I. EBTJV Priority Project goals/objectives and conservation actions/outcomes

Project Title: Eastern Brook Trout Joint Venture Coordination and Operations FY14

Project Goals/Objectives: A) To establish a priority list of catchments where anthropogenic fish passage barriers and poor management of riparian and in-stream habitat are the primary threats to conserving wild Brook Trout, B) to establish a pilot program that further tests a wild Brook Trout monitoring framework, and C) to advance an integrated education and outreach campaign that raises awareness about the plight of wild Brook Trout among anglers and outdoor/environmental reporters.

Conservation Actions/Outcomes: To achieve Objective A, the Eastern Brook Trout Joint Venture will collaborate with key partners to establish a priority list of catchments where anthropogenic fish passage barriers and poor management of riparian and in-stream habitat are identified as the primary threat to conserving wild Brook Trout. To achieve Objective B, the Eastern Brook Trout Joint Venture will collaborate with the Chesapeake Bay Program to establish a pilot program that further tests a wild Brook Trout monitoring framework that uses patch-based metrics in conjunction with a sampling design that combines fixed annual "sentinel" patches and a rotating panel design for other patches. To achieve Objective C, the Eastern Brook Trout Joint Venture will advance an integrated education and outreach campaign that raises awareness about the plight of wild Brook Trout among anglers and outdoor/environmental reporters by developing a "state of the species" report and a public "dashboard" that measures the impacts of implementing each of the partnership's priority conservation strategies. This project addresses top stressors that affect wild Brook Trout in the eastern portion of its historic U.S. range, furthers a process for monitoring long-term wild Brook Trout population trends, and builds awareness about wild Brook Trout conservation needs. Collectively, these outcomes are crucial to reversing the decline of wild Brook Trout and ensure we have healthy waters that sustain outdoor recreational activities, generate economic vitality, and provide inherent values for generations to come.

Project Title: Restoring Habitat Connectivity, Machias & Saint Croix River Tributary Streams ME EBTJV NFHAP FY14

Project Goal/Objective: To restore habitat connectivity on four Brook Trout habitat streams and eliminate ongoing risks of sedimentation during culvert failure, in watersheds identified as Brook Trout habitat protection priorities by the Eastern Brook Trout Joint Venture. These restoration projects will enhance the value of previous investments in land conservation and aquatic habitat restoration in the upper Machias and St. Croix River watersheds located in the State of Maine.

Conservation Actions/Outcomes: To achieve the project objective four culverts that are acting as fish passage barriers will be replaced with fish-friendly bottomless arch culverts. At all four sites, the Maine Fisheries Resource Office will survey for fish and install block nets during construction. This project will result in restoration of upstream passage to approximately 6.4 miles of habitat. It will provide access to a cold water tributary from Grand Lake Stream and between two major tributaries of Grand Lake Brook. Restoring natural stream function will improve brook trout habitat on four streams.

Project Title: Mill Creek Large Woody Debris Chop & Drop, Tygart River, Kumbrabow State Forest, WV EBTJV FY14

Project Goal/Objective: To use "chop and drop" as well as natural stream restoration techniques to remove and/or strategically place storm damaged trees to enhance Brook Trout habitat, protect stream morphology, and minimize sedimentation.

Conservation Actions/Outcomes: Project partners will assess stream conditions and score stream reach or segments to determine the appropriateness of strategic "chop and drop" LWD restoration. Stream size (bankfull width), sediment load, substrate, channel stability, flow velocity, site access, distribution of existing LWD, flow resistance, navigation, and location of raw materials will be important factors considered in determining the best approach for carrying out the project work. Strategically removing and placing LWD according to an assessment and scoring methodology on Mill Creek will hasten the incorporation of sustainable in-stream LWD habitat for long-term Brook Trout fishery benefits.

Project Title: Aquatic Organism Passage, Chastain Creek, Cullowhee, NC

Project Goal/Objective: To eliminate fish barriers and impediments to movement, reduce sediment inputs, and prevent the installation of fish barriers in the future. Ultimately, the project will allow native-strain Brook Trout to move freely between lower areas of the watershed and higher elevation streams.

Conservation Actions/Outcomes: This project will use the USDA FS Stream Simulation design guidelines and pre-fabricated stream crossing structures sized to allow natural substrate/stream bed characteristic within the structure and provide free fish passage. Once completed, the project will result in re-connecting 5.5 miles of upstream high elevation habitat with over 1.3 miles of lower, more productive waters. This will allow Southern Appalachian strain Brook Trout to be more resilient to climate change.

Project Title: Dam Removal, Wells River, Groton, Vermont EBTJV

Project Goal/Objective: To improve and reconnect adjacent habitats that support stable Brook Trout populations within the Wells River watershed in the State of Vermont.

Conservation Actions/Outcomes: The objective of this project will be met by the removal of an obsolete, partially breached low-head dam located on the Upper Wells River. Once the project is completed, the upper Wells River will revert to free-flowing conditions that will help cool downstream waters and allow natural sediment transfer to occur, thereby improving Brook Trout habitat.

Project Title: Turner Dam Removal, Nissitissit River, Pepperell, MA Permitting & Deconstruction Phase NFPP FY14

Project Goals/Objectives: 1) restore riverine connectivity for fish passage and habitat access for resident coldwater and diadromous fish; 2) restore, enhance, and connect rare freshwater

mussel habitat; 3) improve water quality; and, 4) restore river processes (e.g. natural sediment and organic matter regimes) and improve downstream benthic habitat conditions.

Conservation Actions/Outcomes: The objectives of this project will be accomplished by removing the full vertical extent of a 110-foot long stone masonry primary spillway. Removal of this dam will restore 0.19 miles of river channel and reconnect 20 miles of a high quality riverine system to the Nashua River watershed, which will provide coldwater refugia for resident and migratory fish during periods of seasonal thermal stress.

Project Title: Restoration of Habitat Connectivity in Branch Brook, Kennebunk, Maine EBTJV NFHAP FY14

Project Goal/Objective: To remove fish passage barriers in Branch Brook (repair and upgrade the defunct fish ladder, remove collapsed stones). Secondary objectives include: (1) using non-lethal sampling of stable carbon and nitrogen isotopes to document potential anadromous life history, and (2) use standard (trapping) and novel (PIT tagging) methods to assess fish use of the restored ladder.

Conservation Actions/Outcomes: A non-operable fish ladder will be repaired and improved, which will open 1.5 miles of upstream river, benefitting at least four species (Brook Trout, Blueback Herring, American Eel, and Sea Lamprey) identified by 2012 pre-restoration monitoring. The effectiveness of the fish ladder upgrade in enhancing fish passage will be assessed using standard (trapping) and novel (Passive Integrated Transponder tagging) methods. To establish whether a sea-run Brook Trout population resides in this portion of Branch Brook, non-lethal, stable isotope analyses of fin clips will be performed. Stone abutments from a now unused road crossing that restricts fish passage for resident brook trout will be removed, which will reconnect 1.8 miles of mainstem upstream of the site to a 4 mile network of mainstem and tributaries downstream of the site. The resulting 5.8 mile network of stream habitat is expected to benefit resident Brook Trout by reestablishing habitat connectivity and access to important spawning and nursery habitat. Post-restoration monitoring will assess the efficacy of the barrier removal.

Project Title: Dirt and Gravel Road Stabilization, Twomile Run, Westport, PA NFHAP EBTJV FY14

Project Goal/Objective: To reduce non-point source sediment pollution by implementing environmentally sensitive management practices on unmaintained dirt and gravel roads in the Twomile Run watershed. The project will benefit seven miles of streams where native Brook Trout recovery is successfully underway as a result of abandoned mine drainage remediation.

Conservation Actions/Outcomes: Sediment pollution will be reduced by implementing environmentally sensitive management practices on 4,368 feet of unmaintained dirt and gravel roads, which includes installing 14 broad-based dips to control surface runoff, establishing road crown and profile, and limiting access by installing two gates and placing stumps across open areas. Additionally, 1,076 feet of unmaintained dirt roads will be reclaimed and permanently closed via the addition of water bars, seed, and mulch, followed by restricting access from other improved roads.

Project Title: Large Wood Material Workshop, East Fork of the Greenbrier River, Thornwood, WV EBTJV FY14

Project Goal/Objective: To demonstrate the value of installing large wood as Brook Trout habitat structure.

Conservation Actions/Outcomes: The installation of two engineered log habitat structures will serve as the training centerpiece of a workshop for up to 50 professionals from federal and state agencies, universities, and NGOs. The national caliber training staff will cover the role of wood in ecosystems, design of engineered wood structures, installation practices, and site restoration practices. Installation of these two structures will complete the enhancement of approximately 0.7 miles of habitat for native Brook Trout and other species of concern.

Project Title: Spring Brook Dam Removal & Culvert Replacement, Sterling, MA NFHAP EBTJV NFPP FY14

Project Goal/Objective: To reduce in-stream temperatures in the stream by removing an impoundment in an effort to support a downstream population of native Brook Trout.

Conservation Actions/Outcomes: The project will restore 300 m of the stream by breaching a 6 – 8 ft. high earthen dam and replacing an undersized culvert downstream of the dam. Any invasive plants will be removed and both the stream banks and former impoundment basin will be restored with native vegetation. Restoration will open the stream up to a sustainable native Brook Trout population in the Wekepeke Brook.

Project Title: Constructing Four Stream Smart Road Crossings in Washington County, ME EBTJV NFHAP FY14

Project Goals/Objectives: 1) work cooperatively with landowners to replace 4 undersized culverts experiencing chronic failures with bank-full spanning open bottom structures; 2) increase fish passage to 5.5 miles of upstream habitat; and, 3) increase pubic and decision-maker awareness of the impacts of undersized culverts and benefits of “Stream Smart” crossings.

Conservation Actions/Outcomes: The project will replace undersized round culverts with 1.2 bankfull spanning open bottom structures at four road/stream crossing using Stream Simulation Design. The replacement structures at each location will be: Gardner Brook – 11 foot span open bottom arch culvert, Spearin Brook – 10 foot span open bottom arch culvert, Meadow Brook – 10 foot span concrete bridge, Ingersol Brook – 11 foot span concrete bridge. Collectively, these projects will restore upstream fish passage and stream connectivity to a total of 5.5 miles of up-steam habitat in four streams that support populations of native Brook Trout. The actions will enhance access to coldwater refugia which will serve to mitigate current and future effects of climate change.

Project Title: Patten Stream Fish Passage Construction, Surry, ME EBTJV NFHAP NFPP

Project Goal/Objective: To restore unhindered fish passage by installing a cost-effective, nature-like fish passage structure, while encouraging awareness of road-stream barriers and Brook Trout conservation activities in the watershed.

Conservation Actions/Outcomes: The project entails construction of an engineered design for three, progressively higher rock weirs that will facilitate unhindered upstream passage for wild Brook Trout and other species. The weir boulders will be pinned to bedrock and sized to accommodate peak flows and ice without damage or movement. Hydraulic and hydrologic evaluations and elevation surveys are guiding the final design. Given the site conditions (small system, entrenched, stable, straight channel reach) the design is appropriate and anticipated to be low maintenance. The project will re-establish unhindered wild Brook Trout passage throughout at least 23.1 miles of tributary and mainstem in the Patten Stream drainage from headwaters to the estuary.

Project Title: McQuesten Brook Dam Removals, McQuesten Brook, Manchester, NH NFHAP EBTJV FY2014

Project Goals/Objectives: To restore free-flowing conditions, improve overall ecology, remove barriers to diadromous and resident fish species, and eliminate the existing environmentally- impaired conditions within the impoundment.

Conservation Actions/Outcomes: The removal of three fish passage barriers will be based on the results of a geomorphic assessment, topographic survey, sediment analyses, and hydrology and hydraulic analyses. This watershed has some of the highest wild Brook Trout biomass found in in a highly developed urban area in New Hampshire. Habitat connectivity is necessary for Brook Trout to gain access to nursery habitat and thermal refugia.

Project Title: Upper Savage River Restoration Project, Garrett County, MD EBTJV FY2014

Project Goal/Objective: To restore natural stream channel dimensions, pattern and profile to a segment of the Upper Savage River.

Conservation Actions/Outcomes: A Natural Stream Design has been developed for the site to enhance aquatic habitat, stabilize stream banks, decrease sediment and nutrient delivery to the stream, restore a riparian corridor, and improve shading of the stream. Planting trees and shrubs and bioengineering practices will protect reconstructed banks and benches and re-establish a riparian corridor. This project will stabilize and enhance 1000 feet of eroding, aggrading stream utilizing in-stream structures, bankfull benches, and riparian plantings to restore natural channel dimensions, pattern and profile, along with in-stream habitat and riparian vegetation. Restoration will reduce sediment loads and enhance Brook Trout habitat.

Project Title: Modification of Two Culverts for Fish Passage in Big Run Watershed, Graham Township, PA EBTJV NFPP FY14

Project Goals/Objectives: To eliminate the Hubler Run Culvert, which is a complete blockage to Brook Trout and to modify the Big Run Culvert to provide unobstructed fish passage.

Conservation Actions/Outcomes: The Hubler Run Culvert will be completely removed and replaced with a hydraulically suitable culvert and installed to create fish passage to this tributary. Stone will be placed on the upstream and downstream end to prevent undermining. The culvert installation will follow USFWS Best Management Practices for fish passable culverts. The Big Run Culvert will be modified to allow for fish passage for all life stages under various flow conditions. It is thought that this can be accomplished by using a torch to cut off the beveled ends of the pipe eliminating the pipe "lip" to allow fish to migrate freely throughout Big Run. The project will remove the remaining two man-made barriers to Brook Trout movement in the watershed providing access to 2 miles of spawning and rearing habitat. The project will also replace a severely degraded culvert that is contributing to sediment loads in the watershed.

Project Title: Potential for Accelerated Recovery of Brook Trout Populations in Acidified Streams of the Adirondack Mountains

Project Goals/Objectives: 1) quantify the relations between improved water quality and health of Brook Trout populations in streams treated by alternative liming methods; 2) evaluate the efficacy of both treatment methods; 3) classify the present-day level of acidification and suitability of habitat (water quality) for Brook Trout in streams of the region; and, 4) develop strategies that could be used to effectively accelerate recovery of water chemistry and Brook Trout populations in acidified streams across the Adirondack Park.

Conservation Actions/Outcomes: Tributary liming - stream flow is being monitored continuously and chemistry has been monitored via routine and storm samples at 2 control streams, 1 whole-watershed liming stream, and at 2 in-stream liming tributaries. About 150 tons of high-calcium limestone will be distributed over a 30 ha watershed by helicopter in October 2013. Lime is being added annually to two episodically acidified streams. All samples are being analyzed by the USGS for Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, SO_4^{2-}, NO^{3-}, Cl^{-}, DOC, Si, NH^{4+}, ANC, pH, total (unfiltered) Al, total monomeric Al and organic monomeric Al, inorganic Al and base-cation surplus (BCS) (calculated), specific conductance and specific ultraviolet absorbance using USEPA-approved methods. Brook Trout surveys - population density and biomass will be estimated annually in five tributaries to Honnedaga Lake for at least two years prior to liming (completed) and as many as three years following liming. Fish will be collected over three or more passes using a backpack electroshocker within seine-blocked reaches. The number, lengths, and weights of all fish captured during each pass will be used to estimate population sizes, total biomass, and corresponding 95% confidence intervals using the Moran-Zippin method of proportional reduction. Water chemistry survey - sixty-four of the original WASS sites will be sampled in 2014-2015 and 61 of the ECASS sites will be sampled in 2017-18. Sites will be chosen, using a stratified random design, from each of four classes (severely acidic, acidic, weakly buffered, moderately buffered) defined by

base-cation surplus (BCS) (BCS < -30; -30 < BCS < 25; 25 > BCS < 75; 75 < BCS < 250; as $\mu eq\ L^{-1}$). One-L grab samples, collected during each visit, will be analyzed by the USGS or ALSC Laboratory for constituents noted above. Data analysis - the calcium-application levels and neutralization attained in limed streams, response of trout populations to both treatments, and the estimated acidification status of streams in the western and east-central Adirondacks will be assessed using univariate and multivariate models to determine the most-effective practice and application levels needed to create water chemistry suitable for brook trout populations in streams of differing acidity across the region.

Project Title: Tack Factory Dam Removal, Third Herring Brook, Norwell, MA Design Phase NFPP FY2014

Project Goal/Objective: To remove an impediment to passage and cause of poor water quality, resulting in more natural stream conditions that allows for free movement of species upstream and downstream. This project will improve aquatic habitat quality by increasing dissolved oxygen content and reducing temperatures in the area of the current dam impoundment.

Conservation Actions/Outcomes: This project focuses on permitting, historical review, and final design and bid specifications for dam removal, a proven method for restoring hydrology, sediment regime, and passage for aquatic organisms. The physical dam removal will be complemented with re-establishment of a stream channel and stabilizing wetland vegetation. Removal of the Tack Factory Dam will result in a return to naturalize riverine processes and provide passage to over 8.4 miles of habitat for Brook Trout and other resident and migratory fish. It will also complement ongoing removal efforts at the next dam upstream, and is part of a larger, multi-phase effort to restore the entire Third Herring Brook to a naturalized state.