

**Project Title: Enhancing and connecting wild brook trout populations in VT's
West Mountain Wildlife Management Area**

Project Location (VT, Essex, Newark, Congressional District 1)

Congressional District of Project: 1st

Congressional District of Applicant: 2nd

NFHP / EBTJV Funding Requested: \$50,000

Total Project Cost: \$162,100

Total Federal Matching: \$5,000

Total Non-Federal Matching: \$157,100

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USFWS FONS Database Project Number: 53330-2016-115

Coordination Completed with Sponsoring U.S. Fish and Wildlife Service Office

(Check One):

 x Yes

 No

 09.22.2014

Date Coordination Began

I. PROJECT DESCRIPTION, SCOPE OF WORK, AND PARTNER INFORMATION

A. Project Description

Trout Unlimited's Upper Connecticut Home Rivers Initiative (TU) has been working since 2008 in the Upper Connecticut River watershed. To this point, TU and its partners have rigorously prioritized and focused their efforts on restoring and enhancing brook trout populations that spend their entire life cycle in rivers and streams. However, there are some brook trout populations in northeastern Vermont that spend at least part of their lives in ponds. Before European colonization, many small ponds throughout Vermont supported self-sustaining brook trout populations. Habitat degradation and introductions of other fish species have eliminated nearly all of these brook trout populations. Currently, there are only eight ponds in the entire state of Vermont that are known to support self-sustaining populations of brook trout that are robust enough to provide quality angling opportunities. Four ponds within the Nulhegan, Wheeler Stream, and Paul Stream watersheds support at least some level of naturally reproducing brook trout: Unknown Pond (Nulhegan), Lewis Pond (Nulhegan), West Mountain Pond (Wheeler Stream), and Unknown Pond (Paul Stream). Two other ponds within the WMA have at least some potential for supporting self-sustaining brook trout populations: Notch Pond (Wheeler Stream) and South America Pond (Paul Stream).

With a recent National Fish and Wildlife Foundation Forest and Rivers Grant (NFWF), TU and its partners are investigating opportunities for restoring and enhancing naturally reproducing brook trout populations connected to wild, non-stocked brook trout ponds. Specifically, the partners are identifying opportunities to improve access to spawning tributaries and improve habitat in these tributaries through crossing replacements and instream habitat restorations. This Eastern Brook Trout Joint Venture (EBTJV) proposal advances the partners' recent assessment and survey work on wild brook trout ponds through this reconnection and habitat restoration project.

Proposal: Vermont's state-owned 22,500-acre West Mountain Wildlife Management Area (WMA), resides in the Paul Stream, Nulhegan River, and Wheeler Stream watersheds. As part of a larger multi-year, stream crossing program to retire roads and replace inadequate stream crossings, combined with a focus on rare wild brook trout ponds, this reconnection and restoration proposal respectfully seeks \$50,000 EBTJV funding to increase connectivity and conduct instream habitat improvements in the Wheeler Stream watershed in brook trout spawning tributaries of West Mountain Pond, a wild "non-stocked" brook trout pond

Mirroring TU's successful partnerships in nearby Indian and Nash Streams NH, and the Nulhegan River VT, TU and VTFW will use EBTJV funding to improve access to spawning and juvenile rearing habitat by removing barriers to brook trout migration and improving spawning and juvenile rearing habitat in one tributary by strategically adding large woody material.

Background: In 2006, an initial watershed-based assessment of coldwater habitat conditions was completed by Trout Unlimited (TU) in the Upper Connecticut River watershed in New Hampshire and Vermont. In 2008, TU designated the Upper Connecticut watershed as one of its Home Rivers Initiatives, the only one in New England. TU's initial assessment identified fish habitat problems throughout the watershed, including lack of riparian habitat, poor instream habitat diversity and complexity, and

inadequate stream crossings. All of these impacts greatly limit available fish habitat for all life stages of brook trout.

Following these assessments, in 2010, TU began working with its partners, VTFW, the US Fish and Wildlife Service, and Weyerhaeuser on stream restorations in the upper Connecticut River watershed of Vermont, working primarily in two strategically important brook trout watersheds, the Nulhegan River and Paul Stream. Both watersheds are unique and strategically important to the partners for their lands, locations, and natural resources. The partnership's overall restoration objective is four-fold. Reconnect the mainstems to their tributaries. Restore the watersheds' instream habitat and natural function, largely but not exclusively with wood additions. Improve the rivers' ability to retain small and large organic material, which serves as habitat and food for aquatic organisms. Increase number and depth of headwater pools to decrease overall water temperature spikes.

In 2011, VTFW and TU completed a study, which included 33 stream reaches in northeastern Vermont, to determine the factors that limit brook trout abundance in this region and found that water temperature and instream wood were the two most important factors (Kratzer and Warren 2013). As a follow-up to this study, starting in 2012, water temperatures have been recorded at many sites throughout northeastern Vermont to determine which streams have suitable water temperatures for brook trout. Also, starting in 2012, the partners have been scouting many streams to assess instream and riparian habitat and the potential of these streams to be improved by strategic woody habitat additions.

Since then, TU, VTFW and its partners have expanded their work with a recent NFWF Forest and River's grant that allowed the partners to assess and survey the waters around several key self-sustaining wild brook trout ponds. This grant will move this assessment phase forward by allowing the partners to begin key stream crossing replacement projects and instream habitat restoration projects while identifying other opportunities for improving brook trout habitat in these watersheds

West Mountain WMA: The WMA covers 22,500 acres and is one of the largest and least developed pieces of state land in Vermont. The WMA contains portions of the Paul Stream, Nulhegan, and Wheeler Stream watersheds. The WMA's watersheds generally lack a history of human habitation, industrial development, and agriculture. They have, however, been subject to logging for nearly 200 years. In the late 1900s, logging intensified with industrial forest management practices, but timber management has slowed since state acquisition of the land in 1999. Past logging practices have affected brook trout habitat in nearly every brook trout stream in northeastern Vermont, and West Mountain Pond's tributaries are no exception. Specifically, the logging roads and their undersized and improperly installed culverts have fragmented brook trout habitat. Also, the repeated harvest of trees has greatly reduced the natural recruitment of large woody material to these streams.

The new West Mountain WMA management plan was completed as of September 2014. The plan lays out the decommissioning of nearly 9 miles of roads over the next 10 years, including removal of at least 2 problem stream crossings on West Mountain Brook and stream restoration at all crossings as a part of decommissioning. In addition to the crossings identified in this proposal TU and VTFW are conducting strategic woody habitat additions in prioritized stream reaches.

Based on the importance of this conserved land, its rare wild brook trout ponds, its impaired brook trout habitat, and the partners' current work in the adjacent Nulhegan River and Paul Stream watersheds, TU and VTFW will continue a long-term connectivity and instream habitat restoration program in the Northeast Kingdom, with an expanded wild trout pond focus that begins in the WMA. TU and VTFW will replace one culvert with a bridge, remove one culvert on a road that will be retired, and conduct strategic woody habitat additions in 1.25 miles of West Mountain Pond's tributaries.

B. Proposed Methods (Max Characters: 350)

Culverts were assessed and prioritized on the WMA, and fish community and habitat surveys were conducted on both forks of the pond's main tributary. Using these data, key reaches to restore and crossings to replace or remove were identified. With this grant, we will replace 1 impassable culvert with a bridge, remove 1 culvert, and improve brook trout spawning and juvenile rearing habitat on 1.25 miles of the south fork.

C. Project Timeline

The culvert identified for replacement in this grant was assessed and prioritized as part of a WMA-wide assessment. Stream reaches were surveyed and prioritized for restorations during the 2016 field season.

All crossings, matches, and instream habitat restorations will be completed by the end of the 2018 field season. All permits will be submitted in the spring of each year. Bridge construction materials will be ordered in late spring, and the bridge will be installed in the summer field season during low flow periods. Following installations and restorations, TU and VTFW expects to conduct electrofishing surveys and annual monitoring.

West Mountain Brook 2-Year Project Timeline

Name	Action	2017	2018	Miles Restored
North Fork	Crossing replacement	Design and engineering	Construction	1.3 miles opened
South Fork	Crossing removal	Removal		1.2 miles opened
South Fork	Habitat restoration	Strategic wood	Follow up	1.25 miles restored

D. Proposed Accomplishment Summary (Max Characters: 500)

TU and VTFW will work towards achieving the goals of the EBTJV and Vermont State Wildlife Action Plan to restore, protect and sustain brook trout populations and their habitat by replacing one stream crossing and removing another that currently prevents the movement of fish and other aquatic organisms in the West Mountain Pond watershed. The new structures will open 2.5 stream miles and permit fish and other aquatic organisms to move in search of cold water refugia, food, and spawning habitat. In addition, woody habitat will be restored to 1.25 miles of the pond's tributaries.

E. State the Importance of the Project to the Resource (Max Characters: 350)

There are only eight ponds in the entire state that are known to support self-sustaining brook trout populations that are robust enough to provide quality angling. West Mountain Pond is one of these ponds. This project will improve access to, and quality of, spawning and juvenile rearing habitat.

F. Problem and Specific Cause of the Problem (Max Characters: 350)

Endemic to the Upper Connecticut watershed and its major tributaries, the WMA's watersheds suffer from nearly 150 years of poor logging practices, largely from the intensive logging, dams, and drives of the late 1800's to more recent road building activity. As a result, many of the streams in these watersheds lack habitat complexity and connectivity.

G. Objective of the Project with Reference to the Problem (Max Characters: 350)

This project's primary goal, bolsters available brook trout habitat, eliminates habitat fragmentation and increases genetic diversity of unnaturally isolated brook trout populations. Secondary benefits increase flood resiliency and reduce road erosion sediments. Properly sized crossings allow natural transportation of wood, gravel and cobble through the system, which is currently being inhibited.

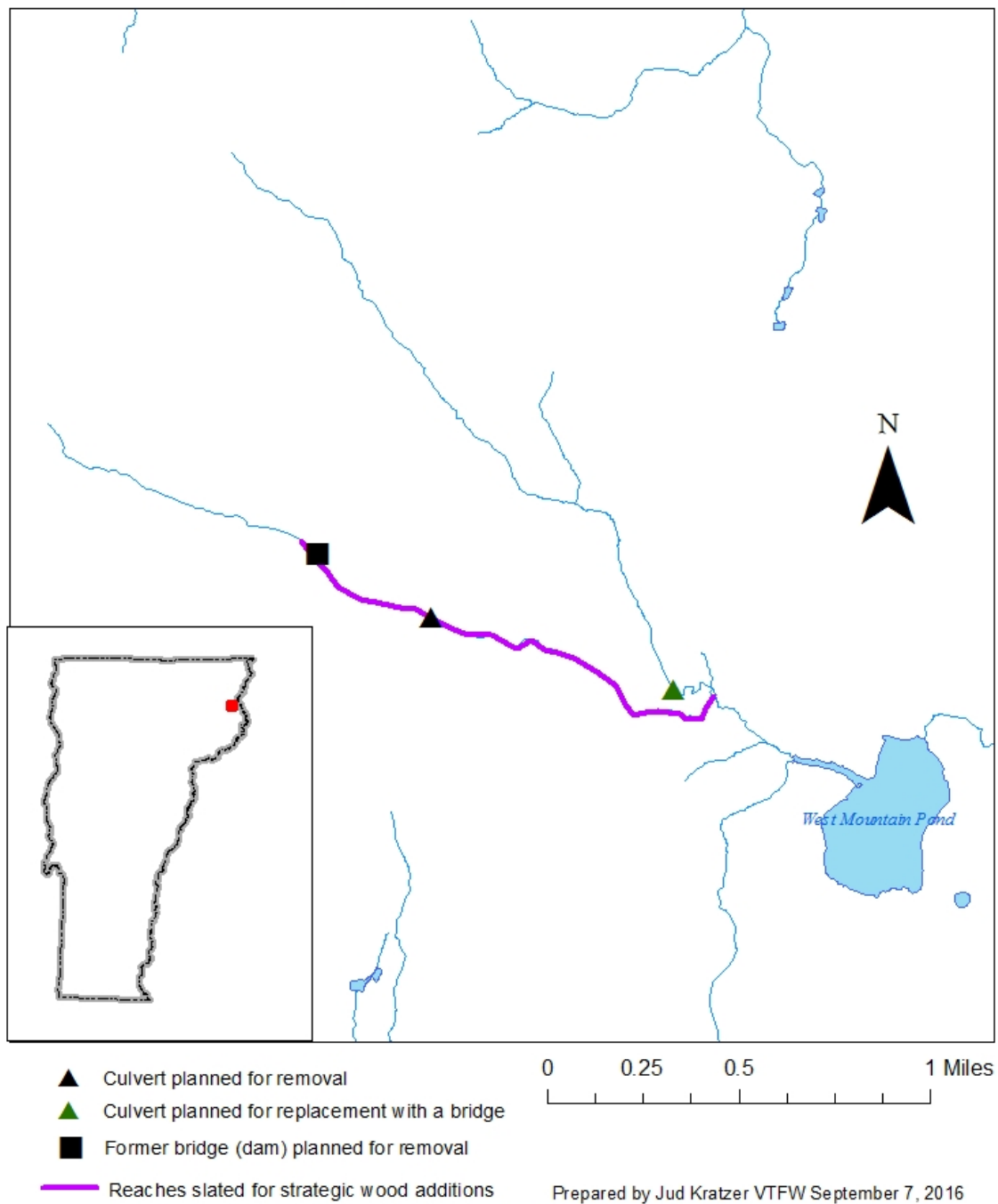
H. Partner Information

Partner Name	Contribution In-Kind	Contribution Cash	Federal or Non-Federal	Partner Category	Role of Partner
National Fish & Wildlife Foundation (Bring Back the		\$10,000	Non Federal	Conservation Group (National)	General project support, implementatio

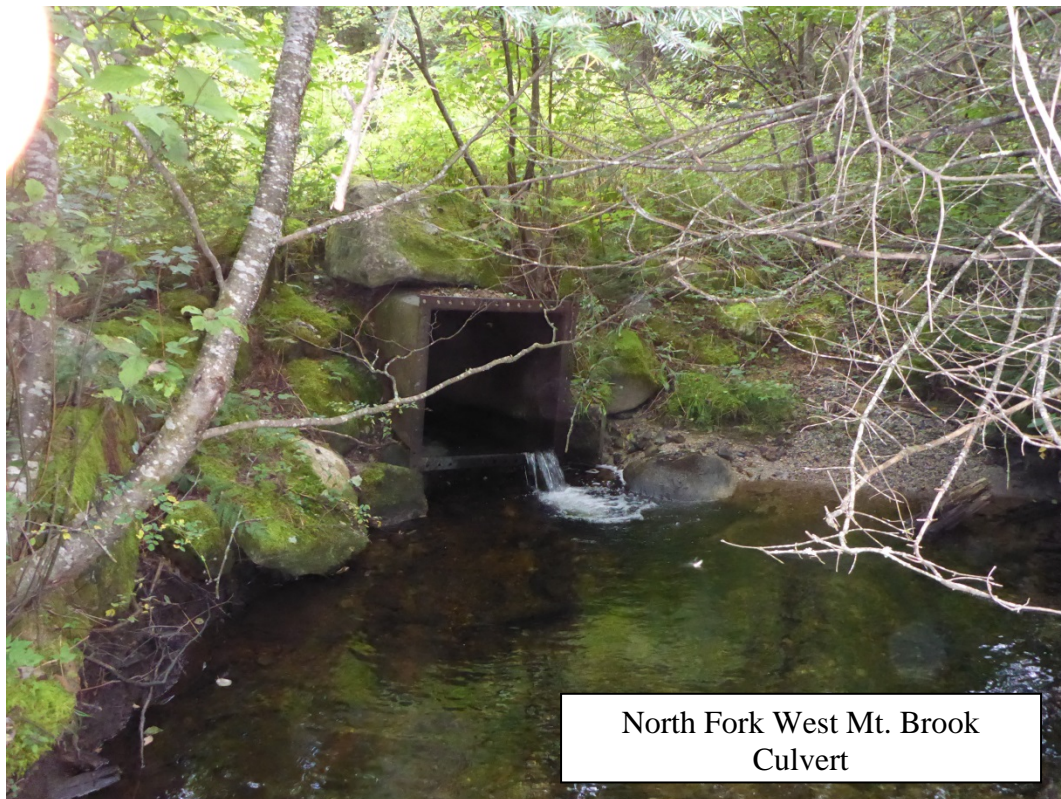
Natives)					n and monitoring
Vermont Fish & Wildlife	\$18,000		25% Non-Federal, 75% Federal (DJ)	State Agency	Major Partner-all aspects & annual monitoring
TU-VT State Wildlife Grant		\$5,000	Federal	State Agency	Crossing design and engineering
Vermont Fish & Wildlife		\$15,000	Non-Federal	State Agency	Crossings
Upper Connecticut Mitigation & Enhancement Fund		\$25,000	Non-Federal	Grantor (Local)	Crossings & wood additions
Nulhegan Wildlife Refuge (USFWS)	\$15,600		Federal	Federal Agency	Housing for TU assistants,
NFWF (Forest and Rivers Grant)		\$13,000	Non-Federal	Grantor (National)	Crossing Construction
VT TU Chapters	\$2,000	\$5,000	Non-Federal	Local Conservation Group	Volunteer Help & Direct support

II. MAP OF PROJECT AREA

Brook Trout Habitat Projects Planned for West Mountain Pond Tributaries



III. PHOTOGRAPH(S) OF PROJECT AREA



North Fork West Mt. Brook
Culvert



IV. PROJECT BUDGET

B. Budget Table Example

Partner Name	Partner Category *	Activity of Partner **	Budget Category***	EBTJV NFHAP Request	Non-Federal Contribution		Federal Contribution		Total Contribution	Acres/Miles Affected
					In-Kind	Cash	In-Kind	Cash		
MEF	Mitigation Grant Fund	Crossing replacement	Construction			\$25,000			\$25,000	1.3
National Fish & Wildlife Foundation (BBN)(F&R)	Conservation Group (National)	Crossing replacement	Construction				\$13,000		\$23,000	2.5
		Restoration	Personnel				\$5,000			
		Monitoring	Personnel & Travel				\$5,000			
EBTJV	Conservation Group (National)	Crossing replacement	Construction & Materials	\$25,000					\$50,000	2.5
		Instream Restorations	Labor	\$15,000						
		Project Implementation	Travel	\$2,000						
		Crossing replacement	Supplies & Equipment	\$3,000						
		Project oversight and monitoring & Monitoring	Personnel	\$5,000						
State Wildlife Grant (TU)	Conservation Group							\$5,000	\$5,000	1.3
Vermont Fish & Wildlife	State Agency	Restoration	Personnel		\$3,500		\$10,000		\$36,500	2.5
		Crossing replacement	Personnel							
		Monitoring	Personnel		\$3,500					
		Crossing replacement	Design			\$5,000				
		Crossing replacement & retirement	Construction		\$1,000	\$10,000	\$3,500			
Nulhegan Refuge	Federal Agency	Restoration	Housing				\$12,000		\$15,600	NA
		Monitoring	Personnel				\$3,600			
VT TU	Local	Restoration	Personnel		\$2,000				\$7,000	

Chapters	Conservation Organization	Culvert Replacement	Construction			\$5,000				
Total Contribution				50,000	\$10,000	\$45,000	\$52,100	\$5,000	\$162,100	

*Partner Categories - Federal Agency, State Agency, Local Government, Conservation Group (Local), Conservation Group (National), Native American Tribe, Private Landowners, Corporations/Businesses

**Activity - Acquisition, Fish Ladder, Dam Removal, Culvert Removal, Restoration, Monitoring

***Budget Categories – Administration/Technical Services, Construction Material, Construction Labor, Equipment, Contractual, Travel, Supplies, Other.

NOTE: This is not a Federal Grant program and therefore does not exclude non-federal match used here from being matched to other Federal Grant sources to leverage funds for the project. Indicate if partnering contributions are in-kind or new cash. NFHAP requests should illustrate how the dollars will be spent and by what organization. Overhead such as utilities, office space, and salary to prepare applications and develop partnerships will not be funded with NFHAP funds and should not be a line item or built into the project. Activities that directly relate to completion of the project such as travel and salary to do design work let and/or monitor contracts are allowable expenses with NFHAP funds but should not constitute more than 10% of the funding request. For more information on the use of NFHAP funds, please see <http://www.fws.gov/policy/717fw1.html>.

V. EVALUATION QUESTIONS

1. Please provide the GPS Coordinates for the project using UTM NAD 83.

<u>North Fork, West Mountain Brook</u> 44.69390, -71.67420	Watershed = 1.12 sq. mi.	Potential stream mileage opened = 1.3 mi
<u>South Fork, West Mountain Brook</u> 44.696691, -71.686975	Watershed = 0.65 sq. mi.	Potential stream mileage opened = 1.2 mi
<u>South Fork, West Mountain Brook</u> 44.696691, -71.686975	Watershed = 0.65 sq. mi.	Potential stream mileage restored = 1.2 mi

2. Please list the type of project (protection, enhancement, restoration; see definitions in the Appendix).

Restoration-This project will restore connectivity on two streams and improve instream habitat on one of these streams. Both streams provide spawning and juvenile rearing habitat for brook trout living in West Mountain Pond. This project is part of a larger, ongoing stream crossing replacement and strategic wood addition projects in Vermont's West Mountain WMA

3. Are brook trout currently present at the project site or in the project stream? If not, were brook trout historically present? Is the habitat known to be suitable for restoration/reintroduction of brook trout?

Vermont Fish and Wildlife last stocked West Mountain Pond in 2003. While sampling the pond with gill nets in 2013, biologists discovered that the pond now supports a robust, self-sustaining population of brook trout. Electrofishing in 2016 confirmed the presence of brook trout in both the north and south forks of West Mountain Brook, the pond's most significant tributary.

4. Please describe how the project will provide for the expansion or improvement of existing habitat?

This project will both improve and expand existing habitat. Replacing/removing stream crossings that block the upstream movement of brook trout will allow pond-dwelling adult brook trout to access spawning and juvenile rearing habitat in the streams. Strategic woody habitat additions will improve existing habitat for all life stages.

5. Does the project include a protection component? Is the project footprint located on private or public land? Is the land currently protected? Does the project include land purchase or easements as match?

Yes, this restoration project lies on brook trout streams in Vermont's state-owned West Mountain WMA. In addition, adjacent to the WMA is the Nulhegan Division of the USFWS Silvio O. Conte

National Fish and Wildlife Refuge and a working forest owned by Weyerhaeuser, which has existing conservation easements on the land. TU, VTFW and USFWS, have been conducting instream wood addition restorations and crossing replacements in the adjacent lands, in part with EBTJV funding.

6. What percentage of the watershed above the proposed project is protected in perpetuity?

100% of the West Mountain Pond watershed is state owned and protected under permanent conservation easement, including riparian buffers.

7. List the specific EBTJV habitat objectives addressed by the project and describe how the project will contribute towards them (refer to the list of EBTJV habitat objectives in the Appendix).

As stated in the EBTJV's "Roadmap to Restoration"ⁱ fact sheet, the Northern Region management priorities are to protect intact populations, determine status, reduce fragmentation, improve water quality and build partnerships. TU's Home Rivers Initiative has worked diligently in the entire Upper Connecticut watershed to determine the status of brook trout populations and has developed strong partnerships, not only on Vermont projects, but on Indian Stream, NH as well, where EBTJV is also a contributing funder. Both partnerships' efforts to reduce fragmentation by replacing stream crossings and conducting instream restorations go hand-in-hand with the Northern Region's priorities.

EBTJV Habitat Objectives

1. Maintain the status, or no net less, of subwatersheds classified as Intact.
2. Strengthen brook trout populations in subwatersheds classified as Intact.

8. State which, if any, EBTJV conservation priority the project addresses (refer to the list of EBTJV conservation priorities in the Appendix):

This project addresses EBTJV's four major conservation goalsⁱⁱ to conserve, enhance or restore brook trout populations, to encourage partnerships among management agencies, to develop and implement outreach and educational programs to ensure public awareness, and to develop support for program implementation to perpetuate and restore brook trout populations throughout their historical range. It also addresses several primary objectives including: maintaining currently intact watersheds, strengthening watersheds, and determining brook trout population status

EBTJV Conservation Priorities

1. Improve and reconnect adjacent habitats that have a high likelihood of supporting stable wild brook trout populations;
2. Focus on critical wild brook trout spawning and early life history habitat in sub-watersheds classified as Intact;
3. Preserve genetic diversity of wild brook trout populations;

9. State which, if any, of the EBTJV common state-level objectives are being addressed by the project (refer to the list of EBTJV common state-level objectives in the Appendix):

According to the EBTJV website's Vermont Brook Trout Conservation Strategies¹,

- A. Priority 1: is Habitat Protection, and with this grant the partners are working in the conserved West Mountain WMA where habitat protection is first and foremost.
- B. Priority 2: is Brook Trout protection, restoration and enhancement. This project will restore connectivity to streams, enhance genetic diversity, and should increase brook trout population numbers for a wild trout pond population.
- C. Priority 4 is Outreach: TU and its partners are using the adjacent Nulhegan River watershed as an outdoor classroom. In 2016, TU brought students in to the watershed as part of its Vermont TU trout camp, a program in which youth learn fly fishing and conservation. This year, students transplanted trees around a recent crossing replacement that had inhibited movement of wild trout since the 1950's. It is expected that similar events will be held in the West Mountain WMA.

EBTJV Common State-Level Objectives:

- 1. Mitigate factors that degrade water quality.
- 2. Maintain or restore natural hydrologic regimes.
- 3. Partner with organizations on projects that involve nongame species, migratory birds, and brook trout.

10. What is the EBTJV subwatershed number (6th level Hydrologic Unit), and associated classification and priority score for the proposed project?

- Subwatershed # = 33097
 - Subwatershed Status Classification (Intact, Reduced, Extirpated; terms are defined in the Appendix) = Reduced
 - Subwatershed Priority Score = 1.62
 - Subwatershed Map Used = New Hampshire Subwatersheds Best for Enhancement

11. Will the completed project benefit any federally listed threatened or endangered species or Service priority species (refer to the list of Service priority species for Region 4 and Region 5 in the Appendix)?

Brook trout

12. Will the completed project benefit any state listed threatened or endangered species or species of greatest conservation need?

Brook trout

13. Will the project provide or enhance connectivity to or within an intact subwatershed?

Yes, this is a connectivity and instream habitat restoration project associated with a wild brook trout pond, which is a rarity in Vermont and throughout the species' range.

14. What are the root causes of the watershed degradation and which of these are addressed by the project?

Past logging practices have affected brook trout habitat in nearly every brook trout stream in northeastern Vermont, and West Mountain Pond's tributaries are no exception.

Specifically, the logging roads and their undersized and improperly installed culverts have fragmented brook trout habitat. Also, the repeated harvest of trees has greatly reduced the natural recruitment of large woody material to these streams.

15. Describe the plans for project effectiveness monitoring and evaluation (i.e. measuring the project's success in meeting its goals/objectives).

These projects reside within the state-owned West Mountain WMA that is managed by VTFW and is in close proximity to their state offices in St. Johnsbury, VT. With state ownership and VTFW management, there will always be a strong team of state fisheries biologists engaged in the monitoring and management of these streams and their crossings. Following crossing replacements and instream restorations, it is expected that electrofishing surveys will take place and annual monitoring will be conducted through site visits and photo surveys.

16. Describe the expected effect on the brook trout population. To what degree will the project strengthen the brook trout population status?

While brook trout populations in this subwatershed are characterized as "reduced", brook trout are firmly established in West Mountain Pond and the north and south forks of its main tributary. Improving access to spawning and juvenile rearing habitat in the two forks while improving the habitat in the south fork will further strengthen the brook trout population of the pond and its tributaries. A past study (Kratzer and Warren 2013) demonstrated that brook trout biomass in northeastern Vermont streams is positively related to density of large woody material. An ongoing study in the East Branch Nulhegan watershed of Vermont has found that brook trout biomass has more than doubled in areas where large woody material was added. Increased brook trout abundance in the tributaries should contribute to increased brook trout abundance in West Mountain Pond. Wild, self-sustaining brook trout ponds are rare in Vermont, as they are across their entire range, save perhaps in northern Maine.

17. Please describe the long term benefit of the project and provide an estimate of the length of time the project is expected to be effective. If a plan for long term maintenance is necessary to maintain project benefits, please describe it.

Project benefits are permanent. TU and its partners at VTFW believe that when it is economically feasible to replace poor culvert crossings with bridges, it should use this method of replacement. Bridges provide excellent movement of both stream materials and fish. Our bridges have hemlock decking, which is expected to be replaced periodically by

the state of Vermont from their West Mountain WMA road fund. We expect that our strategic woody habitat additions will provide benefits for many years and will aid in the recruitment of natural falling wood that now moves through the system.

18. Does the project address, support or build upon existing action plan(s) (e.g. state fish & wildlife, watershed protection, water quality improvement, land or water-use plan(s), or other regional plan(s))?

The West Mountain WMA Long Range Management Plan specifically lists replacement/removal of culverts and strategic wood additions as management actions to be implemented on the WMA. This project also addresses Vermont'sⁱⁱⁱ goals of Habitat Protection; Brook Trout Protection, Restoration and Enhancement; and Assessments. Specifically this project helps to develop instate expertise on crossing and instream work. It uses biological data, habitat evaluations and stream crossing inventories extensively to prioritize work.

19. Are there competitive non-native or invasive fish species within the watershed with access (no barrier) to the proposed project? Are other strains of brook trout, non-native salmonids or other exotics stocked at the proposed site or will they have access following project completion?

Gill netting in 2013 and electrofishing in July 2016 showed no non-native fish species in West Mountain Pond or either fork of West Mountain Brook. Our crossing replacements are not expected to change species diversity, as brook trout have the competitive advantage in these small, cold, low alkalinity streams.

20. Please describe the current status of the project. Is it planned, permitted and ready to begin?

The crossings are covered under Vermont's Stream Alteration General Permit, and all permits will be submitted to the appropriate federal and state agencies in the spring of 2017, the bridge design is an existing design, and the road is owned by the state of Vermont. These crossings will be completed by the end of the 2018 field season. We expect our strategic woody habitat additions to take 2 years to complete. The majority of the work will be conducted in 2017 with a follow up treatment expected in 2018. The partners have cash matches in hand from the state of VT, NFWF, and others.

21. Will public access be allowed at the project site? If so, what kinds of recreational activities are allowed – fishing, hiking, camping, wildlife viewing, etc.?

Yes, one of the main purposes of the WMA and the adjacent private and refuge land is recreational use for perpetuity. The WMA is a popular site for hunting and fishing, has a public camping area, horse riding trails, and is used for wildlife and scenic viewing.

22. Will the project increase recreational fishing opportunities for wild brook trout? If so, how much will it increase and how will the increase be measured?

One of TU's long-term goals for its stream restoration projects in northern NH on Indian and Nash Stream and VT in the Nulhegan, Paul Stream and Wheeler Stream watersheds is to increase recreational fishing opportunities by restoring impaired streams and building brook trout populations. This particular project should help to enhance a very unique fishery, a

wild, self-sustaining brook trout pond. However, due to the low human population numbers in the Northeast Kingdom of VT, the partners do not expect to see a significant increase in fishing hours from these crossing replacements and instream habitat work.

23. What is the recreational potential of the fishery (i.e., fish abundance, average fish size, type of accessibility for fishing)?

The streams in question provide little fishing opportunity in and of themselves, but they do serve as spawning and nursery streams for the pond. The pond has the potential to hold some especially large brook trout. The largest brook trout captured during the 2013 gill netting was over 16" in length.

24. Describe the outreach or educational components of the project and how many individuals/students will be served.

Education is a prime component of TU's work on a local and national level. This season, VTFW and TU's Home Rivers Initiative project manager visited the nearby TU Youth Trout Camp and gave conservation talks. VTFW demonstrated electrofishing techniques and fish identification and used our recent restoration work to lead the group on a tour of TU's restoration work in the East Branch of the Nulhegan River, which was supported in part by an earlier EBTJV grant. Students toured instream wood addition sites, learned how to assess a stream crossing, and toured two recent 2013 culvert-to-bridge projects that students learned to assess the previous year. For the last five seasons, TU has hired student seasonals and interns for summer employment. Their work has been instrumental in assisting the partnership's work on instream restorations and prioritizing instream habitat improvement.

25. If applicable, please briefly describe how this project will promote adaptation to climate change.

As the climate continues to warm, pond-based brook trout populations will become even rarer. Increased water temperatures will decrease survivability of brook trout in ponds and favor competitors such as minnows and suckers. Improving access to spawning and juvenile rearing habitat and improving that habitat should help the West Mountain Pond brook trout population to persist as pond temperatures increase.

26. Please explain how this project is a good investment of funds, using a quantitative approach where possible and the recreational and / or economic value of the project.

The 22,500-acre West Mountain WMA is one tract of a larger 132,000 acre series of adjacent tracts of lands, that were conserved in 1998, with one of the main purposes being public access and recreation. Our work will reopen 2.5 miles of brook trout nursery stream and restore 1.25 miles of instream habitat within these same streams. Furthermore, TU is committed to its partners on replacement of at least three other crossings on the WMA (Seneca Brook, Notch Pond Brook, and North Branch Paul Stream), which will ultimately open 5.2 miles of stream habitat, and to date the partners have improved approximately 1.5 miles of brook trout habitat on Madison Brook, Paul Stream, and North Branch Paul Stream, with strategic woody habitat additions.

More intangible is the recreational/economic benefit that our restoration efforts will provide to the resource

In addition, the strength of our partnership, with VTFW fish biologists as major partners in all aspects; the USFWS Nulhegan Refuge providing labor and housing for seasonal employees; local colleges providing yearly interns for surveys, assessments, and labor; and the adjacent majority landowner, Weyerhaeuser as an instrumental partner by providing trees for instream restorations and in-kind and cash support for projects on their lands; combines our individual roles with our technical expertise, making this restoration project a winning investment.

SUPPORTING DOCUMENTATION:

- **Literature Cited**
- **References to published interagency fishery or aquatic resource management plans.**

¹ http://www.easternbrooktrout.org/docs/EBTJV_Roadmap_Fact_Sheet.pdf

¹ http://www.easternbrooktrout.org/docs/EBTJV_Roadmap_Fact_Sheet.pdf

¹ http://www.vtfishandwildlife.com/wildlife_nongame.cfm

¹ http://www.easternbrooktrout.org/docs/EBTJV_Vermont_CS.pdf

Appendix

Definitions

Protection: Conservation actions that maintain, or prevent the decline of, aquatic habitat.

Enhancement: Conservation actions that heighten, intensify, or improve specific functions of aquatic habitat.

Restoration: Conservation actions that return natural/historic attributes or functions to aquatic habitat.

Subwatershed Classification Terms

Intact: Subwatersheds with wild brook trout present in $\geq 50\%$ of the habitat.

Reduced: Subwatersheds with wild brook trout present in $< 50\%$ of the habitat.

Extirpated: Subwatersheds that historically contained wild brook trout but currently they are not present.

EBTJV Habitat Objectives

3. Maintain the status, or no net less, of subwatersheds classified as Intact.
4. Strengthen brook trout populations in subwatersheds classified as Intact.
5. Establish self-sustaining brook trout populations in subwatersheds classified as Extirpated.
6. Improve Reduced subwatersheds to Intact classification.
7. Strengthen brook trout populations in subwatersheds classified as Reduced.
8. Maintain Reduced subwatersheds in existing condition.
9. Validate the predictive brook trout status model by assessing status in predicted subwatersheds.
10. Maintain the status, or no net loss, of Intact pond and lake watersheds, and assess the status of 100 unknown subwatersheds.

EBTJV Conservation Priorities

4. Increase recreational fishing opportunities for wild brook trout;
5. Protect the “best of the best” habitat that supports existing, healthy wild brook trout populations;

6. Improve and reconnect adjacent habitats that have a high likelihood of supporting stable wild brook trout populations;
7. Focus on critical wild brook trout spawning and early life history habitat in sub-watersheds classified as Intact;
8. Preserve genetic diversity of wild brook trout populations; and,
9. Conserve unique wild brook trout life history strategies (i.e. lacustrine populations, large river populations, and coastal populations).

EBTJV Common State-Level Objectives:

4. Improve protection of brook trout resources.
5. Maximize brook trout habitat and water quality protection through state and federal agencies.
6. Pursue direct land purchase or conservation easements to protect brook trout habitat.
7. Establish land conservation easements that require the use of Best Management Practices and include the development of stewardship plans.
8. Assist landowners in utilizing existing land conservation programs.
9. Minimize fish stocking impacts to wild brook trout populations.
10. Mitigate factors that degrade water quality.
11. Maintain or restore natural hydrologic regimes.
12. Prevent the spread of invasive species into brook trout habitat.
13. Expand and integrate state, federal, and private programs that support riparian conservation in watersheds that support brook trout populations.
14. Utilize state, federal and private programs that support watershed stewardship programs in systems containing brook trout.
15. Partner with organizations on projects that involve nongame species, migratory birds, and brook trout.

Service Priority Species

	R5	R4
Acipenser brevirostrum, Shortnose Sturgeon	x	x
Acipenser fluviatilis, Lake Sturgeon	x	x
Acipenser oxyrinchus, Atlantic Sturgeon	x	
Acipenser oxyrinchus, Atlantic Sturgeon - Carolina DPS		x
Acipenser oxyrinchus, Atlantic Sturgeon - Chesapeake Bay DPS	x	
Acipenser oxyrinchus, Atlantic Sturgeon - Gulf of Maine DPS	x	
Acipenser oxyrinchus, Atlantic Sturgeon - New York Blight DPS	x	
Acipenser oxyrinchus, Atlantic Sturgeon - South Atlantic DPS		x
Acipenser oxyrinchus desotoi, Gulf Sturgeon		x
Alasmidonta heterodon, Dwarf Wedgemussel	x	
Alosa aestivalis, Blueback Herring	x	x
Alosa alabamae, Alabama Shad		x
Alosa mediocris, Hickory Shad	x	x
Alosa pseudoharengus, Alewife	x	
Alosa sapidissima, American Shad	x	x
Ablema neislerii, Fat Threeridge		x
Ambystoma bishopi, Reticulated Flatwoods Salamander		x
Ambystoma singulatum, Flatwoods Salamander		x
Anguilla rostrata, American Eel	x	x
Atractosteus spatula, Alligator Gar		x
Cambarus hartii, Piedmont Blue Burrower		x
Crassostrea virginica, Eastern Oyster		x
Cryptobranchus alleganiensis bishopi, Ozark Hellbender		x
Crystallaria asprella, Crystal Darter		x
Crystallaria cincotta, Diamond Darter	x	
Cynoscion nebulosus, Spotted Seatrout		x
Cyprinella callitaenia, Bluestripe Shiner		x
Cyprogenia stegaria, Fanshell	x	
Elliptio chipolaensis, Chipola Slabshell		x
Elliptio purpurella, Inflated Spike		x
Elliptioideus sloatianus, Purple Bankclimber		x
Epioblasma capsaeformis, Oyster Mussel	x	
Epioblasma torulosa rangiana, Northern Riffleshell	x	
Erimonax monachus, Spotfin Chub		x
Erimystax cahni, Slender Chub	x	
Etheostoma boschungii, Slackwater Darter		x
Etheostoma chienense, Relict Darter		x
Etheostoma moorei, Yellowcheek Darter		x

Etheostoma okaloosae, Okaloosa Darter		x
Etheostoma percnurum, Duskytail Darter	x	x
Etheostoma raneyi, Yazoo Darter		x
Etheostoma sellare, Maryland Darter	x	
Etheostoma sp., Bluemask Darter		x
Fundulus julisia, Barrens Topminnow		x
Ictalurus punctatus, Channel Catfish		x
Lampsilis subangulata, Shiny-rayed Pocketbook		x
Lampsilis virescens, Alabama Lampmussel		x
Lasmigona decorata, Carolina Heelsplitter		x
Lepomis aurius, Redbreast Sunfish		x
Lepomis macrochirus, Bluegill		x
Lepomis microlophus, Redear Sunfish		x
Limulus polyphemus, Horseshoe Crab	x	
Margaritifera hembeli, Louisiana Pearlshell		x
Marstonia castor, Beaverspond Marstonia		x
Medionidus penicillatus, Gulf Mocassinshell		x
Medionidus simpsonianus, Ochlockonee Mocassinshell		x
Micropterus cataractae, Shoal Bass		x
Micropterus dolomieu, Smallmouth Bass		x
Micropterus henshalli, Alabama Spotted Bass		x
Micropterus punctulatus, Spotted Bass		x
Micropterus salmoides, Largemouth Bass		x
Morone chrysops, White Bass		x
Morone saxatilis, Striped Bass	x	x
Moxostoma robustum, Robust Redhorse		x
Moxostoma sp., Sicklefin Redhorse		x
Noturus flavipinnis, Yellowfin Madtom	x	x
Oncorhynchus clarkii, Cutthroat Trout		x
Oncorhynchus mykiss, Rainbow, Steelhead, Redband Trout		x
Percina caprodes, Logperch		x
Percina jenkinsi, Conasauga Logperch		x
Percina rex, Roanoke Logperch	x	
Percina sp. cf. palmeris, Halloween Darter		x
Percopsis omiscomaycus, Trout-Perch		x
Phencobius mirabilis, Suckermouth Minnow		x
Phoxinus cumberlandensis, Blackside Dace	x	
Pleurobema clava, Clubshell	x	
Pleurobema collina, James River Spiny mussel	x	
Pleurobema pyriforme, Oval Pigtoe		x
Polyodon spathula, American Paddlefish		x

Potamilus capax, Fat Pocketbook		X
Procambarus econfinae, Panama City Crayfish		X
Pteronotropis euryzonus, Broadstripe Shiner		X
Pylodictus olivaris, Flathead Catfish		X
Quadrula sparsa, Appalachian Monkeyface Pearlmussel	X	
Rachycentron canadum, Cobia		X
Salmo salar, Atlantic Salmon	X	
Salmo salar, Atlantic Salmon, GOM DPS	X	
Salmo trutta, Brown Trout		X
Salvelinus fontinalis, Brook Trout	X	X
Salvelinus namaycush, Lake Trout	X	X
Sander canadensis, Sauger		X
Sander vitreus, Walleye		X
Scaphirhynchus albus, Pallid Sturgeon		X
Scaphirhynchus platyrhynchus, Shovelnose Sturgeon		X
Scaphirhynchus suttkusi, Alabama Sturgeon		X
Sciaenops ocellatus, Red Drum		X
Scomberomorus maculatus, Spanish Mackerel		X
Villosa fabalis, Rayed Bean	X	
Villosa perpurpurea, Purple Bean	X	

ⁱ http://www.easternbrooktrout.org/docs/EBTJV_Roadmap_Fact_Sheet.pdf

ⁱⁱ http://www.easternbrooktrout.org/docs/EBTJV_Roadmap_Fact_Sheet.pdf

ⁱⁱⁱ http://www.easternbrooktrout.org/docs/EBTJV_Vermont_CS.pdf



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Agency of Natural Resources

September 9, 2016

Re: Eastern Brook Trout Joint Venture Grant Application – Enhancing and connecting wild brook trout populations in VT’s West Mountain Wildlife Management Area, in conjunction with the NFHAP and VT’s EBTJV Strategy

I am writing this letter in support of Joe Norton’s (Trout Unlimited) EBTJV grant application to restore fish passage and improve brook trout habitat in the north and south forks of West Mountain Pond’s main tributary. We have been working closely with Joe over the last several years to prioritize and implement stream habitat improvement efforts in Vermont’s portion of the upper Connecticut River watershed. This particular project holds special value because it stands to benefit one of the very few wild, self-sustaining brook trout ponds that remain in Vermont. This project is also unique in its setting, being near the center of 132,000 acres of Vermont’s unique and diverse Northeast Kingdom that are protected permanently for conservation and public access. The Long Range Management Plan for the West Mountain Wildlife Management Area, which encompasses West Mountain Pond and its tributaries, calls for restoration of fish passage in streams by removing and replacing undersized culverts and for strategic wood additions to improve trout habitat in streams.

We are confident that this project will increase brook trout abundance in West Mountain Pond and its tributaries. From 2009 to 2011, VTFW and Trout Unlimited worked together to determine the factors that were limiting brook trout biomass in northeastern Vermont and determined that water temperature and instream wood were the two most important limiting factors. Following that study, TU and VTFW collaborated with the US Fish and Wildlife Service and Plum Creek Corporation (now Weyerhaeuser) to conduct strategic wood additions in the Nulhegan River and Paul Stream watersheds. Preliminary results suggest that, on average, brook trout biomass has more than doubled at strategic wood addition study sites.

Thank you for considering this grant application.

Sincerely,

Eric Palmer
Fisheries Division Director



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