

Nash Stream Restoration Project

Project Location: (State, County, Parish or Borough): Coos County, NH

Congressional District of Project: 2

Congressional District of Applicant: 2

EBTJV / NFHAP Funding Requested: \$50,000

Total Project Cost: \$386,280

Total Federal Matching: \$91,280

Total Non-Federal Matching: \$245,000 (including In-Kind)

APPLICANT

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U.S. Fish and Wildlife Service Sponsoring Office

Fish and Wildlife Service Office: Central New England Fishery Resources Complex
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U.S. Fish and Wildlife Service FONS Database Project Number: 53340-2011-285

Coordination Completed with US Fish and Wildlife Service Fisheries Office (Check One):

Yes 8/1/2011 **Date Coordination Began**
 No

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

A. Project Description and Scope of Work - *“Provide a short summary that conveys an understanding of what the project involves and will accomplish. Please describe the following: location, need for the project, purpose, goals, objectives, who will do the work and who owns the lands.”*

Trout Unlimited (TU) is seeking funds to restore approximately 5.5 miles of instream habitat on the mainstem of Nash Stream between its confluence with Emerson and Long Mountain Brooks. This work is part of a multi-year effort known as the Nash Stream Restoration Project (Project), the goal of which is to improve habitat for native wild brook trout (*Salvelinus fontinalis*). The Project is located in northern New Hampshire within the state-owned Nash Stream State Forest, which is cooperatively managed by the New Hampshire Division of Forests and Lands (NHDFL) and the New Hampshire Fish and Game Department (NHFGD). All restoration work will be performed by a qualified contractor(s) under the direct supervision of TU's river restoration director and NHFGD's fish habitat biologist.

Historically, Nash Stream was known as a high quality native brook trout stream that provided exceptional angling opportunities. It is also former Atlantic salmon (*Salmo salar*) habitat. Unfortunately, in 1969, the dam used to release water from Nash Bog Pond for log drives failed, sending a torrent of water akin to the 500-year flood event down Nash Stream. Immediately thereafter and in response to the dam failure, stretches of Nash Stream were straightened and its banks made higher by bulldozers. Consequently, much of the instream and riparian habitat was altered to the detriment of wild brook trout and other fish species. Additionally, many essential spawning tributaries were culverted with undersized pipes that impede fish passage and/or have led to geomorphic instability.

The Project began in 2005 as a joint effort of TU, NHDFL and NHFGD. The objective of the Project is to restore habitat for native fish species in the watershed using well-established geomorphic restoration principles. More than 90% of the watershed is owned by the NHDFL and much of Nash Stream is easily accessible to the public. All of the work conducted to date and planned for the future directly implements one or more of the Eastern Brook Trout Joint Venture (EBTJV) habitat objectives. The work also helps to implement the NH Wildlife Action Plan, NHFGD Inland Fisheries Operational Plans, and TU's Strategic Plan. Ongoing research at Nash Stream funded by the U.S. Fish and Wild Service (USFWS) Science Excellence Initiative Program and Management Assistance Grant is providing valuable data to inform the overall restoration project and similar work elsewhere.

B. Proposed Methods (*Max Characters: 350*) *“Please describe the proposed methods and approach and identify whether funds will be used for engineering/design work, for construction, or for both. Projects that propose the use of potentially controversial techniques should explain why those techniques are appropriate in the specific situation.*

Example: The West Virginia DNR will complete physical restoration of approximately 1 mile of stream bank by resloping steep banks, reestablishing the original channel location, and recreating the riffle/pool complex using natural channel design techniques.”

In the project proposed for funding, TU will restore approximately 5.5 miles of instream habitat. Designs are complete, and permits are pending. Activities will include boulder placements, pool construction, large wood additions, floodplain reconnection, and riparian revegetation. All work will use proven restoration techniques that simulate natural stream morphology and process.

C. Project Timeline *“Provide a brief timeline that outlines the entire project including the targeted month and year of completion. Include baseline and post restoration or management action habitat assessment and long term monitoring of population response.”*

As discussed above, the Project is a multi-year effort that was initiated in 2005. Work to date has consisted primarily of completing a comprehensive baseline environmental assessment, building relationships with partners, and implementing restoration measures to improve mainstem habitat and reestablish access to historical spawning and rearing tributaries.

TU is now seeking funds to continue that work for the next two years, specifically focusing on instream and riparian habitat restoration on the mainstem of Nash Stream from the confluence of Emerson Brook to the confluence with Long Mountain Brook. It is anticipated that construction will commence in September 2011 and that restoration activities in this reach will be completed by December 2012. TU and its partners will implement post-project monitoring, including fish, habitat and geomorphic surveys, to evaluate the results of the various project elements.

D. Proposed Accomplishment Summary (Max Characters: 500) *“Summary must contain the initials EBTJV. Example: Project will remediate chronic habitat and water quality problems resulting from historic agricultural practices in four miles of Big Spring Branch, allowing for the reestablishment of an extirpated native brook trout population. This project is in alignment with the EBTJV and Iowa’s State Wildlife Action Plan. Restoration will also benefit anglers that will have new access to this class I trout stream.”*

The Project seeks to improve aquatic habitat and fish passage so that the watershed supports a healthy, self-sustaining population of wild brook trout. EBTJV funds will be used to restore approximately 5.5 miles of instream and riparian habitat. Ultimately, the Project will restore over nine miles of mainstem habitat and access to more than six miles of tributary habitat for native brook trout. The proposed work helps to advance the EBTJV, the NH Wildlife Action Plan, and TU’s Strategic Plan.

E. State the Importance of the project to the Resource (Max Characters: 350) *“Example: This project will result in restoration and protection of four miles of habitat to support reestablishment of an extirpated native brook trout population, reducing fragmentation of brook trout populations in the Blue River watershed.”*

The overall Nash Stream Restoration Project is critical to maintaining viable, robust wild brook trout populations. The Nash Stream State Forest is one of the few remaining large-scale strongholds for brook trout in New Hampshire. The Project will provide the necessary healthy, connected habitat for all life stages of brook trout in the watershed.

F. Problem and Specific Cause of the Problem (Max Characters: 350) *“Example: Historic logging and subsequent agricultural practices have resulted in chronic sediment and nutrient loading in the stream. Brook trout downstream to the mouth have been eliminated due to habitat loss. Sloughing banks have severely altered sediment transport eliminating riffle/pool habitat.”*

The 1969 dam failure caused major destruction of the instream and riparian habitats of Nash Stream, including loss of pools and wood. The problem was compounded by subsequent channel dredging/berming, and installation of undersized culverts that blocked fish passage. As a result, Nash Stream no longer supports a robust wild brook trout fishery.

G. Objective of the Project with Reference to the Problem (Max Characters: 350) *“Example: The primary objective is to restore riffle/pool habitat, and reduce sediment loading to allow for brook trout repopulation.”*

The objective of the overall Project and this funding request is to restore the habitat for native fish in the watershed using well-established geomorphic restoration principles. Complex, connected habitat will be restored using various techniques including adding boulders and large wood that provide a range of flow, velocity and depth regimes.

H. Partner Information

Partner Name	Contribution In-Kind	Contribution Cash	Federal or Non-Federal	Partner Category	Role of Partner
NH Fish and Game Department	\$20,000	\$25,000	Non-federal	State Agency	Provide technical assistance and cash towards the project
NH Division of Forests and Lands			Non-federal	State Agency	Provide technical assistance and cash towards the project
NH Department of Environmental Services		\$91,280	Federal	State Agency	
Upper Connecticut River MEF		\$200,000	Non-federal	Foundation	

II. MAP OF PROJECT AREA (one only)

See attached.

III. PHOTOGRAPH(S) OF PROJECT AREA (no more than 2, please provide credits and attach photo release forms)

See attached.

IV. PROJECT BUDGET

A. General Requirements

B. Budget Table

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		
NH Fish and Game Department	State Agency	Restoration	Contractual		\$20,000	\$25,000			\$45,000	5.5 miles
NH Department of Environmental Services	State Agency	Restoration	Contractual	\$17,500				\$68,780	\$86,280	5.5 miles
			Personnel	\$7,500				\$22,500	\$30,000	
Upper Connecticut River MEF	Foundation	Restoration	Contractual	\$17,500		\$150,504			\$168,004	5.5 miles
			Personnel	\$7,500		\$49,496			\$56,996	
Total Contribution				\$50,000	\$20,000	\$225,000		\$91,280	\$386,280	5.5 miles

*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 - Equipment, Construction, Contractual, Personnel, 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

Please refer to the website (www.easternbrooktrout.org) for application instructions.

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

Upstream coordinates: 19N 4956549, 306847 (at confluence with Emerson Brook);

Midpoint coordinates: 19N 4953266, 306946; and

Downstream coordinates: 19N 4950195, 305849 (at confluence with Long Mountain Brook).

2. Please list the type of project. Examples include: in-stream habitat, riparian planting, fencing, acid mine drainage restoration, fish passage, reintroduction, assessment, etc.

In-stream and riparian habitat restoration; fluvial geomorphic restoration.

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?

Wild brook trout are currently present at the Project site, but in much limited numbers relative to their potential based on water quality at the site. Brook trout were historically more abundant at the site before the dam failure in 1969. The area is well-known to be suitable for wild brook trout habitat restoration, and recommended for such work in the Nash Stream State Forest Management Plan (1995).

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

The project will improve (restore) the existing habitat using well-established geomorphic principles. TU and its partners have accomplished habitat restoration in areas upstream of the site in question. First, we hired an expert fluvial geomorphologist to conduct a thorough geomorphic assessment of approximately nine miles of the mainstem of Nash Stream. Subsequently, we conducted multiple stream walks with the consulting fluvial geomorphologist and NH Fish and Game personnel (John Magee, Fish Habitat Biologist) to develop final restoration plans. We used geomorphic principles and results from research on wild brook trout, conducted at Nash Stream State Forest using USFWS funds from the Science Excellence Initiative Program and a Management Assistance Grant and from independent research conducted by NHFWD in the Dead Diamond River Watershed nearby.

5. Does the project include a protection component? If so, explain how the project sufficiently protects brook trout habitat. Does the project include fee simple land purchase or easements?

One of the primary reasons the Nash Stream Restoration Project became a reality is because more than 90% of the Nash Stream Watershed is owned by the NH Division of Forests and Lands, and is cooperatively managed by NHFWD. The 1995 Nash Stream Forest Management Plan clearly documents the state's commitment to protecting water quality and aquatic habitat for native fish species, which includes wild brook trout.

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

Approximately 97% (see provided map).

7. List the specific regional EBTJV habitat objectives addressed by the project and describe how the project will contribute towards them.

Regional Habitat Objective #4: Improve 17 reduced subwatersheds to healthy classification by 2012. Nash Stream was determined to be “reduced” and extensive fish surveys and analyses of those data indicate that “reduced” is correct. We firmly believe, and the fish and habitat data demonstrate, that this subwatershed (which is the Nash Stream Watershed, a HUC12) can be restored such that the wild brook trout classification can achieve a classification of “healthy”.

This proposal directly implements the following EBTJV *Strategies for New Hampshire*:

Strategy 3.1.1. Identify and prioritize subwatersheds that are least likely to change with climate and contain suitable habitat for increased occupancy by wild brook trout.

Strategy 3.2.1. Identify and use effective habitat restoration/enhancement techniques.

Strategy 3.2.2. Evaluate brook trout habitat enhancement and restoration actions and monitor the use by wild brook trout.

Strategy 3.2.3. Expand the range of wild brook trout into enhanced and restored habitat through the process of natural recolonization.

Strategy 4.1.2. Evaluate the quality and quantity of brook trout habitat in selected waters not limited by water temperatures.

Strategy 4.1.3. Derive wild brook trout population estimates in suitable waters.

Strategy 4.2.1. Manage for wild brook trout fisheries in waters that support self-sustaining populations at densities >13 lbs/acre.

8. Please state whether the project is an enhancement, restoration or protection project.

The Project is both an enhancement and restoration project. Some areas of Nash Stream are in dire need of restoration; some areas appear to offer suitable to excellent habitat. TU has designed the project to enhance habitat where opportunities to do so exist.

9. State which, if any, EBTJV priority the project addresses:

Key Priorities:

Priority 2. Restore brook trout populations where original habitat conditions exist and where habitats can be restored.

Detailed geomorphic, water quality, habitat and fish survey assessments have documented those areas where suitable habitat exists and those areas in need of restoration.

Priority 3. Monitor and evaluate brook trout population responses to habitat protection, enhancement and restoration projects.

We are committed to monitoring native fish populations throughout the watershed as a means to prioritize and evaluate our restoration actions. We have conducted fish surveys since 2005, and will likely continue to do so through at least 2015.

Priority 4. Complete brook trout distribution and quantitative status assessments.

This is being done annually in specific areas of the watershed to prioritize and evaluate our restoration actions.

Priority 5. Increase recreational fishing opportunities for wild brook trout.

The Project, ultimately, is being done to increase recreational fishing opportunities for wild brook trout.

10. What is the EBTJV subwatershed number and priority ranking for the proposed project watershed for the type of project (enhancement, restoration or protection) being proposed?

Watershed # = 33096

Priority Score = 1.66

Map = NH Best for Restoration Map

Note: Proposed projects in watersheds that are classified as “other subwatersheds” and shown in grey on the state priority maps are not eligible for funding for that type of project.

Although the state maps for Restoration, Enhancement, and Protection show the Nash Stream Watershed in grey, a great deal of empirical data were collected of the fish, water quality and habitat in the Nash Stream Watershed (in 1990 and again in several years since 2005). These data clearly demonstrate that the wild brook trout population in the watershed, especially in the mainstem of Nash Stream, is greatly reduced. In many areas of Nash Stream, there are virtually no wild brook trout despite the fact that water quality is clearly suitable for them. The geomorphic and habitat assessments document that it is the poor physical habitat that has not allowed the wild brook trout to recover from past impacts. All of this data is available upon request.

11. Will the completed project benefit any federally listed threatened or endangered species?

No.

12. Will the completed project benefit any state listed threatened or endangered species?

No.

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

This specific proposed work to be funded by EBTJV will not; however, the overall Nash Stream Restoration Project will certainly increase connectivity within the Nash

Stream Watershed and Upper Ammonoosuc River Watershed. Already, we have removed three culverts and replaced four that provide 100% fish passage in tributaries to Nash Stream. Furthermore, TU and its partners intend to replace at least four more crossings to provide 100% fish passage in three more tributaries.

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

The 1969 flood, subsequent dredging and straightening of Nash Stream following the flood, and poorly designed and constructed culverts that impede fish passage and often cause geomorphic problems are the root causes of the watershed degradation. The impacts from all three of these will be addressed by the overall Project, and the impacts of the flood and dredging will specifically be addressed through the use of the EBTJV funds.

15. Describe the plans for project monitoring and evaluation.

TU and its partners are committed to long-term monitoring of aquatic habitat and fish populations throughout the watershed as a means to evaluate restoration actions. We have conducted extensive fish surveys since 2005, and intend to continue to do so until at least 2015. We have conducted thorough geomorphic assessments of Nash Stream, and will continue to do so after the restoration activities are complete. Much of that post-project assessment of habitat will be in the form of photo-documentation.

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

We expect the wild brook trout population to increase dramatically, especially in those areas where the habitat was most degraded. While scientific fish surveys have yet to be conducted, anecdotal information from an upstream reach where similar restoration work was done in 2010 offers encouraging results. According to one angler: “We got fish in every pool we tried, and multiple fish at that...the large preponderance...were these feisty, fast, perfect little darker wild fish.” In addition, passage studies and fish surveys conducted by NHFGD also suggest that the barrier removals conducted to date have resulted in a greater number of wild trout in each tributary stream.

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, please describe it.

The long term benefit of the project is to restore the natural fluvial process and geomorphic integrity of nine miles of Nash Stream. We expect that the project will be effective for centuries or longer. The project is designed to avoid the need for long term maintenance. First, the boulders placed to provide greater habitat complexity will not move or be buried by sediment, and do not degrade. Second, our approach to adding instream wood is to capitalize on natural wood recruitment. Many of the areas where we already have added instream wood were selected so as to maximize capture of naturally occurring wood as it flows downstream. Our observations indicate that these areas continue to recruit wood well after the initial wood placements.

18. What size stream does the project benefit? Is this stream a tributary or mainstem habitat?

Nash Stream is third- and fourth-order mainstem habitat, generally between thirty and sixty feet wide during the typical lowest flow of the year. Extensive water temperature monitoring each year since 2005 documents that water temperatures are suitable for wild brook trout (mean July water temperature is below the threshold of ~19.5C).

19. What competitive non-native or invasive fish are in the watershed with access (no barrier) to the proposed project?

NHFGD has caught literally thousands of fish in its fish surveys in Nash Stream since 2005. One of those was a stocked brown trout that apparently moved into the lower reaches of Nash Stream from the Upper Ammonoosuc River. All other fish caught were native species. We believe that there are no non-native or invasive fish populations in the Nash Stream Watershed.

20. Are other strains of brook trout, salmonids, or exotics present in the proposed watershed? Where (e.g. upstream, downstream, and distance from project site) does the stocking take place with respect to the project site?

NHFGD has stocked hatchery brook trout into Nash Stream, including areas upstream and downstream of the project site, each year since about 1980. From the thousands of fish caught in fish surveys, none were hatchery trout that were stocked in any prior year. As a result, NHFGD believes the hatchery trout perish the late fall or winter. Additionally, a comprehensive genetics study (funded by the USFWS Science Excellence Initiative Program) documented that hatchery trout are not likely contributing genetic material to the wild brook trout population there.

21. Please describe the current status of the project. Is it planned, permitted and ready to begin? Please identify the targeted month and year for project completion.

The Project is planned and being reviewed by state and federal permitting regulators. We expect to have a permit in hand in September 2011. This will be the eighth environmental permit received for the overall Nash Stream Restoration Project (all were Standard Dredge and Fill in Wetlands permits issued through wetland restoration rules). We will begin work in September or October 2011, and plan to continue restoration work at this site in summer 2012.

22. Will public access be allowed at the project site? If so, what kinds of recreational activities are allowed - public fishing, nature trails, etc?

There is unhindered public access, including fishing access, to the site via the Nash Stream Road. This road is closed to vehicular traffic from about December through early May each year to avoid damage to the road surface. It is used as an important snowmobile corridor in winter. At any time of year, the public can access all areas of the 28,000+ acre watershed on foot. The Cohas Trail, a hiking trail, traverses the Nash Stream State Forest, including the summits of several of the watershed's mountains.

23. What is the recreational quality of the potential fishery?

We believe the Nash Stream watershed has the potential to become a regional high-quality fishery, known well beyond the borders of New Hampshire.

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

Students from Groundwork Lawrence and Somerville previously participated in educational / volunteer opportunities at Nash Stream. The students were trained in culvert assessment protocols and later helped to seed and mulch the riparian area following removal of the middle Farrer Brook culvert. Similar educational and volunteer opportunities will be offered in the future. Outreach activities include maintaining a website about the Project and issuance of periodic press releases.

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

Central to the Project is that much of the watershed's streams are extremely cold in the summer, thus they will serve as potential long-term refugia to climate change in which wild brook trout must deal with a warmer summer. Considering that climate change will reduce the amount of suitable habitat for brook trout we have this specific goal in mind: that Nash Stream State Forest will be one place where wild brook trout can continue to thrive long into the future.

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.

From the first day the Project started, TU and its partners have relied on the empirical data collected on fish, water quality and habitat to determine what restoration activities should occur and where. We continue to operate under the umbrella of "biggest bang for the buck". Because the Nash Stream State Forest is publicly owned, access is unfettered, and it has great potential as long-term coldwater refugia, we believe that this Project is an excellent investment of funds. There is already well-established recreational use of the Forest, including angling. Such use is expected to increase as a result of the project thereby providing an economic boost to one of the more depressed regions of the state.

VI. SUPPORTING DOCUMENTATION:

1. Literature Cited –

Magee, J.A. 2011. Fish Passage May Lead to More Fish. Presented at the Annual Meeting of the Atlantic International Chapter of the American Fisheries Society, Stanhope, Prince Edward Island, Canada, September 20, 2010.

Magee, J.A. 2010. The Use of Instream Wood by Brook Trout in the Nash Stream Watershed. Annual Meeting of the Atlantic International Chapter of the American Fisheries Society, Shelburne, NH USA, September 21, 2009.

Warren, D.R., M. M. Mineau, E.J. Ward and C.E. Kraft. 2010. Relating fish biomass to habitat and chemistry in headwater streams of the northeastern United States. *Environ Biol Fish* (2010) 88:51–62.

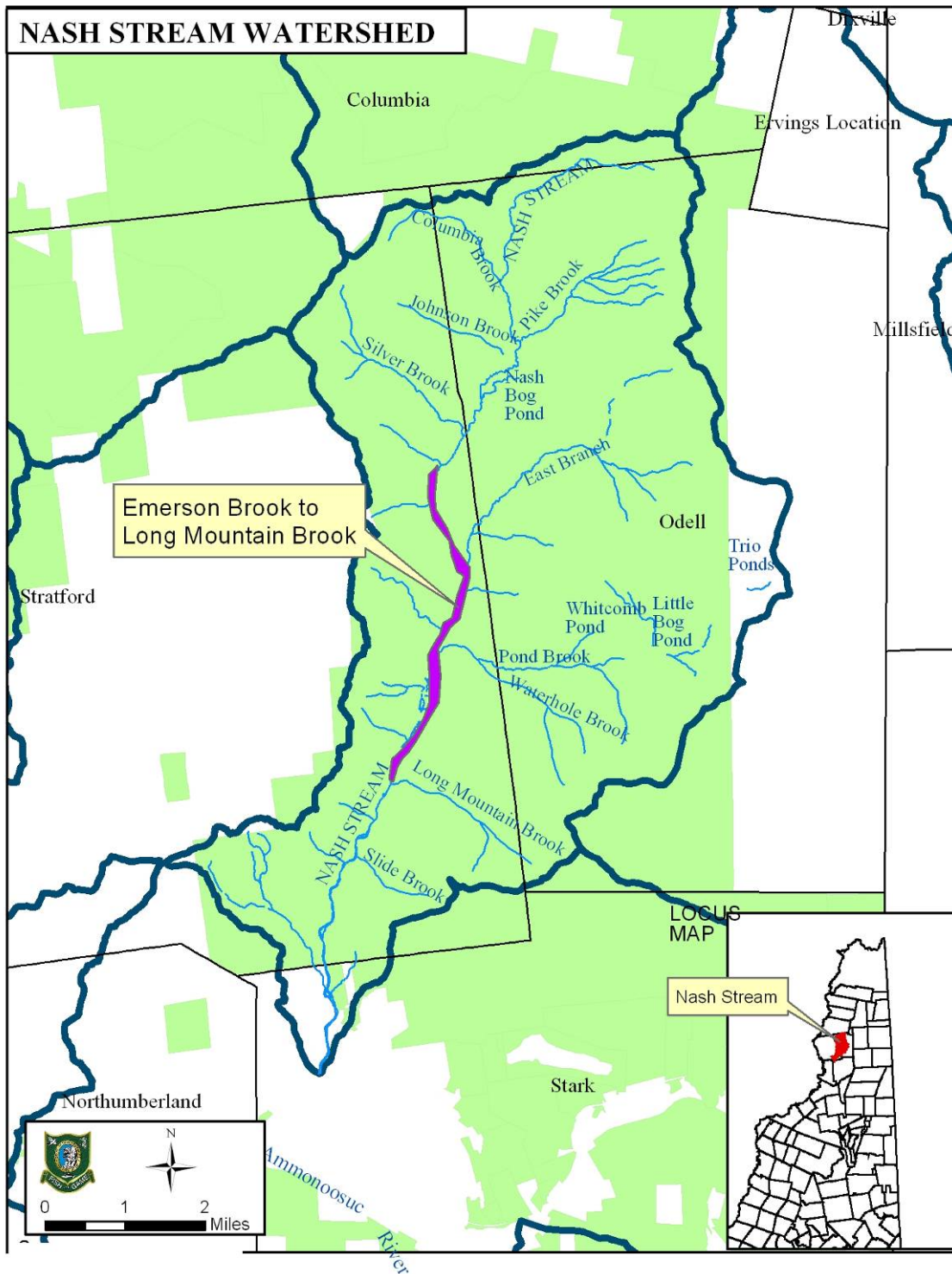
2. **References to published interagency fishery or aquatic resource management plans.**

EBTJV Brook Trout Conservation Strategies – New Hampshire

http://www.easternbrooktrout.org/docs/EBTJV_NewHampshire_CS.pdf

New Hampshire Wildlife Action Plan

http://www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/WAP_pieces/WAP_Chapter_5.pdf



Proposed work area is in Nash Stream itself within purple shaded area.
 1:100,000. Map created August 1, 2011 by John Magee, NHFGD