Project Title

53340-2014-351 - Nash Stream Restoration & Columbia Road Culverts, Odell, Coos County, NH, EBTJV FY2015

Project Location (State, County, Town, Congressional District): New Hampshire, Coos County, Stratford, Odell, Congressional District 2

Congressional District of Project: 2

Congressional District of Applicant: 2

NFHP / EBTJV Funding Requested: $50,000

Total Project Cost: $276,000

Total Federal Matching: $0

Total Non-Federal Matching: $226,000

Applicant:
Project Officer: Jim MacCartney
Organization: Trout Unlimited
Street: 54 Portsmouth Street
City, State, Zip: Concord, NH 03301
Telephone Number: 603-226-3436
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U.S. Fish and Wildlife Service Sponsoring Office:
Project Officer: Martha Naley, Restoration Biologist
Fish and Wildlife Service Office: Central New England Fishery Resources Complex
Street: 103 East Plumtree Road
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USFWS FONS Database Project Number: 53340-2014-351

Coordination Completed with Sponsoring U.S. Fish and Wildlife Service Office (Check One):

X Yes 9/17/2014 Date Coordination Began

_____ No

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

A. Project Description:

B. Proposed Methods (Max Characters: 350): TU will restore approximately 6 miles of instream habitat and reconnect another 2.7 miles. Activities will include boulder placements, pool construction, large wood additions, floodplain reconnection and stream crossing remediation. All work will use proven restoration techniques that simulate natural stream processes and morphology.

C. Project Timeline:

Project Timeline	2015												2016												2017								
Description	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
Construction - Long Mt. Brook to West Side Rd.																																	
Design - Lower Columbia Rd. Culvert																																	
Permitting - Lower Columbia Rd. Culvert																																	
Construction - Lower Columbia Rd. Culvert																																	
Design - Upper Columbia Rd. Culvert																																	
Permitting - Upper Columbia Rd. Culvert																																	
Construction - Upper Columbia Rd. Culvert																																	
Design - Tributary habitat restoration																																	
Permitting - Tributary habitat restoration																																	
Construction - Tributary habitat restoration																																	

D. Proposed Accomplishment Summary (Max Characters: 500): The Project will restore six miles of instream habitat by adding wood and other habitat elements, and will replace two culverts to remediate long-term habitat impairments caused by a catastrophic dam break, subsequent bulldozing and berming, active and passive removal of instream wood and geomorphically-incompatible stream crossings, ultimately resulting in the restoration of thriving wild brook trout populations in Nash Stream and its perennial tributaries.

E. State the Importance of the Project to the Resource (Max Characters: 350): The overall Nash Stream Restoration Project is critical to maintaining viable, robust wild brook trout populations. The Nash Stream 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): A catastrophic dam break in 1969, subsequent channel dredging/berming, and installation of undersized culverts caused major destruction of instream and riparian habitats, including loss of pools and wood. As a result, Nash Stream no longer supports a robust wild brook trout fishery. The tributaries also lack natural levels of instream wood.

G. Objective of the Project with Reference to the Problem (Max Characters: 350): The objective of the overall Project and this funding request is to restore the habitat for native fish in the watershed using well-established process-based 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	$15,000 (in-hand)	Non-Federal	State Agency	Provide fisheries expertise, monitoring equipment, and cash towards the project
NH Division of Forests and Lands	$1,000		Non-Federal	State Agency	Land manager
Upper Connecticut River MEF		$150,000 (likely)	Non-Federal	Corporation	Provide cash for all aspects of the project
Groveton Trailblazers		$40,000 (likely)	Non-Federal	Corporation	Provide cash to purchase materials for culvert replacements

II. MAP OF PROJECT AREA
See attached.

III. PHOTOGRAPH(S) OF PROJECT AREA
See attached.

A. DSC01988: Undersized, poorly functioning culvert and accumulated wood – Columbia Rd.-Nash Stream crossing.
B. DSC00373: Incised reach with eroding bank and lack of pools between Slide Brook and West Side Road.

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		
NH Fish and Game Department	State Agency	Restoration (mainstem & tributaries)	Personnel		$14,000				$14,000	6.0 miles
			Contractual			$15,000			$15,000	
		Monitoring (fish survey)	Equipment & Personnel		$6,000				$6,000	
NH Division of Forests and Lands	State Agency	Restoration (mainstem & tributaries)	Personnel		$500				$500	
		Culvert Removals (Columbia Rd)	Personnel		$500				$500	2.7 miles
Upper Connecticut River MEF	Corporation	Restoration (mainstem & tributaries)	Contractual	$24,000		$110,000			$134,000	
			Personnel	$5,000					$5,000	
			Travel	$1,000					$1,000	
		Culvert Removals (Columbia Rd)	Contractual			$40,000			$40,000	
Groveton Trailblazers	Corporation	Culvert Removals (Columbia Rd)	Materials			$40,000			$40,000	
			Contractual	$20,000					$20,000	
				$50,000	$21,000	$205,000			$276,000	8.7 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 – 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.**

   Barrier name: Upper Columbia Road-Nash Stream Crossing
   Decimal degree longitude: (NAD-1983) 44.7706
   Decimal degree latitude: (NAD-1983) -71.4253

   Barrier name: Lower Columbia Road-Nash Stream Crossing
   Decimal degree longitude: (NAD-1983) 44.7669
   Decimal degree latitude: (NAD-1983) -71.4236

   Nash Stream Mainstem
   Decimal degree longitude: (NAD-1983) Upstream 44.6787
   Decimal degree latitude: (NAD-1983) Upstream -71.4498
   Decimal degree longitude: (NAD-1983) Downstream 44.6481
   Decimal degree latitude: (NAD-1983) Downstream -71.4654

   Nash Stream Tributaries: various throughout the watershed.

2. **Please list the type of project (protection, enhancement, restoration; see definitions in the Appendix).** 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 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-establish process-based restoration principles. TU and its partners have already accomplished significant habitat restoration in other parts of the Nash Stream watershed including the mainstem and two perennial tributaries. To do so, 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 NHFGD in the Dead Diamond River watershed nearby. Finally we hired a contractor to implement the designs under the supervision of TU staff, supported by NHFGD personnel.

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?** 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 NHFGD. 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 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).**

   4. Improve Reduced subwatersheds to Intact classification.
   - The overall goal of the project is to restore natural channel process in the Nash Stream watershed and thereby improve aquatic habitat for its native fauna, including brook trout.

   5. Strengthen brook trout populations in subwatersheds classified as Reduced.
   - Restoration of natural channel processes and the resulting improvements in the quality and connectedness of aquatic habitat will help to support and strengthen wild brook trout populations in the Nash Stream watershed.

   6. Maintain Reduced subwatersheds in existing condition.
   - The project seeks to improve and reconnect instream habitat for wild brook trout and not degrade it from its existing condition.

   7. Validate the predictive brook trout status model by assessing status in predicted subwatersheds.
   - Monitoring (fish surveys) performed as a component of the project is expected to provide a much more comprehensive and complete picture of the status of brook trout in the Nash Stream watershed and thus help validate the predictive model.

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

   1. Increase recreational fishing opportunities for wild brook trout;
   3. Improve and reconnect adjacent habitats that have a high likelihood of supporting stable wild brook trout populations;
   5. 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):**

2. Maximize brook trout habitat and water quality protection through state and federal agencies.
6. Minimize fish stocking impacts to wild brook trout populations.
7. Mitigate factors that degrade water quality.
8. Maintain or restore natural hydrologic regimes.
11. Utilize state, federal and private programs that support watershed stewardship programs in systems containing brook trout.
12. 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 # = 33096**
    - **Subwatershed Status Classification (Intact, Reduced, Extirpated; terms are defined in the Appendix) =** Reduced
    - **Subwatershed Priority Score = 1.66**
    - **Subwatershed Map Used =** New Hampshire priority scores for Reduced subwatersheds, and Eastern Brook Trout: Status and Threats - New Hampshire

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)?** No.

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

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 the Upper Ammonoosuc River watershed to which it drains. The adjacent subwatershed to the east, Phillips Brook, is classified as Intact and there are no barriers on the Upper Ammonoosuc River between Nash Stream and Phillips Brook. Already, we have removed three culverts and replaced seven others that provide 100% fish passage in tributaries to Nash Stream.

14. **What are the root causes of the watershed degradation and which of these are addressed by the project?** A catastrophic dam break in 1969, 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 effectiveness monitoring and evaluation (i.e. measuring the project's success in meeting its goals/objectives).** 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 2020. 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. Some of it will be monitoring conducted in cooperation with several universities and by the NH Fish and Game Department (NHFGD).

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. Fish surveys conducted by NHFGD in the vicinity of instream restoration work completed on upstream reaches of the mainstem of Nash Stream since 2010 show a positive response including occupation by wild brook trout of newly created habitat. Anecdotal information paints a similar story. One angler reported: "We got fish in every pool we tried, and multiple fish at that… 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 to maintain project benefits, please describe it.** The long term benefit of the project is to restore natural fluvial processes, and improve and reconnect instream habitat of nine miles of Nash Stream to achieve Intact status of its wild brook trout. 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 and provide ideal habitat for various life stages of wild brook trout. Finally, reconnected habitat helps provide resiliency for wild brook trout populations by enabling individuals to recolonize former habitat or expand to new suitable habitat.

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)?** Yes, the Nash Stream Forest Management Plan (1995), Nash Stram Forest Management Plan Updates and Revisions (2002), and NH Wildlife Action Plan (2010).

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?** 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.

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. NHFGD has dramatically reduced the number of hatchery fished stocked in Nash Stream since initiation of the project so as to minimize competition with wild native brook trout. 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.

20. **Please describe the current status of the project. Is it planned, permitted and ready to begin?** Significant work has already been accomplished at Nash Stream. Numerous stream crossings have been remediated, and several miles of instream habitat work have been completed. This proposal continues that work. Designs are completed for the proposed mainstem restoration work between Long Mountain Brook and the West Side Road bridge, and a Standard Dredge and Fill Permit (#2013-02064) from the NH Wetlands Bureau is in hand. Designs for the Columbia Road stream crossings are expected to be similar to those used elsewhere in the Nash Stream Forest and which were previously permitted by the NH Wetlands Bureau.

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.?** 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 Cohos Trail, a hiking trail, traverses the Nash Stream Forest, including the summits of several of the watershed's mountains.

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?** Restoration in the mainstem will certainly increase recreational fishing opportunities for wild brook trout. Extensive fish surveys conducted since 2005 have documented that very few wild brook trout exist in the mainstem between Long Mountain Brook and the West Side Road Bridge, due to habitat impairments. Long-term research in the tributaries by NHFGD has shown that more instream wood leads to a much higher biomass of wild brook trout. Because the tributaries have relatively low amounts of instream wood, restoring this important habitat element will lead to increased wild brook trout biomass.

23. **What is the recreational potential of the fishery (i.e., fish abundance, average fish size, type of accessibility for fishing)?** We believe the Nash Stream watershed has the potential to become a regional high-quality fishery, known well beyond the borders of

New Hampshire. Only one year after we constructed large wood jams on a section of the mainstem of Nash Stream, we found wild brook trout that were more than twice the length and five times the weight of those that were present prior to the restoration work there. Additionally, we caught about ten times the number of wild trout in this section after restoration work was completed. Clearly, the work is quickly accomplishing its goal to provide excellent recreational fishing opportunities for wild brook trout.

24. **Describe the 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. Additionally, students from Plymouth State College and the University of New Hampshire have participated in, and conducted various research projects either independently or in conjunction with studies performed by NHFGD. Similar educational and volunteer opportunities are expected to continue moving forward. 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 Forest will be a stronghold 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.** Since initiation of the Project, TU and its partners have relied on the empirical data collected about 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 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.

    Some of the work completed to date was supported with funds from the Eastern Brook Trout Joint Venture. Those funds assisted with implementation of more than four miles of instream habitat restoration between Emerson Brook and Long Mountain Brook and resulted in Nash Stream being named to the National Fish Habitat Partnership's list of ten "Waters to Watch" for 2014. This proposal seeks to build on that previous investment by completing mainstem habitat restoration work downstream of Long Mountain Brook and remediating two undersized and poorly functioning culverts in the upper mainstem that impede fish passage and degrade water quality.

SUPPORTING DOCUMENTATION:

- **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.

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

Nash Stream Forest Management Plan (1995)
https://www.nhdfl.org/library/pdf/library/pdf/NashStreamForest%20Management%20Plan%201995.pdf

Nash Stream Forest Management Plan Updates and Revisions (2002)
https://www.nhdfl.org/library/pdf/library/pdf/NashStreamManagementPlanUpdateRevisions2002.pdf

New Hampshire Wildlife Action Plan
http://www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/WAP_pieces/WAP_Chapter_5.pdf

Eastern Brook Trout: Status and Threats - New Hampshire
http://easternbrooktrout.org/reports/fact-sheets/brookie_NH.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 ≥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

1. Maintain the status, or no net less, of subwatersheds classified as Intact.

2. Strengthen brook trout populations in subwatersheds classified as Intact.

3. Establish self-sustaining brook trout populations in subwatersheds classified as Extirpated.

4. Improve Reduced subwatersheds to Intact classification.

5. Strengthen brook trout populations in subwatersheds classified as Reduced.

6. Maintain Reduced subwatersheds in existing condition.

7. Validate the predictive brook trout status model by assessing status in predicted subwatersheds.

8. Maintain the status, or no net loss, of Intact pond and lake watersheds, and assess the status of 100 unknown subwatersheds.

EBTJV Conservation Priorities

1. Increase recreational fishing opportunities for wild brook trout;

2. Protect the "best of the best" habitat that supports existing, healthy wild brook trout populations;

3. Improve and reconnect adjacent habitats that have a high likelihood of supporting stable wild brook trout populations;

4. Focus on critical wild brook trout spawning and early life history habitat in sub-watersheds classified as Intact;

5. Preserve genetic diversity of wild brook trout populations; and,

6. Conserve unique wild brook trout life history strategies (i.e. lacustrine populations, large river populations, and coastal populations).

EBTJV Common State-Level Objectives:

1. Improve protection of brook trout resources.

2. Maximize brook trout habitat and water quality protection through state and federal agencies.

3. Pursue direct land purchase or conservation easements to protect brook trout habitat.

4. Establish land conservation easements that require the use of Best Management Practices and include the development of stewardship plans.

5. Assist landowners in utilizing existing land conservation programs.

6. Minimize fish stocking impacts to wild brook trout populations.

7. Mitigate factors that degrade water quality.

8. Maintain or restore natural hydrologic regimes.

9. Prevent the spread of invasive species into brook trout habitat.

10. Expand and integrate state, federal, and private programs that support riparian conservation in watersheds that support brook trout populations.

11. Utilize state, federal and private programs that support watershed stewardship programs in systems containing brook trout.

12. 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 fluvescens, 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 psuedoharengus, 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
Cyprinelia callitaenia, Bluestripe Shiner		x
Cyprogenia stegaria, Fanshell	x	
Elliptio chipolaensis, Chipola Slabshell		x
Elliptio purpurella, Inflated Spike		x
Elliptoideus 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 boschungi, 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 auritus, 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, Smallmouthl 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 mirabillis, Suckermouth Minnow		x
Phoxinus cumberlandensis, Blackside Dace	x	
Pleurobema clava, Clubshell	x	
Pleurobema collina, James River Spinymussel	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 platorynchus, 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	