

**ALARKA HEADWATERS HABITAT CONNECTIVITY &
SEDIMENTATION REDUCTION PROJECT
Alarka Creek, Swain County, North Carolina**

Project Location (State, County, Town): Swain County, North Carolina

Congressional District of Project: NC 11

Congressional District of Applicant: Trout Unlimited Southeast Office - NC 10; TU National Office - VA 8

NFHP/EBTJV Funding Request: \$50,000

Total of Other Federal Funding Contributions: \$37,350

Total of Non-Federal Funding Contributions: \$105,363

Total Project Cost: \$192,713

Applicant

Project Officer: Andy Brown, Coldwater Conservation Manager – Southeast Region

Organization: Trout Unlimited

Street: 160 Zillicoa Street

City, State, Zip: Asheville, NC 28801

Telephone Number: (828) 674-1067

Email Address: abrown@tu.org

National Office Address

Street: 1777 N. Kent Street, Suite 100

City, State, Zip: Arlington, Virginia 22209

Briefly describe the mission of your organization: To conserve, protect and restore North America's coldwater fisheries and their watersheds

U.S. Fish and Wildlife Service Sponsoring Office

Project Officer: Tripp Boltin

Fish and Wildlife Service Office: Wadmalaw Island Conservation Office

Street: PO Box 69

City, State, Zip: Wadmalaw Island, SC 29487

Telephone Number: (843) 819-1229

Email Address: Walter_Boltin@fws.org

US Fish and Wildlife Service FIS Activity Number: 1991688723

The FIS Activity Number can be obtained from your sponsoring Service Fishery Resource Office. They will get this number after entering the Project in the Service's FIS Database.

Coordination Completed with Sponsoring Service Fishery Resource Office (Check One):

Yes 9/3/2020 Date Coordination Began

No

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

A. Statement of Project Need: The long-term viability of native Eastern Brook Trout in the southern Appalachian mountains is threatened primarily by three stressors: 1) loss of connectivity between fish populations for reproduction and gene flow and between fish and their available habitat; 2) sedimentation impacts on fish health and habitat; and 3) loss of cold waters due to climate change and high elevation land loss/degradation. This project directly addresses the first two stressors by replacing a double-piped culverted stream crossing on National Forest System Road 86 (FSR86) with a bottomless arch pipe (AOP) over Alarka Creek and adjusting the elevation and drainage features on the graveled road approaches to alleviate existing storm sediment inputs. This project is Phase I of a three-phased connectivity and sediment reduction project, with Phases II and III in years two – four involving replacement of two fords with AOP structures, graveled road improvements that reduce sedimentation, and a spruce bog restoration. All phases of this project occur within a high elevation (~4,000 feet) protected area in 100% ownership by the Nantahala National Forest, which indirectly addresses the third stressor. ***This work is needed to enhance genetic diversification and create a more robust, resilient and thriving group of brook trout populations better able to withstand a warming climate.*** It is a project that supports goals of the State of NC’s Wildlife Habitat Action Plan, Trout Management Plan and the Pisgah-Nantahala National Forest’s Land Resources Management Plan.

We are requesting \$50,000 from the EBTJV for Phase I (Year 1) of this four-year project. Phase I will reconnect and enhance gene flow among allopatric native Eastern Brook Trout populations and make available an additional 2,500 feet of stream habitat to the brook trout population currently below the culvert. Also as part of Phase I (counted as match, but not included in our request from EBTJV) is the removal of another crossing on the closed and gated FSR86-F over an unnamed tributary to Alarka Creek, which will open an additional 2,000 feet of stream habitat to this allopatric native brook trout catchment. The entirety of this work is being performed in a protected headwaters area managed by the Nantahala National Forest and is protected from adverse impacts of non-native rainbow trout downstream by a 150-foot waterfall that serves as a natural barrier. Phase I will result in a total of 4,500 feet of habitat reconnection. Phase II, only mentioned in this proposal to provide context and for which no funds are being requested here, will enhance connectivity for over 1 more mile. ***This work will result in over two miles of restored connectivity for Phases I and II combined.***

As the partners work on Phase I, we will perform other assessments at the project site and downstream in the watershed to evaluate our AOP success in Phase I and help determine a plan of action on Phases II and III that may also include extending the range of allopatric native brook trout into downstream areas where they are known to exist at the present time concurrently with wild rainbow trout.

While native Eastern Brook Trout is the target species for this project, other beneficiaries at the project site include the Southern Pygmy Salamander and Southern Appalachian Salamander, both of whom we know to be here, and potentially the Santeetlah Dusky Salamander (no records but high potential presence). As part of our AOP construction, we will include both Eastern Hemlock and Red Spruce as key pieces of the vegetation mix. Eastern Hemlock is suffering severe decline throughout the region and is an essential historical component of Alarka Creek. Red Spruce is also a keystone species here in the headwaters with Alarka Creek being the southernmost extent of that significant natural community. Because conservation benefits flow downstream, our work in the Alarka headwaters will also benefit Eastern Hellbender, Smoky Dace and Olive Darters all of whom are known to exist historically lower in the watershed.

EBTJV funding is needed to advance Phase I of this broader three-phased Eastern Brook Trout driven watershed scale restoration in Alarka Creek and sustain the momentum generated by this partnership for Phases II – III.

Partners currently include: Nantahala National Forest, National Forests in NC, NC Wildlife Resources Commission, Trout Unlimited, Eastern Band of the Cherokee Indian, Mainspring Conservation Trust, Mountain True, and American Rivers.

- B. Project Purpose (Max Characters: 350):** We envision the 2.33 square mile Alarka Headwaters above the falls as a thriving, interconnected, sustainable population of allopatric native Eastern Brook Trout free of threat from anthropogenically generated sedimentation and with financial & partnership momentum to extend this range downstream at least 2 more square miles and potentially more.

- C. Project Objectives:** This project is an on-the-ground design and construction project. Project objectives are outlined in chronological order of expected execution. In summary, the objectives relate to *Watershed Survey; Phase I AOP Design, Construction and Associated Contracting processes; Monitoring and Evaluation of Project Effectiveness; Brook Trout Population and Range Expansion Planning; Phase II AOP Design, Construction and Associated*

Contracting; Phase III Spruce Bog Restoration; and Brook Trout Population and Range Expansion Implementation.

Objective 1) Perform watershed survey for entirety of Alarka Creek, including both the headwaters that hold allopatric populations of brook trout (project site for Phases I-III) and downstream areas below Alarka Falls that contain populations of brook trout with wild rainbow trout. Survey will include: a) natural and man-made barrier inventories; b) electrofishing tributaries to supplement existing fish data; c) pebble counts and riffle embeddedness measurements; and d) photo-documentation of non-point sources of sediment inputs. Survey will provide baseline data to feed monitoring and evaluation as well as discernment on feasibility and plan for native brook trout range extension.

Objective 2) Obtain design for AOP (bottomless arch) and stream simulation for the Phase I replacement of the corrugated metal culvert stream crossing on FSR86 for which we are requesting EBTJV funding. *Monies are in-hand and design is expected in March 2021.*

Objective 3) Secure contract agreement with qualified construction contractor to remove culverts on FSR86 and FSR86-F and build the AOP structures (bottomless arch on FS86; ford on FS86-F) consistent with USFS stream simulation design standards. Ford construction and stream simulation on FS86-F will be paid from other sources but costs are included as match in this proposal.

Objective 4) Complete construction of the FSR86 bottomless arch culvert and FSR86-F ford and associated stream simulation hydrological modifications. Revegetate sites incorporating Red Spruce and Eastern Hemlock as species.

Objective 5) Evaluate fish movement through both AOPs. Evaluate sediment reduction from graveled road elevation changes and modifications to road drainage features.

Objective 6) If determined feasible, develop plan for expanding range of native brook trout into lower reaches of Alarka Creek below waterfall.

Objective 7) Repeat process identified in Objectives 2 – 4 for the design and implementation of Phase II AOPs.

Objective 8) Implement native brook trout expansion plan into lower reaches of Alarka Creek if determined feasible.

Objective 9) Design and implement Phase III Spruce Bog Restoration work at Alarka Headwaters and other identified areas.

D. Project Methods/Approach: There are a variety of methods and approaches being utilized on this project depending upon activity.

Watershed Survey: *Anthropogenic barrier surveys* will be performed using the barrier survey protocol developed by the Southeast Aquatic Resources Partnership (SARP) while *natural barrier surveys* will be performed using Trout Unlimited's Waterfall Barrier Survey. Data from both will be collected using ArcGIS Survey123 and it will be stored with SARP and TU. The barrier surveys will be performed by Trout Unlimited, Mainspring Conservation Trust, and the Eastern Band of Cherokee Indian Natural Resources. Existing presence-absence trout survey data collected by NC Wildlife Resources Commission throughout the Alarka watershed will be compiled and studied by partners. This collection will be enhanced with new trout data as deemed necessary and collected by the NC Wildlife Resources Commission. Sedimentation impacts will be documented using modified Wolman pebble counts, NC Department of Environmental Quality riffle embeddedness estimations and photo documentation of overland non-point sources of sediment. The survey will also include temperature and pH collections. The survey will be performed watershed-wide (exact locations still to be determined). This survey is intended to aid monitoring and evaluation of sediment reductions gained from the graveled road improvements constructed in all three phases of this project at the headwaters of Alarka Creek. It will also be essential in helping us answer realistically how far the range of brook trout can be extended downstream into Alarka Creek. All partners will be involved in development of the survey design.

Phase I AOP (FSR86 Bottomless Arch to be paid in part by EBTJV): The design of this AOP will be solicited from a private engineering firm qualified in both structural and hydrological engineering to design bottomless arch structures using US Forest Service stream simulation design standards (or equivalent) and USFS road specifications. Because the USFS has a bottomless arch culvert in-hand that has been deemed satisfactory for this project by USFS engineers and key partners, the design will not need to include evaluation and selection of AOP size – saving on design costs. Trout Unlimited will bid the design, and in concert with the USFS and NC Wildlife Resources Commission at minimum, evaluate bids and award the design contract. TU will award and administer the design contract. TU, NNF and NCWRC will participate and provide feedback throughout the design process. Upon obtaining a satisfactory design, TU will solicit bids from qualified construction contractors to build the structure. Both USFS and NCWRC will evaluate and select the winning bid. TU will award and administer the construction contract. Since this project will be on a USFS road, USFS will be ultimately

responsible for the satisfactory installation of this AOP structure and associated modifications to the graveled road approaches leading to the stream crossing. TU and the USFS have a master stewardship agreement under which we routinely collaborate on AOP projects on national forest system roads. TU and the NCWRC also have a memorandum of agreement that outlines our collaboration on AOP and related coldwater conservation work. USFS and NCWRC also have a standing memorandum of agreement.

Phase I AOP (FSR86-F Ford to be paid by other sources than EBTJV but used as match):

This project is on a gated national forest system road that will be open only in case of wildlife treatment or other emergencies. The National Forests in NC Forest Hydrologist routinely works with private contractors to remove smaller culverts and replace them with fords on such gated roads. The hydrologist is trained in USFS stream simulation, natural stream channel design techniques and ford construction and works collaborative with USFS road engineering staff. The hydrologist has made a determination that the road and stream intersection here will accommodate a ford, eliminating need for an AOP design. To construct the ford, the Forest Hydrologist will work directly with the construction contractor hired for the bottomless arch on FSR86 to build this ford in the same general timeframe. TU will hold the contract with the contractor and will negotiate the price for this work during the contracting process for the bottomless arch.

Monitoring & Evaluation

There are three essential items to monitor and evaluate in this project: 1) the construction of the project to ensure that it is built according to designs, specifications and project objectives; 2) fish passage; and 3) reductions in sediment gained through the road improvements.

The bottomless arch construction will be monitored throughout the construction phase by fisheries biologists, a hydrologist, and engineers to ensure it meets the contract design specifications. The final inspection will evaluate the success of the fish passage by measuring the stream gradient through the arch and the maximum step heights of the new channel. The movement of trout through the new crossing will also be assumed based on the barrier rating given crossing pre and post construction using the SARP barrier inventory protocol. The NC Wildlife Resources Commission will continue to electro-fish this area every 5 - 10 years as is on their current trout survey schedule for western NC. The most recent survey was performed just last month in September 2020 for this project. If capacity exists, the NCWRC would like to perform genetic samples but cannot yet commit to that effort.

The sediment effects on habitat piece of this project will build off the data collected during the watershed survey discussed above. It will focus specifically in the headwaters above Alarka Falls and include data collected at Year 1 (pre and post Phase I construction), Year 3 and Year 5. Five to seven data stations or more will be installed upstream of the culvert replacement (including above Phase II ford replacements) and an equal number or more stations installed downstream of the Phase I culvert replacement. Pebble counts and riffle embeddness measures will be taken prior to construction and after construction. Due to the low gradient of this high hanging valley and ongoing sediment inputs from the graveled road that cannot be addressed until Phase II, we admit that it is doubtful that any meaningful change will be detected in particle size or particle embeddedness characteristics within the first year of the completion of Phase I. Yet we do want to establish this baseline from which possible changes can begin to be detected in Years 3 and 5. Our photo documentation of sediment inputs from the graveled road and associated volume estimations (lengthxwidthxdepth) pre and post construction of Phase I should deliver more immediate qualitative information.

This concludes objectives directly related to the EBTJV funding request for Phase I. The objectives below are shown to illustrate the multi-phased and multi-year scope into which the Phase I EBTJV request fits.

Phase II AOP and Road Realignment

The US Government has recently passed the Great American Outdoors Act (GAOA), which will allocate funding to federal land management agency maintenance backlogs. The Nantahala National Forest and TU prioritized the Alarka Headwaters AOPs and road re-alignment as top projects meriting attention. Should GAOA funding be allocated to these projects, it would come in 2022 or later. This timing is well aligned with our time schedule. The methods and approaches outlined above for design and implementation of the Phase I bottomless arch AOP would apply here and involve the same key partners.

Phase III Spruce Bog Restoration

During construction of the uppermost Phase II AOP, attention will be paid to the spruce bog located just to the west and north of the road to ensure that any changes in elevation of the road and stream do not adversely impact the hydrology of this wetland. Additional design and/or interdisciplinary team consultation within the Nantahala National Forest and involving all of our partners is needed. This Phase III component of the project is likely 3 to 4 years out.

Brook Trout Population & Range Expansion

High quality data collected over a number of years in the Alarka Headwaters substantiates the purpose and need for the new bottomless arch project specified in Phase

I and for which the partners request EBTJV investments. In future years however, we would like to expand the size of this allopatric brook trout catchment if it is determined feasible to do so. The range expansion objective involves both planning and execution efforts but will be performed during Phases II and III. Data collected during the watershed survey performed as part of Phase I will be used to help determine feasibility of any expansion plans. If deemed a realistic undertaking, the partners will identify other data needs, perform collections and develop a target expansion point in the Alarka watershed building off of natural or man-made barriers. Partners will then develop a plan for removing non-native wild rainbow trout and potentially moving brook trout from one area in the watershed to another.

E. Project Timeline:

Phase I – Year 1 (Year 2021)

- Objective 1: Watershed Survey (January – March)
- Objective 2: Phase I AOP Design for Bottomless Arch Complete (By Mid-March)
- Objective 3: Phase I AOP Bottomless Arch & Ford Construction Contract (June)
- Objective 4: Phase I AOP Arch & Ford Construction Complete (October 15)
- Objective 5: Evaluate Phase I AOPs on Connectivity & Sediment (By December)

Phase II – Year 2 (Year 2022)

- Objective 6: Determine Brook Trout Expansion Feasibility. Develop Plan (All Year)
- Objective 7: Phase II AOPs on Two Fords Design & Construction (All Year)

Phase III – Year 3 and 4 (Year 2023 and 2024)

- Objective 8: Implement Brook Trout Expansion Plan
- Objective 9: Phase III Spruce Bog Restoration Planning & Implementation

F. Project Milestones:

- Developing Project Concept (Developed 2019; Revised and Complete 2020)
- Convening Partners (Complete 2020) – Partnership includes Nantahala National Forest, NC Wildlife Resources Commission, Trout Unlimited, Mainspring Conservation Trust, American Rivers, Eastern Band of Cherokee Indian, and Mountain True. Project fits within context or sub-group of Little Tennessee Native Fish Conservation Partnership.
- Matching Funds and In-Kind Services Sought & Procured (In Process) – Obtained NC Wildlife Resources Commission \$25K cash for Phase I AOP Design; Obtained National Forest in NC Permission for Use of Existing Bottomless Arch Pipe and Determined That It Will Work Here; Advertised Project to NC Land and Water Fund for Potential Cash Match and Proposal Due Feb 2, 2021 is in Process; Obtained In-Kind Service Commitments from All Partners; Advertised Project to US Forest Service Regional and National Office for Use of Great American Outdoors Act funds.

Other Funding Sources being sought including proposal to Trout and Salmon Foundation.

- Watershed Survey Complete
- Phase I AOP Design
- Phase I AOP Construction
- Positive Funding Award Notifications from NC Land & Water Fund & GAOA
- Evaluation Showing Brook Trout Accessing More Habitat & Other Populations
- Phase II Projects Moving Forward
- Brook Trout Range Expansion in Alarka Creek Deemed Feasible
- Projects Implemented to Expand Brook Trout Range
- Phase III Bog Restoration Moving Forward

G. Environmental Compliance Review Requirements: The National Forests in NC has completed National Environmental Policy Act (NEPA) review for the Phase I AOPs, which includes Endangered Species Act and National Historic Preservation Act assessment requirements. A signed decision is on record. For Phase II, all staff reviews for NEPA compliance have been performed and a signed favorable decision is expected soon. NEPA review is still needed for the Phase III spruce bog restoration. When we commence design work on the Phase I AOP, we will approach the NC Department of Environmental Quality for Section 401/404 permits. All in-stream construction work will be complete prior to October 15 of any calendar year to maintain compliance with the State of NC Trout Moratorium administered by our NC Wildlife Resources Commission partner.

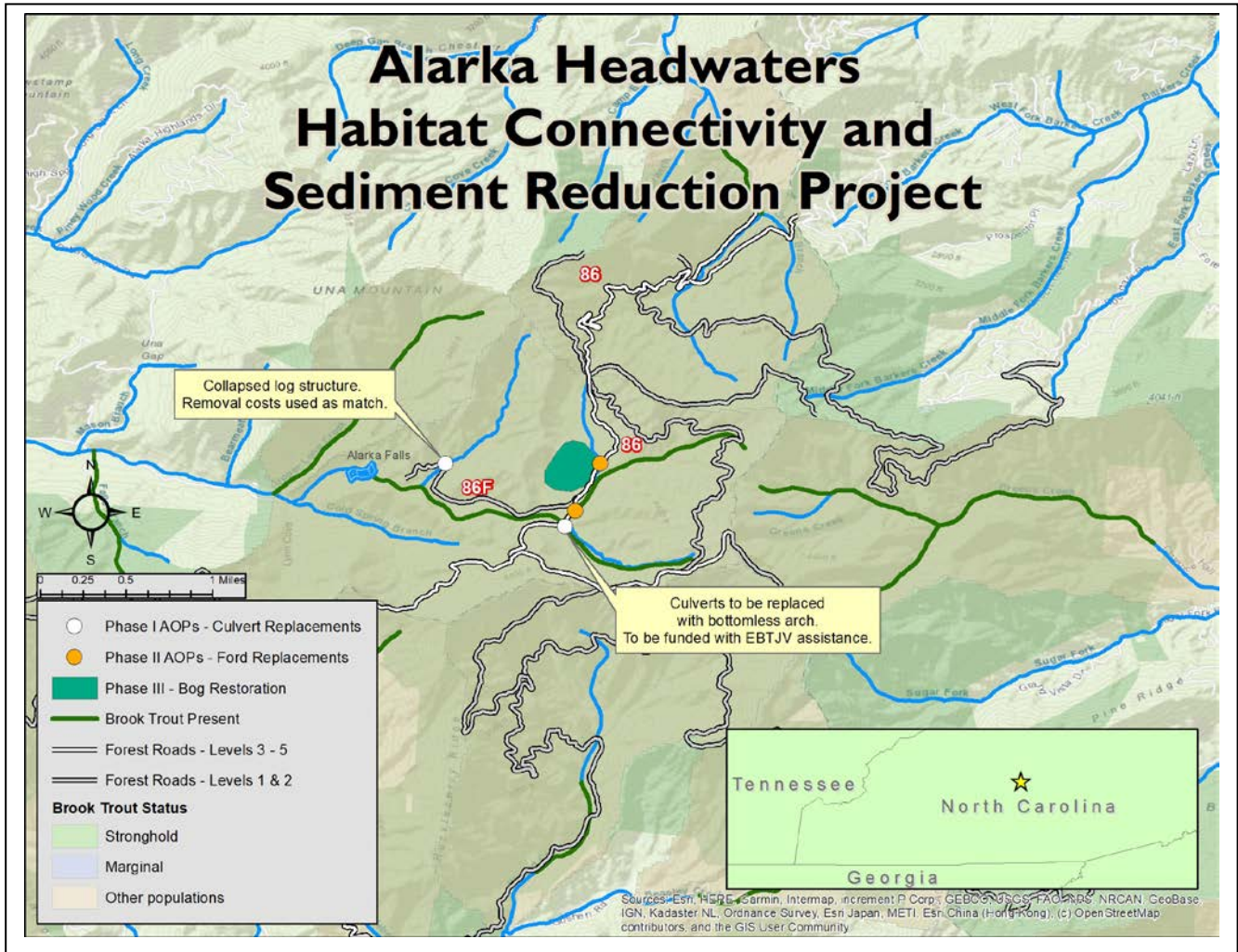
H. Key Project Personnel: 1) Jason Farmer, Fisheries Biologist – Nantahala National Forest. 2) Brady Dodd, Forest Hydrologist – National Forests in North Carolina; 3) Scott Loftis, Mountain Aquatic Habitat Coordinator – NC Wildlife Resources Commission. 4) Andy Brown, Coldwater Conservation Manager for Trout Unlimited, Southeast Region. 5) Jordan Smith, Executive Director – Mainspring Conservation Trust; Bill McLarney, Senior Scientist and Aquatic Programs Specialist – MCT; Jason Meador, Aquatics Program Manager – MCT. 6) Gail Lazaras, Associate Director of American Rivers, Rivers of Southern Appalachia and the Carolinas. 7) Callie Moore, Western Regional Director – Mountain True. 8) Michael LaVoie, Natural Resource Manager – Eastern Band of Cherokee Indian.

I. Partner Information:

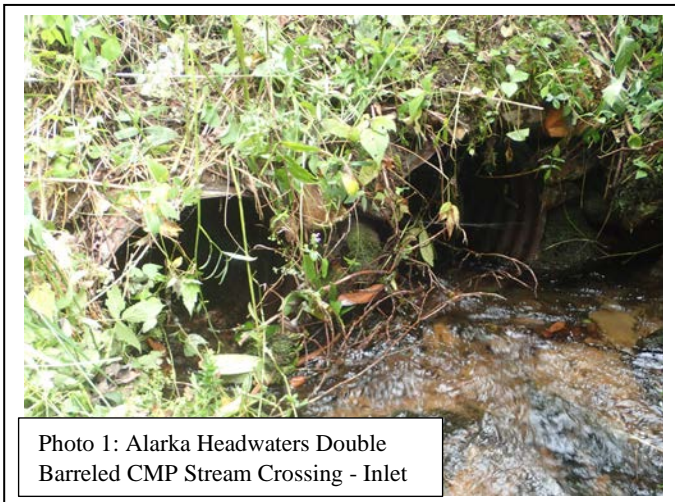
Partner Name	In-Kind Contribution (In-hand or Requested)	Cash Contribution (In-hand or Requested)	Federal or Non-Federal Contribution	Partner Category*
Trout Unlimited	\$4,500 (In-Hand)		Non-Federal	Conservation Group – National & Local
Nantahala National Forest	\$9,350 (In-Hand)	\$20,000* (In-Hand)	Federal	Federal Agency
National Forests in NC	\$8,000 (In-Hand)		Federal	Federal Agency
NC Wildlife Resources Commission	\$4,663 (In-Hand)	\$25,000 (In-Hand)	Non-Federal	State Agency
Eastern Band of Cherokee Indian	\$2,500 (In-Hand)		Non-Federal	Native American Tribe
Mainspring Conservation Trust	\$4,500 (In-Hand)		Non-Federal	Local Conservation Group
Mountain True	\$1,200 (In-Hand)		Non-Federal	Local Conservation Group
American Rivers	\$1,000 (In-Hand)		Non-Federal	Conservation Group – National
NC Land & Water Fund		\$57,000 (Requested)	Non-Federal	State Agency
Trout & Salmon Fndtn		\$5,000 (Requested)	Non-Federal	National Conservation Group

*Note – Nantahala National Forest cash contribution of \$20,000 is in form of bottomless arch pipe already purchased and ready to be used on this project. We wanted to distinguish that contribution from the in-kind service contribution of NNF staff.

II. Provide a Map of The Project Area



III. Provide Photograph(s) of the Project Area



IV. Project Budget Narrative and Table (next page for Project Budget)

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		
Nantahala National Forest	Federal Agency	Culvert Removal	Technical Services	\$0			\$8,350		\$8,350	4,500 feet
		Culvert Removal	Construction Material	\$0				\$20,000	\$20,000	2,500 feet
		Monitoring	Technical Services	\$0			\$1,000		\$1,000	
National Forests in NC	Federal Agency	Culvert Removal	Technical Services	\$0			\$8,000		\$8,000	2,000 feet
NC Wildlife Resources Commission	State Agency	Culvert Removal	Contractual	\$0		\$25,000			\$25,000	2,500 feet
		Culvert Removal	Technical Services	\$0	\$3,901				\$3,901	4,500 feet
		Monitoring	Technical Services	\$0	\$762				\$762	
Trout Unlimited	Nat & Local Conservation Group	Culvert Removal	Admin	\$6,183					\$6,183	2,500 feet
		Culvert Removal	Technical Services	\$5,000	\$3,500				\$8,500	4,500 feet
		Culvert Removal	Contractual	\$38,817					\$38,817	2,500 feet
		Monitoring	Technical Services	\$0	\$1,000				\$1,000	
Mainspring Consvtn Trust	Local Conservation Group	Culvert Removal	Technical Services	\$0	\$2,000				\$2,000	4,500 feet
		Monitoring	Technical Services	\$0	\$2,500				\$2,500	
Eastern Band of Cherokee Indian	Native American Tribe	Monitoring	Technical Services	\$0	\$2,500				\$2,500	
Mountain True	Local Conservation Group	Culvert Removal	Technical Services	\$0	\$500				\$500	4,500 feet
		Monitoring	Technical Services	\$0	\$700				\$700	
American Rivers		Culvert Removal	Technical Services	\$0	\$1000				\$1000	4,500 feet

	Nat & Local Conservation Group									
NC Land & Water Fund	State Agency	Culvert Removal	Construction Materials	\$0		\$52,000			\$52,000	4,500 feet
		Culvert Removal	Contractual	\$0		\$5,000			\$5,000	4,500 feet
Trout & Salmon Foundation	National Conservation Group	Culvert Removal	Contractual	\$0		\$4,313			\$4,313	4,500 feet
		Culvert Removal	Admin	\$0		\$687			\$687	4,500 feet
Total Contribution				\$50,000	\$18,363	\$87,000	\$17,350	\$20,000	\$192,713	4,500 ft reconnection in Phase I

*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 cash along with which funds are in-hand (committed) and which have been requested but are still pending. 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 the FWS [guidelines](#).

V. PROJECT EVALUATION QUESTIONS

1. **What are the GPS Coordinates for the Project site (please use UTM NAD 83):**
35.33416N 83.35433W
2. **List the type of Project that will be implemented (protection, enhancement, restoration; see definitions in the Appendix A).** RESTORATION
3. **Are Brook Trout currently present at the Project site or have access to the Project site? If not, were Brook Trout historically present?** YES. The NC Wildlife Resources Commission confirmed this fact with September 2020 electrofishing surveys.
4. **Describe how the Project will conserve Brook Trout and/or its habitat?** IN THE IMMEDIACY THROUGH RESTORING CONNECTIVITY AT A ROAD CROSSING THAT IS A FISH PASSAGE BARRIER AND ALLEVIATING A SIGNIFICANT SOURCE OF SEDIMENTATION ON THE GRAVELLED ROAD APPROACHES TO THAT CROSSING. MOREOVER, THIS IS A THREE-PHASED, MULT-YEAR PROJECT THAT INVOLVES REPLACEMENT OF TWO ADDITIONAL FORD TYPE ROAD CROSSINGS WITH AOP STRUCTURES AND THE RESTORATION OF A BOG. ALL OF THIS IS OCCURRING AT A 4,000 FT ELEVATION, PROTECTED WATERSHED OWNED AND MANAGED BY THE NATIONAL FORESTS IN NC AND IS ABOVE A 150 FT WATERFALL THAT SEPERATES NON-NATIVE WILD RAINBOW TROUT FROM THE POPULATIONS IN THE HEADWATERS. THIS PROJECT – THROUGH A WATERSHED SURVEY – IS ALSO EXAMING FEASIBILITY OF EXTENDING THE SIZE OF THE BROOK TROUT CATCHMENT IN THE PHASES I – III AREA INTO THE DOWNSTREAM AREAS BELOW THE WATERFALL AND, IF DETERMINED FEASIBLE, MAKING A PLAN TO DO THAT AND IMPLEMENTING THAT PLAN OVER TIME. THIS PROJECT ENJOYS THE SUPPORT & PARTICIPATION OF FOUR NON-PROFIT LOCAL CONSERVATION GROUPS WHO ARE CHAMPIONS FOR THIS EFFORT WITHIN THEIR CONSTITUENCIES AND THE BROADER GENERAL PUBLIC.
5. **Is the Project site located on/along private or public land? Is the land currently under any form of protection (e.g. conservation easement)?** PROJECT IS 100% ON NANTHALA NATIONAL FOREST LAND AND IS PROTECTED
6. **What percentage of the watershed above the Project site is protected in perpetuity?** 100%
7. **List the specific EBTJV range-wide habitat goal(s) and objective(s) addressed by the Project and describe how the Project will contribute towards achieving them (refer to the list of EBTJV range-wide habitat goals and objectives in the Appendix B).** THIS FIRST PHASE OF A MULTI-YEAR PROJECT SATISFIES THE GOAL TO INCREASE CONNECTIVITY WITHIN ALLOPATRIC BROOK TROUT CATCHMENTS AND THE GOAL TO MAINTAIN AN ALREADY EXISTING HIGH QUALITY ALLOPATRIC BROOK TROUT POPULATION. IT SATISFIES THESE TWO GOALS BY REPLACING ONE DOUBLE-BARRELED CORREGATED METAL CULVERT IDENTIFIED AS A FISH

PASSAGE BARRIER WITH A BOTTOMLESS ARCH CULVERT THAT SPANS OVER 1.5 BANKFUL WIDTH OF THE STREAM (TO BE PAID IN PART BY EBTJV) AND REPLACING ANOTHER CULVERT WITH A FORD THAT WILL ALSO PASS FISH & OTHER AQUATIC ORGANISMS (NOT PAID BY EBTJV BUT INCLUDED AS MATCH IN PHASE I). PHASE I RE-ESTABLISHES FULL CONNECTIVITY TO OVER 4,500 FEET OF STREAM AND RE-CONNECTS CURRENTLY DISCONNECTED NATIVE BROOK TROUT POPULATIONS. PHASE II (NOT INCLUDED IN THIS PROPOSAL) REPLACES TWO FORDS WITH AOP STRUCTURES, ALSO IMPROVING FISH PASSAGE AND AQUATIC/HYDROLOGICAL CONNECTIVITY. MOREOVER AND EQUALLY AS IMPORTANT, EACH OF THESE PROJECTS AND THE ASSOCIATED IMPROVEMENTS TO DRAINAGE FEATURES ON THE GRAVELLED ROADS WILL REMOVE THE ONLY ANTHROPOGENIC SEDIMENT SOURCE IN THIS ALREADY PROTECTED, HIGH ELEVATION (~4,000 FT) HEADWATERS AREA IN THE ALARKA CREEK WATERSHED. A THIRD PHASE OF THIS PROJECT INVOLVES RESTORATION OF A SPRUCE BOG WETLAND ON ONE OF THE IMPORTANT SOURCE TRIBUTARIES.

- 8. List the EBTJV key conservation action(s) the Project addresses (refer to the list of EBTJV key conservation actions in the Appendix C).**
 - Conserve and/or increase habitats that support robust wild Brook Trout populations
 - Conserve genetic diversity of wild Brook Trout populations
 - Minimize threats to wild Brook Trout populations (e.g., degraded water quality, invasive species, altered hydrologic regimes)

- 9. What are the EBTJV Feature ID# and Classification Code for the catchment(s) where the Project work will be implemented (see Appendix D for a description on how to determine both items)?**
 - **Catchment Feature ID#:** 1.9735333E7
 - **Catchment Classification Code:** 1.3

- 10. Will the Project result in re-establishing wild Brook Trout within the catchment? NO**

THIS PROJECT IS INTENDED TO REMOVE TWO PRIMARY STRESSORS (SEDIMENTATION AND DISCONNECTION/FRAGMENTATION) IN ORDER TO PROTECT AND SUSTAIN AN EXISTING ROBUST POPULATION OF WILD BROOK TROUT. HOWEVER – IF THE WATERSHED SURVEY DATA COLLECTED DURING PHASE I INFORMS THE PARTNERS THAT EXPANSION OF ALLOPATRIC BROOK TROUT RANGE IS POSSIBLE IN THE WATERSHED, THEN THIS PROJECT WILL LEAD TO THAT OUTCOME.

- 11. Is/are the catchment(s) where the Project work will be implemented located in a Wild Trout Patch; if so what is the Wild Trout Patch Feature ID# and Classification Code (see Appendix E for a description on how to determine both items)?**
 - **Wild Trout Patch Feature ID#:**1.9735333E7
 - **Wild Trout Patch Classification Code:** 1.3

- 12. Will the Project benefit any federally listed threatened or endangered species or FWS priority species (refer to the list of FWS priority species for Region 4 and Region 5 in Appendix F)?** NO
- 13. Will the Project benefit any state listed threatened or endangered species or species of greatest conservation need?** THE ALARKA HEADWATERS IS LISTED BY THE NC NATURAL HERITAGE PROGRAM AS A SIGNIFICANT NATURAL AREA THAT CONTAINS AN EXCELLENT REPRESENTATION OF A HIGH, HANGING VALLEY – OCCUPYING ELEVATIONS OF 4,000 FEET AND ABOVE WITH FLAT, MEANDERING STREAMS AND THE SOUTHERNMOST EXTENT IN THE CONTINENTAL US OF A RED SPRUCE BOG. WITHIN THIS SITE ARE POPULATIONS OF 10 STATE LISTED RARE SPECIES (ONE FEDERALLY ENDANGERED AND ONE FEDERALLY THREATENED), IN ADDITION TO NATIVE EASTERN BROOK TROUT. OUR PROJECT IS NOT INTENDED TO DIRECTLY BENEFIT ANY OF THESE SPECIES OTHER THAN BROOK TROUT BUT A SUSTAINED CONSERVATION PRESENCE BY THIS MULTI-ORGANIZATION PARTNERSHIP WILL BENEFIT AWARENESS AND OTHER STEWARDSHIP EFFORTS OVER TIME. CONSERVATION BIOLOGISTS WITH THE NCWRC DO INDICATE THAT THE SPRUCE BOG AND OTHER WETLANDS IN THE ALARKA HEADWATERS HAVE HIGH POTENTIAL FOR HOSTING BOG TURTLES, EASTERN BOX TURTLES AND QUEEN SNAKES THOUGH NONE HAVE BEEN FOUND YET. DOWNSTREAM FROM THE HEADWATERS AREA THAT IS OUR CURRENT FOCUS, THE NCWRC HAS REINTRODUCED WAVY RAYED LAMPMUSSEL (SPECIES OF SPECIAL CONCERN IN NC). OLIVE DARTERS AND SMOKY DACE (BOTH NC SPECIS OF SPECIAL CONCERN) ARE ALSO KNOWN TO BE PRESENT DOWNSTREAM
- 14. What are the root causes of degradation in the catchment(s) where the Project is located and which of these are addressed by the Project?** SEDIMENTATION FROM A GRAVELLED FOREST SERVICE ROAD AND DISCONNECTION OF AQUATIC HABITAT AND HYDROLOGICAL PROCESSES BY FOUR STREAM CROSSINGS (CULVERTS AND FORDS). THERE ARE NO OTHER STRESSORS (OTHER THAN A WARMING CLIMATE) TO THIS HIGH ELEVATION BROOK TROUT CATCHMENT
- 15. Describe the plans for measuring the Project’s success in meeting its goals and objectives.** THE PROJECT MUST MEET CONSERVATION OBJECTIVES FOR FISH AND AQUATIC ORGANISMS, HYDROLOGICAL CONNECTIVITY AND ENGINEERING OBJECTIVES FOR ROAD TRANSPORT. BIOLOGISTS, HYDROLOGISTS, ENGINEERS AND PROJECT MANAGERS FROM OUR FEDERAL AND STATE AGENCIES, TROUT UNLIMITED AND PRIVATE ENGINEERING FIRMS WILL ENSURE THAT THE PROJECT IS DESIGNED AND CONSTRUCTED TO SATISFY THESE OBJECTIVES. THE PROJECT WILL RECEIVE ROUTINE INSPECTIONS THROUGHOUT CONSTRUCTION TO IDENTIFY AND CORRECT ANY PROBLEMS. FINAL INSPECTION WILL DOCUMENT STREAM GRADIENT THROUGH NEW ARCH AND STEP HEIGHTS. THE SOUTHEAST AQUATIC RESOURCES PARTNERSHIP (SARP) BARRIER

INVENTORY PROTOCOL WILL BE UTILIZED TO ESTABLISH A PRE AND POST CONSTRUCTION BARRIER RATING. ELEVATION GRADES PRE AND POST CONSTRUCTION WILL ALSO BE ESTABLISHED DOCUMENTING HYDROLOGICAL ELEVATIONS. SEDIMENTATION IMPACTS ON IN-STREAM HABITAT PRE AND POST CONSTRUCTION, ABOVE AND BELOW THE STREAM CROSSING WILL BE GAUGED USING WOLMAN PEBBLE COUNTS AND NC DEPARTMENT OF ENVIRONMENTAL QUALITY RIFFLE EMBEDDEDNESS MEASUREMENTS. SEDIMENTATION IMPACTS WILL ALSO BE PHOTO DOCUMENTED PRE AND POST CONSTRUCTION. THE NC WILDLIFE RESOURCES COMMISSION WILL CONTINUED TO ELECTRO-FISH THIS AREA EVERY 5-10 YEARS AS IS ON THEIR CURRENT TROUT SURVEY SCHEDULE FOR WESTERN NC. THE MOST RECENT SURVEY WAS PERFORMED JUST LAST MONTH IN SEPTEMBER 2020 FOR THIS PROJECT. IF CAPACITY EXISTS, THE NCWRC WOULD LIKE TO PERFORM GENETIC SAMPLES BUT CANNOT YET COMMIT TO THAT EFFORT.

- 16. Does the Project support any goals in 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))?** THIS PROJECT SUPPORTS GOALS OF THE NC WILDLIFE RESOURCES COMMISSION'S TROUT MANAGEMENT PLAN AND STATE WILDLIFE ACTION PLAN. IT ALSO SUPPORTS GOALS OF THE PISGAH-NANTAHALA LAND RESOURCE MANAGEMENT PLAN WHICH SPECIFICALLY STATES "Manage streams for wild trout where conditions are favorable: improve habitat of wild trout streams as a first priority".
- 17. Are there invasive fish species within the Project site or have access (no barrier) to it?** NO. THERE ARE WILD RAINBOW TROUT DOWNSTREAM OF THE PROJECT SITE BUT THEY HAVE NO IN-STREAM ACCESS TO THE AREA DUE TO A 150 FT TALL WATERFALL
- 18. Are hatchery-reared salmonids stocked at the Project site or that have access (no barrier) to it?** NO
- 19. Describe the current status of the Project. Is it planned, permitted, and ready to begin?** THIS PROJECT IS PLANNED AND PARTIALLY PERMITTED. NEPA IS COMPLETE BUT WE STILL NEED TO OBTAIN STATE OF NC/US ARMY CORPS WATER QUALITY PERMITS AND WILL DO THAT AT DESIGN. CASH IS ON-HAND TO DEVELOP AN AOP DESIGN AND A REQUEST FOR BID WILL SOON BE LET TO A PRIVATE ENGINEERING FIRM TO DO THIS WORK. THE DESIGNS WILL IN ALL PROBABILITY BE COMPLETE PRIOR TO EBTJV ANNOUNCING AWARDS. A BOTTOMLESS ARCH PIPE THAT FITS THIS SITE HAS BEEN PROCURED. WE STILL NEED OTHER FUNDS IN ADDITION TO OUR EBTJV REQUEST TO PAY FOR OTHER CONSTRUCTION MATERIALS AND A CONTRACTOR. A GRANT APPLICATION IS BEING SUBMITTED TO THE NC LAND AND WATER FUND AT THE BEGINNING OF 2021. THE PROJECT HAS BEEN SHARED WITH THE FIELD REPRESENTATIVE AND

BASED ON HIS FEEDBACK AND PAST EXPERIENCE WITH SIMILAR PROPOSALS, WE HAVE HIGH CONFIDENCE IN RECEIVING AN AWARD.

- 20. Will public access be allowed at the Project site? If so, what kinds of recreational activities are allowed – fishing, hiking, camping, wildlife viewing, etc.?** THE PROJECT IS LOCATED ON NANTAHALA NATIONAL FOREST SYSTEM LANDS AND ALL RECREATION, INCLUDING ANGLING, IS ALLOWED.
- 21. Will the Project improve recreational fishing opportunities for wild Brook Trout? If so, describe the improvement and how the improvement will be measured?** THIS PROJECT WILL HELP MAINTAIN AND IMPROVE THE EXISTING FISHERY DUE TO THE ECOLOGICAL BENEFITS GAINED FROM ALLEVIATING A SEDIMENT SOURCE AND RESTORING POPULATION CONNECTIVITY AND CONNECTIVITY WITH MORE HABITAT.
- 22. Describe the outreach or educational components associated with the Project.** THIS PROJECT IS BEING UNDERTAKEN BY A STRONG PARTNERSHIP INVOLVING FIVE LOCAL AND/OR NATIONAL CONSERVATION GROUPS, FOUR OF WHICH HAVE A LOCAL/REGIONAL MEMBERSHIP CONSTITUENCY. EACH OF THESE ORGANIZATIONS WILL PROMOTE THIS PROJECT IN THEIR MAILINGS AND OTHER ACTIVITIES. TROUT UNLIMITED HAS A MEMBERSHIP OF AROUND 4,000 PEOPLE IN 14 CHAPTERS IN THE STATE OF NC ALONE. THIS PROJECT WILL BE FEATURED IN THE ANNUAL CIRCUIT-RIDE TO THESE CHAPTERS BY THE TU COLDWATER CONSERVATION MANAGER. TU AND MAINSPRING CONSERVATION TRUST VOLUNTEERS WILL BE INVOLVED IN THE WATERSHED SURVEY AND MONITORING-EVALUATION EFFORTS, WHICH WILL PROVIDE EXPERIENTIAL EDUCATION OPPORTUNITIES FOR THESE PEOPLE.
- 23. Describe how this Project lessens the effects of climate change on Brook Trout.** THIS PROJECT IMPROVES HABITAT BY RESTORING CONNECTIVITY AND ALLEVIATING SEDIMENTATION. GREAT CONNECTIVITY ALLOWS MORE RELIABLE ACCESS TO HIGHER SOURCE WATERS, WHICH IS AN ESSENTIAL PIECE OF CLIMATE ADAPTATION FOR FISH AND OTHER SPECIES OF THE COLDWATER ECOLOGY. THE PROJECT IMPROVES GENE FLOW TO ENSURE INCREASED GENETIC DIVERSITY, EQUIPPING THIS POPULATION TO HANDLE FUTURE IMPACTS TO HABITAT LIKELY TO INCREASE DUE TO CLIMATE CHANGE. THIS WORK IS BEING UNDERTAKEN AT 4,000 FEET IN ELEVATION, WHICH DOES NOT NECESSARILY LESSEN EFFECTS OF CLIMATE CHANGE, BUT HELPS TO SUSTAIN AN EXISTING HIGH QUALITY COLDWATER HABITAT AS CLIMATE CHANGE OCCURS. BECAUSE THIS PROJECT IS AT THE TOP OF THE WATERSHED THAT IS PROTECTED INTO PERPETUITY, THERE ARE NO OTHER STRESSORS TO ADDRESS TO THE BROOK TROUT AND THEIR POPULATION THAN WHAT WE ARE ALREADY PROPOSING. THE NATIVE EASTERN BROOK TROUT POPULATION WILL BE MORE RESILIENT TO CLIMATE CHANGES DUE TO OUR WORK HERE.
- 24. Explain how this Project is a good investment of funds, particularly in terms of its recreational and/or economic value.** THIS PROJECT LEVERAGES FUNDING AND

IN-KIND SERVICES FROM 11 DIFFERENT PARTNERS – SHARING THE ASSETS THAT EACH BRINGS AND PROVIDING MULTIPLE OPPORTUNITIES TO REACH A WIDE AUDIENCE ABOUT THE IMPORTANCE OF THIS WORK. IT IS WELL DOCUMENTED THAT AOP STREAM CROSSINGS WITHSTAND HIGH FLOW EVENTS MUCH BETTER THAN TRADITIONAL CULVERTS, PROTECTING THE ROAD INFRASTRUCTURE FROM STORM DAMAGE. THIS ROAD IS ESSENTIAL FOR TRANSPORTING THE RECREATIONAL PUBLIC INTO THE ALARKA HEADWATERS AREA TO VISIT THE SPRUCE BOG, HUNT, FISH AND CAMP.

VI. SUPPORTING DOCUMENTATION:

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

Appendix A

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.

Appendix B

EBTJV Range-wide Habitat Goals and Objectives

GOAL	OBJECTIVE
Increase the average size (km ²) of wild Brook Trout patches, which is currently 19 km ²	Increase the size (km ²) of 30 wild Brook Trout patches by the year 2022.
Restore wild Brook Trout to catchments where they were extirpated	Establish wild Brook Trout in 15 extirpated catchments by the year 2022.
Maintain the current number of wild Brook Trout patches (i.e. no net loss)	Retain at least 6,022 allopatric wild Brook Trout patches (1.1) across the EBTJV geographic range by the year 2022. Retain at least 3,838 sympatric wild Brook Trout patches (1.2, 1.3, and 1.4) across the EBTJV geographic range by the year 2022.
Increase connectivity within and among wild Brook Trout catchments	Complete Aquatic Organism Passage projects within 45 wild Brook Trout catchments by 2022.

Appendix C

EBTJV Key Conservation Actions

- Increase recreational fishing opportunities for wild Brook Trout
- Conserve and/or increase habitats that support robust wild Brook Trout populations
- Restore and reconnect suitable habitats adjacent to robust wild Brook Trout populations
- Conserve genetic diversity of wild Brook Trout populations
- Conserve unique wild Brook Trout life history strategies (e.g., lacustrine populations, large river populations, and coastal populations).
- Minimize threats to wild Brook Trout populations (e.g., degraded water quality, invasive species, altered hydrologic regimes)

Appendix D

To determine the EBTJV Feature ID# and Classification Code for the catchment where your Project work will be implemented, please follow these steps:

1. Click on this [Brook Trout Integrated Spatial Data and Tools](#) link;
2. Put a \surd mark in the box next to the Legend label EBTJV Classified Catchments to display this data layer;
3. Locate the catchment where your Project work will be implemented; you can increase or decrease the map scale by selecting the appropriate map scale (see drop down menu located in the lower left hand corner) or use the wheel on your mouse. You can also change the layer's transparency by clicking the yellow light icon that is associated with this layer in the Legend and sliding the opacity bar.
4. Once you have located the Project's catchment, find the Identify Features button at the top of the page (hovering your cursor over each button will identify its function). Open the drop down menu for this function and select the EBTJV Classified Catchments layer, and then click the Identify Features button once to turn it on.
5. Next move your cursor within the boundary of the project's catchment and click once. A Feature Information box will appear on your screen and you will see the catchment's "featureid" number and "ebtjv_code". Record both numbers in the appropriate locations in the Project Application Form.

Appendix E

To determine the EBTJV Wild Trout Patch Feature ID# and Classification Code for the catchment where your Project work will be implemented, please follow these steps:

1. Click on this [Brook Trout Integrated Spatial Data and Tools](#) link;
2. Put a \surd mark in the box next to the Legend label Wild Trout Habitat Patches to display this data layer;
3. Locate the catchment where your Project work will be implemented; you can increase or decrease the map scale by selecting the appropriate map scale (see drop down menu located in the lower left hand corner) or use the wheel on your mouse. You can also change the layer's transparency by clicking the yellow light icon that is associated with this layer in the Legend and sliding the opacity bar.
4. Once you have located the Project's catchment, find the Identify Features button at the top of the page (hovering your cursor over each button will identify its function). Open the drop down menu for this function and select the Wild Trout Habitat patches layer, and then click the Identify Features button once to turn it on.
5. Next move your cursor within the boundary of the Project's catchment and click once. A Feature Information box will appear on your screen and you will see the catchment's "feat_id" number and "ebtjv_code". Record both numbers in the appropriate locations in the Project Application Form.

Appendix F

FWS 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
Cyprinella callitaenia, Bluestripe Shiner		x
Cyprogenia stegaria, Fanshell	x	
Elliptio chipolaensis, Chipola Slabshell		x
Elliptio purplella, 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 boschungii, Slackwater Darter		x
Etheostoma chienense, Relict Darter		x
Etheostoma moorei, Yellowcheek Darter		x

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