

**Restoring Habitat Connectivity in the Bobbs Creek Watershed, PA Under the
EBTJV**

NFHAP funding requested:

Project Location: Allegheny National Forest, Hickory Township, Forest County, PA
Congressional District: 5th District of Pennsylvania

APPLICANT

United States Forest Service – Allegheny
National Forest
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**Sponsoring Fish and Wildlife Service
Fisheries Office**

Fish & Wildlife Service Office: Northeast
Fishery Center
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Date Submitted

September 19, 2008

PROJECT DESCRIPTION, SCOPE OF WORK, AND PARTNER INFORMATION

A. Project Description and Scope of Work

Need for the project: This project is needed to restore brook trout habitat connectivity and provide improved access to spawning tributaries in the Bobbs Creek watershed on the Allegheny National Forest (ANF) in Forest County, PA. Bobbs Creek is a tributary of Tionesta Creek in the Allegheny River basin and is 4.4 miles (7 km) in length and drains a 21 square-kilometer area. Bobbs Creek is currently managed by the PA Fish & Boat Commission as a wild trout fishery with no trout stocking. Although, 39% of Pennsylvania's subwatersheds have greatly reduced brook trout populations (Hudy et al. 2006), the ANF remains a stronghold in the state with much of its area classified as having $\geq 50\%$ of historic brook trout habitat still occupied. This area of the state should be a priority for brook trout conservation because of its existing brook trout resources and its proximity to the western extent of current eastern brook trout range.

USFS road #116 parallels Bobbs Creek from its confluence with Tionesta Creek upstream for approximately 1.7 miles. This road crosses two unnamed tributaries to Bobbs Creek. These crossings (hereafter named 116/1 and 116/2) currently have culverts which are of insufficient size for the bankfull stream width of these tributaries. These culverts often become choked with debris, and concentrate streamflow making passage by brook trout impossible during much of the year. Crossing 116/1 is comprised of two 4 foot diameter culverts and crossing 116/2 is comprised of three 4.5 foot diameter culverts. In addition, these crossings also have a high potential for failure; therefore they need to be replaced due to safety concerns and to avoid large delivery of sediment to Bobbs Creek. Also, oil and gas drilling operations and their associated road construction is anticipated to increase on the ANF in the near future requiring stream crossings that minimize impacts on stream systems. Small tributaries provide optimal spawning and nursery areas for juvenile brook trout, but ideal foraging areas for adult brook trout may be located in other portions of the watershed (i.e. larger streams, Petty et al. (2005)). Unimpeded movement of brook trout is important for access to optimal spawning and foraging areas, maintaining metapopulation dynamics, and maintaining genetic diversity.

Funding for the replacement of stream crossing 116/1 with an open-bottom culvert has been secured through USFS stewardship timber sales, but funding for replacement of stream crossing 116/2 is still needed. Replacement of the 116/2 stream crossing will enable complete barrier free movement of brook trout in the Bobbs Creek watershed.

Purpose, goals, and objectives: The purpose of this project is to improve brook trout habitat connectivity in the Bobbs Creek watershed on the ANF. Also, this project will reduce flooding potential on USFS road 116 and reduce the delivery of sediment to the stream. The objectives of the project include: 1) Replace the USFS road 116/1 and 116/2 road crossings single open-bottom culverts; 2) provide improved surfacing of the road; and 3) assess brook trout population response to culvert replacement in the two unnamed tributaries to Bobbs Creek and in the mainstem of Bobbs Creek.

Work to be done and by whom:

- Project planning, design, and contracting - USFS
- Installation of an open-bottom arch culvert at crossing 116/2 - USFS
- Brook trout population monitoring in tributary and mainstem of Bobbs Creek - USFS, USFWS Northeast Fishery Center (NEFC) and Lower Great Lakes FRO (LGLFRO)

An open-bottom arch culvert is set on concrete footers on each side of the stream while maintaining the natural stream substrate. The footers are set at or near the bankfull width. In addition, limestone surfacing will be applied to the road surface to reduce erosion and sedimentation.

Who owns or will own and manage affected lands: The lands where this project will be conducted are owned by the U.S. Forest Service – Allegheny National Forest and Collins Pine Co. Collins Pine is a land management company primarily engaged in timber management. Collins Pine certified company for sustainable forestry under the Scientific Certification System Organization, and follow the principles and criteria of the Forest Stewardship Council. The portion of Bobbs Creek Watershed owned by Collins Pine is open to public access and recreational fishing opportunities.

Duration of benefits, including length of any land or management contracts, easements or other agreements: This project will have long-term benefits as the majority of the affected watershed is on federally owned land and open bottom culverts have an expected lifespan of 50+ years.

Expected results and how and when they will be monitored: Expected results are increased brook trout habitat connectivity and increased spawning and abundance in both the unnamed tributaries and in the mainstem of Bobbs Creek. PA Fish & Boat Commission found total brook trout density equaled 14.5 individuals per 100 m² at a site upstream of the confluence of the unnamed tributary crossing 116/2 (river mile 1.45) in 1999. At another mainstem site downstream of the 116/1 crossing (river mile 0.11), they found only 0.6 brook trout per 100 m². The USFS sampled a site on the unnamed tributary immediately above crossing 116/2 in 2005 and found 9.5 brook trout per 100 m². If replacement of both the 116/1 and 116/2 were accomplished and brook trout movement increased within the watershed, it is expected that densities in the unnamed tributaries would increase and be equivalent to that seen on the mainstem of Bobbs Creek upstream of the 116/2 crossing as more adult brook trout could immigrate to and spawn in these areas. Also, we expect an increase in brook trout density in the lower portion of Bobbs Creek as brook trout spawned in the tributaries disperse.

Adult and young-of-the-year (YOY) brook trout density (# / 100 m²) will be estimated at three or more sites on each tributary upstream of the road crossings and at three or more sites on the mainstem of Bobbs Creek. Each site will be a minimum of 100 m length and will be sampled with multiple electrofishing passes. Populations and density will be estimated by removal estimators (White et al. 1982). Density will be estimated just prior to spawning in September of 2009 (pre-culvert replacement) and then annually in

September 2010 – 2013 (post-culvert replacement). Sampling at this time of year will ensure that YOY are large enough to effectively capture by electrofishing and will also capture adult brook trout staged for spawning.

Timetable for accomplishment of major activities during the one-year performance period:

August 2009 – USFS and USFWS partners will plan pre-culvert replacement assessment

September 2009 – USFS and USFWS biologists will conduct pre-culvert replacement monitoring

October 2009 – August 2010 – Culvert replacement on stream crossing 116/2

September 2010 – 2013 – Post-culvert replacement monitoring begins

B. Partner Information

USFS – U.S. Forest Service

NEFC – U.S. Fish & Wildlife Service – Northeast Fishery Center

LGLFRO – U.S. Fish & Wildlife Service – Lower Great Lakes Fishery Resource Office

Partner Name	Contribution In-Kind	Contribution Cash	Federal or Non-Federal	Partner Category	Role of Partner
USFS	\$5,000	\$70,000	Federal	Federal Agency	Design, oversight, permitting, and awarding stewardship timber sale receipts to pay for cost of culvert 116/1 replacement,
USFS	\$7,000	\$35,000	Federal	Federal Agency	Project oversight, technical assistance, culvert design, permitting, monitoring, and reporting of culvert 116/2 replacement.
NEFC	\$11,250		Federal	Federal Agency	Technical assistance, monitoring, data analysis, reporting
LGLFRO	\$3,900		Federal	Federal Agency	Technical assistance, monitoring

C. Milestones and Timeline

- Meet with partners to discuss project design and implementation (completed)
- Meet with partners to finalize pre- and post- monitoring design (Summer 2009)
- Conduct pre-culvert replacement monitoring (Fall 2009)
- Replace road crossing 116/1 culvert (Fall 2009)
- Replace road crossing 116/2 culvert (Fall 2009 – Summer 2010)
- Conduct 1st post-culvert replacement monitoring (Fall 2010)
- Conduct 2nd post-culvert replacement monitoring (Fall 2011)
- Conduct 3rd post-culvert replacement monitoring (Fall 2012)
- Conduct 4th post-culvert replacement monitoring (Fall 2013)
- Final data analysis and report writing (Winter – Spring 2014)
- Dissemination of results though professional conferences, presentations to conservation groups, peer-review journals

III. MAP OF PROJECT AREA

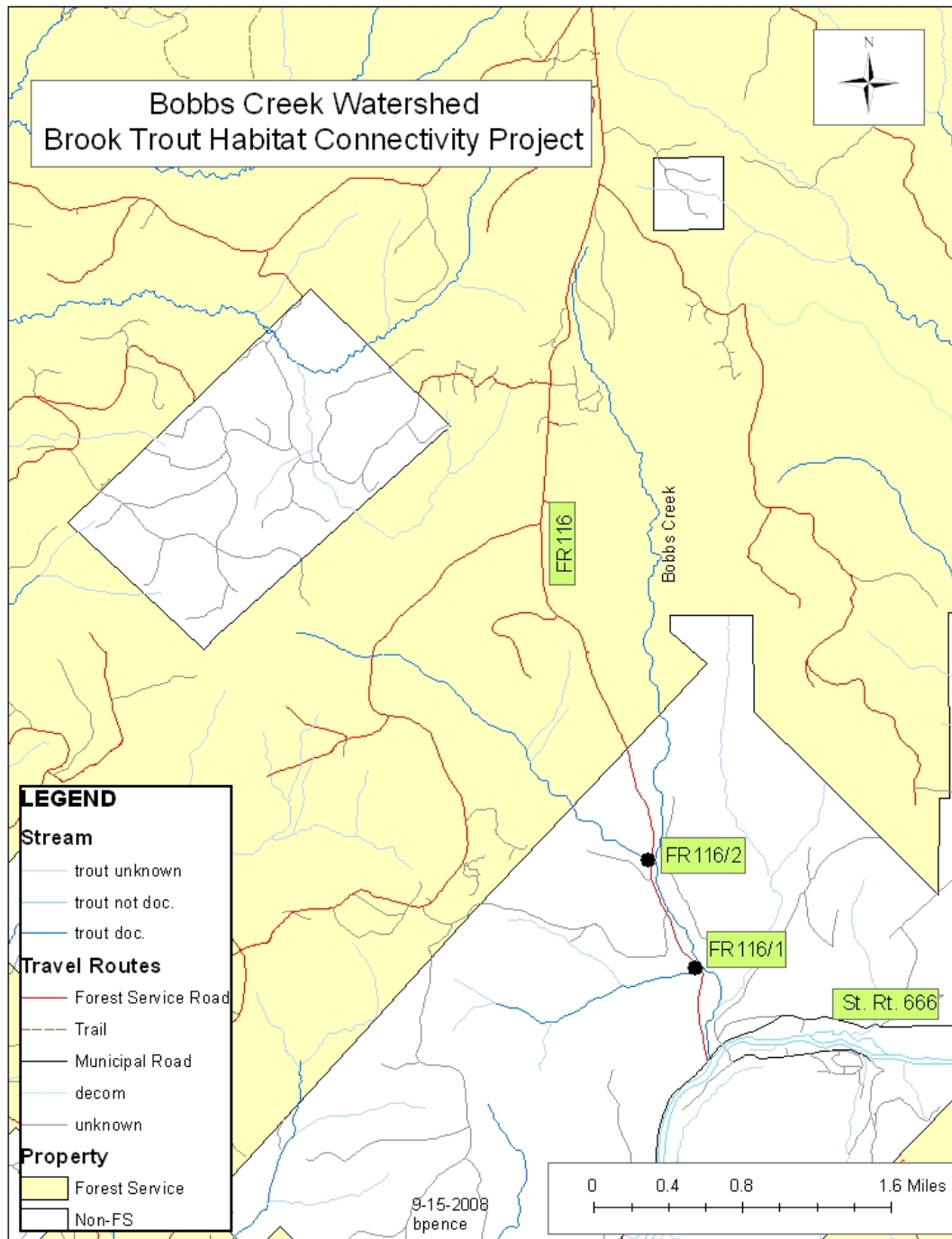


Figure 1: Map of project area on the Allegheny National Forest (subwatershed 420216). Crossing 116/1 is located at 41.5977°, -79.2175°, and crossing 116/2 is located at 41.6063°, -79.2227°.

IV. PHOTOGRAPH(S) OF PROJECT AREA



Figure 2: Inlet (upstream) for culvert 116/2. Note the accumulation of debris and near complete closure of the culvert on the far left. Photo courtesy of Brent Pence (USFS).



Figure 3: Outlet (downstream) for culvert 116/2. Note the elevation between the culvert ends and the water level, and the concentration of flow through only one of the three culverts. Photo courtesy of Brent Pence (USFS).

V. PROJECT BUDGET

Partner	Activity	NFHAP Request	Non-Fed. Contribution	Federal Contribution	Total	Acres/Miles Affected
USFS	Project Design 116/2			\$5,000		
USFS	Culvert 116/1 design, oversight, and replacement			\$75,000		1.4 miles of tributary habitat
USFS	Culvert 116/2 replacement	\$79,000		\$35,000		2.4 miles of tributary habitat
USFS	Monitoring			\$2,000		
NEFC	Travel expenses for monitoring	\$5,800				
NEFC	Salary for monitoring work	\$6,750		\$6,500		
NEFC	Data analysis, report writing			\$4,500		
LGLFRO	Travel expenses for monitoring	\$1,750				
LGLFRO	Salary for monitoring work	\$4,700		\$3,900		
Total		\$98,000		\$132,150		3.8 miles

Project Total: \$230,150
% Requested: 43%
% Match: 57%

VI. EVALUATION QUESTIONS

A. Conservation of Sustainable Brook Trout Population

Although the stream crossings are located on private land, 85% of the watershed upstream of road crossing 116/2 and 59% of the watershed on the mainstem of Bobbs Creek is public land managed by the Allegheny National Forest. Culvert replacement and monitoring of this project meets goals and objectives outlined in the EBTJV strategy, Pennsylvania Conservation strategies, and the ANF forest plan.

The regional and habitat objectives outlined in the EBTJV “Conserving the Eastern Brook Trout: Action Strategies” that are supported by this project are:

1. Maintain the status, or no net loss, or 746 subwatersheds classified as healthy by 2012.
2. Strengthen brook trout populations in 44 subwatersheds classified as healthy by 2012.

The state-level habitat objectives supported by this project area:

1. Improve protection of brook trout resources.
2. Maximize brook trout habitat and water quality protection through state and federal agencies.
7. Mitigate factors that degrade water quality
11. Utilize state, federal, and private programs that support watershed stewardship programs in systems containing brook trout.

This project also supports several of the goals listed by the Pennsylvania Fish and Boat Commission in “Conserving the Eastern Brook Trout: Action Strategies”:

- 1.2. Improve brook trout habitat.
- 2.2. Monitor status of existing brook trout populations.
 - 3.1. Protect existing brook trout populations from future degradation.
 - 3.2. Restore and Enhance brook trout populations.
- 4.2. Develop relationships that foster trout enhancement, protection and restoration.

The Allegheny National Forest has a Forest Plan that in part describes a desired condition of waters within the forest. The following are excerpts from that plan:

- Aquatic and riparian ecosystems are primarily free-flowing and connected.
- A majority of cold-water streams provide suitable habitat and water quality for aquatic species including the propagation of brook trout and other headwater stream fishes.
- Wilderness Trout Streams, Class A Wild Trout Streams, and Remote Trout Streams emphasize quality angling, water quality and natural forest conditions immediately upslope of these streams.

This project also supports research that will be able to differentiate between natural variation and true population level effects of culvert replacement.

B. Threatened and Endangered Species and Species of Conservation or Management Concern:

There are no state or federal threatened or endangered species in the project area. The project will benefit brook trout which is considered a high priority species of conservation concern by the USFWS Region 5 Fisheries program. The Pennsylvania Fish & Boat Commission is adding brook trout to their State Wildlife Action Plan at Conservation Tier 5 – Maintenance Concern Level.

C. Other species of Economic Importance not Included Above:

Wild trout angling is economically important in Pennsylvania with large benefits to local communities. Because the ANF is public lands, the area attracts a large number of anglers, including many non-residents.

Non-native brown trout were found in the lower section of the Bobbs Creek mainstem (River mile 0.11) by the PA Fish & Boat Commission at a low density of 0.3 individuals per 100 m² in 1999. No YOY brown trout were found and no brown trout were found in any other previously sampled sites in the watershed. It is likely that the brown trout found in the lower mainstem of Bobbs Creek were immigrants from Tionesta Creek.

D. Special Considerations

The ANF serves as a refuge for brook trout on the western edge of the species extant range. Despite the comparatively good status of brook trout on the ANF, the landscape is a multiple use area. A major threat to brook trout in the ANF is oil and gas drilling operations and associated road construction and stream crossings. It is anticipated that 69-116 miles of new Forest Service roads and 1920 miles of new private oil and gas roads will be constructed on the ANF over the next 15 years if the current pace of new oil and gas development continues. Also, an additional 171-203 miles of existing corridors could be transferred to Forest Service standards. Proper installation of culverts and replacement of degraded and/or improperly installed culverts will maintain habitat connectivity, access to spawning and foraging areas, and genetic diversity of brook trout.

E. EBTJV Targeted Watershed:

This project falls within EBJTV subwatershed 420216 which is listed as having “Intact” populations and has a priority of 1.37. This subwatershed where Bobbs Creek is located is the only one within the Allegheny/Ohio drainage with an “Intact” population.

F. Habitat Connectivity and Enhancing Population Mobility:

This project will allow complete habitat connectivity and freedom of movement by the brook trout population throughout the Bobbs Creek watershed. The Allegheny National Forest owns 2% of the Bobbs Creek watershed upstream of road crossing 116/1, 85% of the watershed upstream of road crossing 116/2, and 59% of the watershed on the mainstem of Bobbs Creek. There are existing brook trout populations in the two unnamed tributaries as well as the mainstem of Bobbs Creek, but movement between the tributaries and mainstem is likely limited during much of the year due to the culverts. This project will reestablish connectivity between the mainstem of Bobbs Creek and 1.4 and 2.4 miles of tributary habitat upstream of crossings 116/1 and 116/2, respectively.

Long-term success of the project in enhancing brook trout populations is highly probable as the lifespan of open-bottom culverts is 50+ years.

G. Management Assets:

This project fits well into an adaptive management framework for ANF management and eastern brook trout. An ongoing project on the ANF is identifying potential barriers to fish movement and this project will specifically test the hypothesis that culverts are limiting brook trout populations. Through long-term monitoring, spatial and temporal variation in the brook trout population will be assessed and the effectiveness of the culvert replacement appropriately evaluated. Pre-assessment work will be conducted in September 2009 and post-assessment work will be conducted in September 2010 – 2013. Brook trout will be sampled with standard multiple pass (3 or more) electrofishing and the generalized removal estimator in the program CAPTURE (White et al. 1982) will be used to estimate populations and densities. Resultant data will be analyzed as a mixed effects model with year and site location as random effects and tributary vs. mainstem habitat as fixed effects (Littell et al. 1996).

The Bobbs Creek watershed is open to the general public for angling free of charge under state wide general trout regulations with easy access to the mainstem of Bobbs Creek via via forest road 116 which joins with state route 666.

The project will have an educational component and developed as a demonstration project for the EBTJV. The extensive monitoring design can serve as a model to illustrate appropriate monitoring to determine if EBTJV projects are having a positive population level effect. Installation of open-bottom culverts will demonstrate the benefits of appropriate stream crossing techniques. In addition to fish passage, these benefits include reduced potential for culvert failures, maintenance costs, and reduced erosion. This is especially important in a multiple use environment such as the ANF.

H. Supporting Documentation

Please see the accompanying letter of support from Pennsylvania Fish & Boat Commission area fisheries manager Al Woomer, letter of support from Collins Pine, landowner where crossings 116/1 and 116/2 are located, and photo release form.

Literature Cited

- Hudy, M., T. M. Thieling, N. Gillespie, and E. P. Smith. 2006. Distribution, status, and perturbations to brook trout within the eastern United States. On-line linkage at www.brookie.org
- Littell, R. C., G. A. Milliken, W. W. Stroup, and R. D. Wolfinger. 1996. SAS® System for Mixed Models, Cary, NC: SAS Institute Inc., 633pp.
- Petty, J. T., P. J. Lamothe, and P. M. Mazik. 2005. Spatial and seasonal dynamics of brook trout populations inhabiting a central Appalachian watershed. *Transactions of the American Fisheries Society* 134: 572-587.
- White, G. C., D. R. Anderson, K. P. Burnham, and D. L. Otis. 1982. Capture-recapture and removal methods for sampling closed populations. Los Alamos National Laboratory, Los Alamos, New Mexico, USA.

**U.S. Fish and Wildlife Service Fisheries Operational Needs System database
(FONS) Entry Form**

Field Priority:

Title of Project:

Restoring Habitat Connectivity in the Bobbs Creek Watershed, PA Under the EBTJV

Proposed Accomplishment:

This project will replace inadequate stream crossing culverts that are an impediment to brook trout movement in the Bobbs Creek watershed with open-bottom culverts, allowing free access to 3.8 miles of tributary habitat. This project is in alignment with goals and strategies of the NFHAP, EBTJV, Pennsylvania Brook Trout Conservation strategies, and Allegheny National Forest plan. Culvert replacement will enhance brook trout populations in both the tributaries and mainstem of Bobbs Creek.

Description:

Importance of the project to the resource.

This project will increase habitat connectivity and result in unimpeded access of brook trout to 3.8 miles of tributary spawning habitat in the Bobbs Creek watershed on the Allegheny National Forest.

Problem and specific causes of the Problem.

Barriers to fish passage prevent or impede access to critical habitat. USFS road 116 has two stream crossings (crossings 116/1 & 116/2) consisting of inadequate culverts in the Bobbs Creek watershed that impede access tributary habitat and require replacement to restore habitat connectivity, decrease flooding problems, and decrease sedimentation.

Objective of the project with reference to the problem.

The objectives of the project include: 1) Replace the USFS road 116/1 and 116/2 crossings single open-bottom culverts; 2) provide improved surfacing of the road; and 3) assess brook trout population response to culvert replacement in both unnamed tributaries to Bobbs Creek and in the mainstem of Bobbs Creek.

Method applied to accomplish objective.

USFS road crossings 116/1 and 116/2 will be replaced with open-bottom arch culverts that will allow free movement of brook trout. Brook trout populations will be assessed in tributary and mainstem habitat using backpack electrofishing techniques one year pre- and 4 years post-culvert replacement.

Additional information pertinent to adequately describe the importance and/or urgency of completing the project.

Habitat connectivity and unimpeded movement of brook trout is important for access to optimal spawning and foraging areas, maintaining metapopulation dynamics, and maintaining genetic diversity. The Allegheny National Forest is a stronghold for brook

trout on the western edge of the species range and continued habitat protection and restoration should be a priority in this area. The USFS has funding available through stewardship timber sales to replace crossing 116/1, but additional funds are requested through the EBTJV to replace crossing 116/2. Replacement of both crossings will open 3.8 miles of stream habitat and allow complete access by brook trout to all habitat in the Bobbs Creek watershed.

List any aquatic or fishery management plans and tasks that the project supports. EBTJV “Conserving the Eastern Brook Trout: Action Strategies” that are supported by this project are:

1. Maintain the status, or no net loss, or 746 subwatersheds classified as healthy by 2012.
2. Strengthen brook trout populations in 44 subwatersheds classified as healthy by 2012.

Fish Passage barriers to be removed by this project:

Barrier Name: USFS road crossing 116/2

Decimal degree longitude: -79.2227°

Decimal degree latitude: 41.6063°

Funding Information

Fund						Total
	1	2	3	4	5	
NFHAP	\$98,000					\$98,000

What is the estimated duration of the project?

5 years

Record anticipated first year partner contributions.

Partner	Cash Matching	In Kind
USFS-Allegheny National Forest	\$105,000	\$12,000
USFWS – Northeast Fishery Center		\$11,250
USFWS – Lower Great Lakes FRO		\$3,900
Total:	\$105,000	\$27,150

Record anticipated new FTEs

	Manager		Administrative Office / Assistant
	Biologist		Outreach Specialist
	Other Specialist / Scientist		Maintenance Worker
	Technician / Fish Culturist		

Congressional District: PA, District #5