



United States Department of the Interior

NATIONAL PARK SERVICE

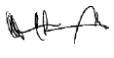
Water Resources Division

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Fort Collins, Colorado 80525

December 20, 2016

To: Stephen Clark, Superintendent, Western Pennsylvania National Parks
Kathy Penrod, Natural Resource Management Specialist, Allegheny Portage Railroad NHS (ALPO), Western Pennsylvania National Parks (WEPA)

Through: Alan C. Ellsworth, Chief, Aquatic Systems Branch, Water Resources Division 
John Wullschleger, Fish Program Lead, Water Resources Division

From: Nic Medley, Fish Biologist/Aquatic Ecologist, Fish Program, Water Resources Division

Subject: TAR 2473: Collect Baseline Information to Document Current Condition of Fish Populations within ALPO in September 2016 (FY17).

Executive Summary

Allegheny Portage Railroad National Historic Site (ALPO) has initiated a project to monitor the fish community within ALPO in Blair Gap Run (BGR) and Millstone Run. Three-pass, removal methods using backpack electrofishers were used to obtain fish population estimates at four sites within ALPO, on September 27 and 28, 2016. The surveys indicated that all sites contained healthy fish communities typical of western Pennsylvania streams of their respective elevations, stream order, and size. The highest elevation, first order stream contained only native brook trout. Native fish abundance and diversity increased downstream. The downstream sites also contained reproducing populations of non-native brown trout. Species-specific population estimates derived from data collected in this study may be used as the pre-impact baseline data in a spatially and temporally replicated Before-After-Control-Impact (BACI) analysis. Continued sampling (all sites annually for two years prior to potential impacts) will provide information that can better demonstrate cause and effect relationships. Additionally, at least one other control site should be chosen for sampling, e.g. outside the BGR catchment area and unassociated with any known potential impacts.

Project Overview

Background

The Pennsylvania Department of Environmental Protection (PADEP) intends to address mine drainage problems in the headwaters of Clearfield Creek and Sugar Run, by constructing an acid mine drainage (AMD) treatment facility near Cresson, PA. The objective of the Cresson AMD Abatement Project (CAP) is two-fold: to eliminate three mine discharges impacting Clearfield Creek and Sugar Run and to provide treated mine water to supplement the Susquehanna River during low-flow conditions. It is anticipated that eliminating uncontrolled surface discharges will restore aquatic life in 15 miles of Clearfield Creek and six miles of Sugar Run that are currently impaired by AMD.

The CAP proposes to pump water from three existing underground mine pools formed by the accumulation of water in abandoned coal mine workings. Water from these mine pools will be delivered to the Cresson AMD treatment facility by vertical wells installed from the ground surface into the three mine pools: Cresson No.9, Gallitzin Shaft and Argyle Stone Bridge (ASBP). The treated, clean effluent from the plant will then be discharged to the Clearfield Creek watershed.

The ASBP underlies ALPO and discharges into Sugar Run. PADEP has submitted a permit to construct an extraction well on NPS property to extract the water from the ASBP. The water from the mine pool will then be conveyed to the CAP via re-injection into a second injection well about 20 feet from the extraction well where it will be conveyed through the Cresson mine complex under Route 22 to the treatment site off park property.

To date, the available environmental and technical analyses have demonstrated that the project should not create any new adverse impacts, or benefits to water or wetland resources within ALPO because the source of water for ALPO streams is not connected to the ASBP that underlies the park. However, there is evidence of AMD seepage within first order, headwater tributaries within BGR. While preliminary analyses indicate the project is unlikely to cause impacts within ALPO (Sharpe 2015; FONSI 2016), the unidentified source of current AMD within BGR, and the close proximity of the ASBP, suggest that an uncharacterized hydrologic connection could exist.

Project Need

A native fish community exists within BGR on properties within ALPO, including a native brook trout population above Blair Gap Reservoir (Map 1). Accordingly, the park believes it is prudent to obtain baseline information about the current status of park fish resources that can be used as a reference point to assess impacts. Therefore, the park implemented a focused fish monitoring effort that builds on previous aquatic resource assessments. Data from this fish monitoring effort will be incorporated into a spatially and temporally replicated Before-After-Control-Impact (BACI) study. The study will supplement previous monitoring efforts to document water quality, flow, and benthic macroinvertebrate populations within perennial reaches of ALPO prior to the implementation of the CAP.

A cooperative effort between ALPO, the Eastern Rivers and Mountains Inventory and Monitoring Network (ERMN) staff, the Northeast Region Hydrologist, and the Water Resources Division (WRD) Fish Program was organized to conduct a baseline fish survey within the BGR catchment and its tributaries within ALPO. Fish population information will be used as a baseline comparison in the event of unanticipated impacts resulting from implementation of CAP, or from changes in other stressors such as weather, climate or land use.

ALPO BACI Study Design

The primary goal of the survey effort was to provide baseline fish community data that can be used to assess the magnitude of possible future impacts that may result from CAP.

The Before-After-Control-Impact (BACI) study design is a standard experimental design used to detect environmental impacts. Ideally, the design would incorporate spatial and temporal replication of both the reference and the impacted sites. Underwood (1992) describes the rationale:

“BACI (Before/After and Control/Impact) sampling is widely used in investigations of environmental impacts on mean abundance of a population. The principle is that an anthropogenic disturbance in the “impact” location will cause a different pattern of change from before to after it starts compared with

natural change in the control location. This can be detectable efficiently as a statistical interaction in an analysis of variance of the data. Usually, samples are taken at replicated, random intervals of time before and after the putative impact starts; this ensures that chance temporal fluctuations in either location do not confound the detection of an impact”.

While this is the standard approach, Underwood (1992) further explains that the lack of spatial replication is not sufficient to confirm that observed differences between the control and the impacted site are not a result of factors unrelated to the presumed cause of an observed change. He states:

“These designs are, however, insufficient because any location-specific temporal difference that occurs between the two locations will be interpreted as an impact even if it has nothing to do with the human disturbance. Alternatively, abundance in the single control location may change in the same direction, cancelling the effects of an impact. Here, asymmetrical designs are developed that compare the temporal change in a potentially impacted location with those in a randomly-selected set of control locations. An impact must cause a different temporal change in the disturbed location from what would be expected in similar locations. This can be detected for short-term (pulse) or long-term (press) impacts by different patterns of significance in the temporal interactions between time~ of sampling and locations. From these novel designs, tests are derived that demonstrate whether an unusual pattern of temporal change in abundance of organisms is specific to the supposedly impacted location and correlated with the onset of the disturbance”.

While a temporally and spatially replicated BACI design is ideal, the number of replicates is almost always limited by practical constraints such as the location and availability of sites, how often they can be sampled, and the personnel and funding required. Ultimately, the number of sites sampled, and sampling frequency is often a compromise between acquiring sufficient data to demonstrate an impact and the resources available. Such is the case at ALPO.

Four previously sampled sites were initially chosen to be surveyed in this study (Map 1). Based upon the presumption of a possible AMD impact in the headwaters of Blair Gap Run, ALPO-1, ALPO-4, and ALPO-6 were all sites that could possibly be impacted by AMD originating in the headwaters above ALPO-1. ALPO-5 on Millstone Run is not on the mainstem of BGR and not considered to be within the potentially impacted area, and was chosen as the reference/control site for the study. It should be noted that should any impact occur from AMD originating below ALPO-1, then this site could also represent a second control site.

Statistical Analyses and Need for Replication

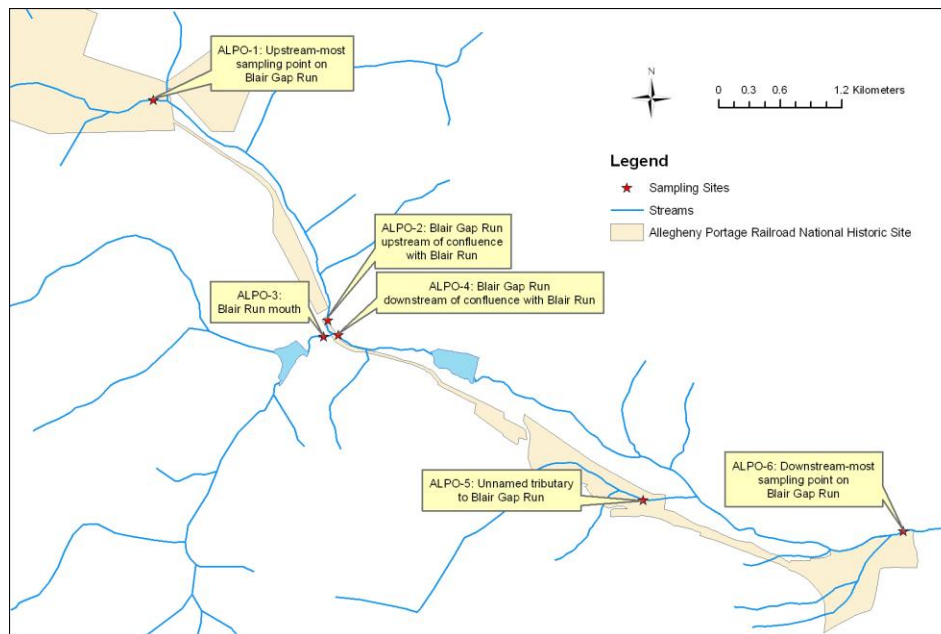
Although the sites have been sampled once in September 2016 there is likely to be an opportunity to resample these sites before the full implementation of CAP project and to extend the spatial replication to include more reference sites should funding and personnel be available. It is recommended that at least one other reference site be chosen, perhaps outside the BGR catchment area and unassociated with any known potential impacts. It is also recommended that all sites be sampled at least three times before and after the presumed impact.

In the event of an AMD impact, it is likely that the three BGR sites would be impacted to different extents. Therefore, while they may all be considered “impact” sites they cannot be assumed to be replicates of the same population. Consequently, the statistical analyses to confirm an impact would likely involve the detection of a statistically significant interaction term amongst a group of differentially impacted sites and the control, each with appropriate replication.

Traditionally, a BACI design is analyzed by standard “Frequentist” statistical methods, an impact being detected as a statistical interaction in an analysis of variance (ANOVA) of the data. However, since the BACI design was popularized in the early 1990’s, there has been a paradigm shift in the application of

different statistical approaches. At this time, while the standard ANOVA approach is a place to start, by the time a complete dataset may become available, it is likely that other statistical approaches (Information-Theoretical, Likelihood, Bayesian) will be favored. It is recommended that should an analysis of the data be required, that the data should be analyzed by a statistician familiar with contemporary methods most appropriate for the “experiment”. However, with adequate spatial and temporal replication of fish sampling, combined with water quality data from other studies being conducted in the park, there should be adequate data to conduct whatever statistical analyses is thought necessary at the time, given careful consideration of the hypotheses to be tested and the nature of the AMD impact.

Survey Locations and Sampling Dates



Map 1. Previously sampled fish, chemical and biological sampling stations located at Allegheny Portage Railroad National Historic Site (Sheeder and Tzilkowski, 2006). (Note: Historic name of ALPO-5 shown as unnamed tributary is Millstone Run.)

Sampling occurred on September 27 and 28, 2016. Fish surveys were conducted at four locations (ALPO-1, ALPO-4, ALPO-5, and ALPO-6), within ALPO previously described by Sheeder and Tzilkowski (2006)[Map 1]. All sites were on NPS property.

Site descriptions are:

- ALPO-1. Blair Gap Run (Skew Arch): from the Skew Arch bridge culvert downstream of the bridge, extending downstream 100m.
- ALPO-4. Blair Gap Run (Muleshoe): from near NPS property boundary, extending upstream 100m (Note: Tzilkowski identified the downstream coordinates (Table 1) as 10 m from the ALPO boundary. However, Penrod has suggested that the lower “boundary” coordinates are actually the mid-reach marker at the gage. The boundary is perhaps 50m farther downstream. Therefore, a re-measurement of the downstream reach coordinates is necessary).

- ALPO-5. Millstone Run: from 10m upstream of eastern park boundary, extending upstream 100m.
- ALPO-6. Blair Gap Run (Foot of Ten): from 10m upstream of the bridge at Mill Road park boundary, extending upstream 100m.

Table 1. Latitude and Longitude of upstream and downstream ends of surveyed stream reaches

Site	Upstream End		Downstream End	
	Latitude	Longitude	Latitude	Longitude
Blair Gap Run (Skew Arch)	40.45341	-78.54038	NA	NA
Blair Gap Run (Muleshoe)	40.43249	-78.51850	40.43218	-78.51770
Millstone Run	40.41900	-78.48473	40.41899	-78.48355
Blair Gap Run (Foot of Ten)	40.41589	-78.45364	40.41607	-78.45256

Horizontal precision of measurements approximately 10m

Methods

The upstream and downstream ends of all reaches were identified, and 1/8 inch block nets secured across the stream, where necessary, to prevent fish from entering or leaving the reach. Backpack electrofishing (Smith Root LR-20B) was employed to conduct a three-pass removal within the reach (Volts = 275; Frequency = 30 Hz; duty Cycle = 20%). All fish captured were removed from the stream reach and temporarily retained, separated by removal pass. At the end of the third pass, fish from each pass were identified to species, and counted. Total length was measured for the first 50 individuals of each species at each site. To avoid sampling bias, fish were randomly subsampled from buckets using small nets until the first 50 fish were measured. Standard length (mm) and weight to the nearest gram, was recorded for the first 50 trout of each species at each site. All fish were returned to the site from which they were captured.

Species specific population estimates were calculated for each reach using the USGS Patuxent Wildlife Research Center's online software module "CAPTURE" (<http://www.mbr-pwrc.usgs.gov/software/capture.html>). The online program computes estimates of capture probability and population size from removal data, for 'closed' population capture-recapture data using the variable probability removal estimator of Pollock and Otto (see Biometrics 1983 for details). [Note: While this module provides an easy to use tool to derive a population estimate for one species at one site, it is recommended that as more data becomes available, or in the event of an impact, Program Mark (White and Burnham, 1999; <http://warnercnr.colostate.edu/~gwhite/mark/mark.htm>) be used to compute population estimates. Program Mark uses Information-Theoretical (see Anderson 2008) statistical methods for model selection and multi-model averaging procedures for more accurate experiment-wide population estimation].

Trout biomass per unit area of stream (kg/ha) was calculated for trout species where they occurred. The population estimate and average weight of an individual trout was used to calculate a reach length estimate of total trout biomass, by species. This estimate was then adjusted using the estimated bank-full stream widths for each site and reported as kg/ha. However, it should be noted that exact biomass estimates for brown trout were not possible because weights were recorded only for the first 50 fish of each species at each site. Consequently, the average weight of a brown trout was calculated from a subset of the total number of brown trout caught, if more than 50, and so may not reflect the exact average

weight of the total number of fish caught. Brook trout numbers were low enough at all sites that all fish were weighed and measured.

Results

A total of 11 species of fish were found within the park (Table 2): 2 species of trout, 4 minnows, 2 suckers, a madtom (small catfish), a sculpin, and a darter. Specifically, brook trout (*Salvelinus fontinalis*); brown trout (*Salmo trutta*); blacknose dace (*Rhinichthys atratulus*); longnose dace (*Rhinichthys cataractae*); cutlips minnow (*Exoglossum maxillina*); creek chub (*Semotilus atromaculatus*); white sucker (*Catostomus commersonii*); northern hogsucker (*Hypentelium nigricans*); margined madtom (*Noturus insignis*); slimy sculpin (*Cottus cognatus*); and tessellated darter (*Etheostoma olmstedii*). Blacknose dace was the most numerically dominant fish in the survey, and small, native fish were numerically dominant at all sites. The most downstream site, ALPO-6, had the greatest diversity with 9 species detected. No new species records were detected in the study area.

Trout Species:

Native, wild brook trout were found at the three most upstream sites. The most upstream site, ALPO-1 contained only native, wild brook trout. Brown trout were found at the three more downstream sites. At ALPO-4, while small native fish were numerically dominant, adult brown trout comprised a high proportion of the observed biomass. Brown trout were most numerous at ALPO-6, amongst sites at which they were found, but almost all were juvenile fish less than 1-year old.

Based upon the Pennsylvania Fish and Boat Commission biomass criteria, trout biomass at ALPO-1 met the criteria for a “wild brook trout” fishery, and ALPO-4 met the criteria for a “wild brown trout” fishery (Table 3). However, it should be noted that biomass estimates for brown trout were not entirely accurate because average fish weight was calculated only from the first 50 fish of each species at each site, not all trout caught. However, the data still confirm that ALPO-4 meets the minimum standards for designation as a wild brown trout fishery with small numbers of brook trout present. It is recommended that in future studies, lengths and weights of *all* trout captured be recorded.

Table 2. Number of fish captured on each removal pass.

Site	Species	Pass 1	Pass 2	Pass 3	Total	N-hat	SE	L 95	U 95
ALPO-1	brook trout	22	9	5	36	46	5.48	40	63
ALPO-4	white sucker	2	0	0	2	2	0.00	2	2
ALPO-4	slimy sculpin	71	40	18	129	165	10.39	150	191
ALPO-4	cutlips minnow	0	0	2	2	6	3.46	3	19
ALPO-4	blacknose dace	5	0	1	6	8	2.45	7	19
ALPO-4	brook trout	4	2	2	8	12	3.46	9	25
ALPO-4	brown trout	55	7	15	77	107	9.49	94	131
ALPO-5	blacknose dace	122	55	53	230	336	17.83	307	377
ALPO-5	brook trout	3	2	0	5	5	0.00	5	5
ALPO-5	brown trout	23	8	5	36	46	5.48	40	63
ALPO-6	white sucker	3	6	4	13	21	4.90	16	37
ALPO-6	tessellated darter	0	1	1	2	4	2.45	3	15
ALPO-6	cutlips minnow	26	16	16	58	90	9.80	76	115
ALPO-6	northern hogsucker	6	2	2	10	14	3.46	11	27
ALPO-6	margined madtom	3	1	8	12	28	6.93	20	48
ALPO-6	blacknose dace	168	167	115	450	680	26.27	635	737
ALPO-6	longnose dace	27	27	22	76	120	11.49	103	148
ALPO-6	brown trout	70	33	20	123	163	10.95	147	190
ALPO-6	creek chub	10	2	10	22	42	7.75	32	63

Total number of fish captured (Total), the estimated population size (N-hat), the Standard Error (SE), and Lower (L 95) and Upper (U 95), 95% confidence intervals for the population estimate, for each species captured within a sampling reach.

Table 3. Estimated trout biomass (kg/ha) at survey locations.

Site	Species	N-hat	Avg Wt (gm)	Biomass (gm)	Width (m)	Area (m)	kg/hect
ALPO-1	brook trout	46	16.61	764.11	2	200	38.21
ALPO-4	brook trout	12	4.50	54.00	5.4	540	1.00
ALPO-4	brown trout	107	51.53	5513.32	5.4	540	102.10
ALPO-5	brook trout	5	24.60	123.00	2.8	280	4.39
ALPO-5	brown trout	46	5.56	255.56	2.8	280	9.13
ALPO-6	brown trout	163	6.71	1093.46	7	700	15.62

N-hat=estimated population size in the reach; Avg Wt=average weight of individual caught; biomass= estimated total trout biomass in the reach; width=average bankful stream width; Area=area of stream sampled (width x stream length); kg/ha=trout biomass per hectare.

Conclusions

1. **Fish Community:** Results confirm that the fish community within ALPO is representative of healthy mountain streams dominated by native, non-game fish, typical of western PA. The fish community at ALPO-1 in the upper reaches of BGR contains only native wild brook trout. The data show that the upper reaches of BGR, above Blair Gap Reservoir meet the Pennsylvania Fish and Boat Commission criteria to be designated a “wild brook trout” fishery.
2. **Non-native brown trout:** The only non-native fish found were European brown trout. At ALPO-4 brown trout comprised the majority of the fish biomass at the site. The data show that should the opportunity arise, the natural native fish community could be restored by the control of non-native brown trout in BGR and Blair Run, downstream to Altoona Reservoir. This would allow native brook trout populations that are currently competing with brown trout to increase their distribution and abundance and re-establish the historical native fish community in BGR within, and adjacent to, ALPO.
3. **Additional Fish Community Monitoring:** The fish inventory data collected during this study, and the resulting population estimates, provide robust baseline data that may be used to detect possible impairment resulting from AMD within ALPO. However, it is most useful if the park continues to collect similar data at regular intervals (annually), and perhaps expands the spatial coverage of the study, in order to provide adequate spatial and temporal replication before and after an impact to clearly demonstrate cause and effect. If funds allow, WRD recommends that at least one other reference site be chosen, perhaps outside the BGR catchment area and unassociated with any known potential impacts. WRD also recommends that all sites be sampled annually for at least two years prior to an environmental impact, and at regular intervals thereafter to obtain adequate temporal replication.
4. **Data Compilation and Storage:** A critical aspect of the study is to ensure that all data collected as part of this continuing effort be compiled in a single database and placed where it can be accessed as needed. Accordingly, a repository has been created for the effort by the ERMN. The project data in Excel format and the associated field data sheets can be found at the NPS Integrated Resource Management Applications (IRMA) Portal which provides access to NPS applications that manage and deliver resource information to parks, partners and the public. The compiled data can be found at <https://irma.nps.gov/DataStore/Reference/Profile/2235931>.

References

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Appendix I. Technical Assistance Request

Technical Assistance Request

STAR Request Id - 2473 (Created By Kathy Penrod and last updated on Jun 16 2016 12:10PM)

Requestor	Kathy Penrod (kathy_penrod@nps.gov)		
Created By	Kathy Penrod (kathy_penrod@nps.gov)		
Last Updated	Thursday, June 16, 2016 12:10 PM		
Current Status	In Process		
Region	Northeast Region		
Park	Allegheny Portage Railroad National Historic Site		
Program Area	Fisheries		
Program Area Lead Info	Wullschleger, John (John_Wullschleger@nps.gov)		
Fiscal Year	2016	Is Expedited?	Yes
Estimated Time	17-40 hours		
Title	Collect Baseline Information to Document Current Condition of Fish Populations within ALPO in October 2016 (FY17)		
Problem Statement			
ALPO faces several stressors to water resources, herpetofaunal and native fish species. The Cresson Treatment Project (Special Use Permit FONSI pending) is intended to provide supplemental water to the Susquehanna River during low-flow periods by pumping and treating water from three abandoned underground mine pools near Cresson, PA, two of which are located under National Park Service property within Allegheny Portage Railroad NHS. Of particular concern is the protection of the stream habitat within the upper reaches of Blair Gap Run above Blair Gap Reservoir (from headwaters to park boundary below Skew Arch Bridge), and perhaps at mid-reaches of the high-gradient, cold water wild trout stream (near Muleshoe area between Cresson and Duncansville, PA). A native brook trout population exists within ALPO in a short reach above Blair Gap Reservoir. Native brook trout are present sympatrically with introduced non-native brown trout at Muleshoe area of Blair Gap Run and the Millstone Run tributary. ALPO believes it is prudent to obtain baseline information about the current health of park aquatic resources that can be used as a baseline reference point, in the event that a hydrologic connection does exist between mine pools and subsurface freshwater that could lead to a negative impact to park resources. ALPO, region and WASO Natural Resource staff decided that estimation of minimum stream flows would be an expensive and intensive undertaking not justified by the potential level of resource threat. Therefore, the park proposes to implement a narrowly focused, inventory and monitoring effort that builds on past efforts to document the status of aquatic resources within the park. This effort would focus on the implementation of a fish monitoring effort to supplement current and previous monitoring efforts to document water quality, flow, and benthic macroinvertebrate populations within perennial reaches of ALPO prior to the implementation of the Cresson Treatment Project, and in light of observations of increased erosion of streambanks and increased subsidence at the Cresson Mountain Summit where Blair Gap Run headwaters terminate.			
Target Expertise			

WASO WRD Fish Biologist Carl Medley assisted park and region staff with development of a Fish Monitoring Plan for reaches of Blair Gap Run within ALPO. Travel costs can be shared by park and possibly Northeast region.		
What are you asking the NRSS to do?		
Assist ALPO and Eastern Rivers and Mountains Network I&M staff, and Northeast Region Hydrologist and/or Aquatic Ecologist, with completion of Fish Population Monitoring at Blair Gap Run, ALPO, Pennsylvania. Sampling will occur in early October 2016 (FY17), prior to trout spawning season so that reproductive condition may be assessed. The primary action is the implementation of a fish monitoring program at Blair Gap Run, ALPO. Backpack electrofishing will be employed to conduct three-pass removal estimate for fish populations within four stream reaches within ALPO. All fish captured will be counted, weighed (grams) and measured (mm). Spawning condition will be assessed. All fish will be returned to the site from which they were captured. Fish population information will be used as a baseline comparison in the event of unanticipated impacts resulting from implementation of the Cresson Treatment Project, or from changes in other stressors such as weather, climate or land use.		
What alternatives does the park have to accomplish the work?		
None. ALPO shares one natural resource staff with JOFL and so is unable to carry out a four-person field team monitoring effort. It is only by the sharing of park, I&M Network, Northeast Region and WASO WRD staff, resources, and expertise that ALPO can complete this needed monitoring to protect native brook trout populations at Blair Gap Run within ALPO.		
Super Approved	Yes	
Travel Needs?	Park will provide travel assistance	
Park has Travel Funding	No	
Requires Private Land Access	No	
Expected date of completion	10/10/2016	
Is Multi Year?	No	
Additional Information	Carl Medley has advised the park that the optimal time for fish data collection is prior to trout spawning. Plans are to conduct fish population monitoring the week of October 10, 2016 or October 17, 2016 (FY17).	
Comments	ALPO NRM discretionary budget funds can be requested for travel cost sharing but will not be assigned until FY17. (ALPO is part of the 5-park units called WEPA, and our FY16 travel budget and ceiling will be expended on Flight 93 Anniversary events.) Northeast Region may also be able to contribute some travel cost sharing funds.	
Park Rank	1	
Park Comments	It has been ten years since I have had any fish data collected at the wild trout stream Blair Gap Run within ALPO; due to potential natural resource threats facing the park I believe that it is prudent to implement this Fish Monitoring Plan to obtain current baseline information on fish populations at this wild trout fishery within ALPO.	
Region Rank		
Region Comments		
Acceptance Level		

Actual Hours	
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Alternate Contacts

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Documents

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Other Programs

Program Area Comments

Technical Assistance Lead

History

Action	Subject	Date Finished	Notification Sent
Status Change	TAR 2473 - Status Change to Draft	6/16/2016 12:12 PM	No
Status Change	TAR 2473 - Status Change to InProcess	6/16/2016 12:12 PM	Yes
Add Additional Contact	TAR 2473 - Additional Contact Added	6/16/2016 12:24 PM	Yes
Add Additional Contact	TAR 2473 - Additional Contact Added	6/16/2016 12:24 PM	Yes
Add Additional Contact	TAR 2473 - Additional Contact Added	6/16/2016 12:24 PM	Yes
Add Document	TAR 2473 - Document Added	6/16/2016 12:32 PM	Yes

Photo 1. The Team. September 28, 2016 (NPS)



From left to right:

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Kristina Callahan, Data Manager, I&M Program, NERO-ERMN, NPS, Penn State, College Station, PA
Nic Medley, Fish Biologist/Aquatic Ecologist, Fish Program, Water Resources Division, NRSS, Fort Collins, CO

Kathy Penrod, Natural Resource Management Specialist, Allegheny Portage Railroad NHS, Gallitzin PA
Caleb Tzilkowski, Aquatic Ecologist, I&M Program, NERO-ERMN, NPS, Penn State, College Station, PA

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