FINDING OF NO SIGNIFICANT IMPACT
COBBS CREEK FISH PASSAGE PROJECT
SECTION 566, WATER RESOURCE DEVELOPMENT ACT OF 1996
PHILADELPHIA, PENNSYLVANIA

OVERVIEW

The United States Army Corps of Engineers (Corps), Philadelphia District has evaluated fish passage options at the Woodland Dam on Cobbs Creek, located in Fairmount Park, Philadelphia, Pennsylvania. The Woodland Dam is located close to the Cobbs Creek Parkway and Woodland Avenue. The dam is approximately 100 feet in length by 8 feet in height.

PURPOSE AND SPECIFICATIONS

The Woodland Dam is the first impediment to fish passage on Cobbs Creek and serves as the demarcation between tidal and non-tidal influences along the creek. In 2003, the Philadelphia Water Department (PWD) biologists performed multiple surveys along the tidal and non-tidal portions of Cobbs Creek to determine the numbers and types of fish present and to assess the overall fish population diversity. Biologists collected nineteen species above the Woodland Avenue Dam and identified forty-three species in the tidal portions of Cobbs Creek. Most notable was the absence of anadromous and semi-migratory fish species in the non-tidal reaches (above Woodland Dam).

This project has investigated the best alternative to promote fish passage to reaches of Cobbs Creek upstream of Woodland Dam. The most effective method of restoring fish passage and allowing access to upstream habitats is to remove the dam and restore the channel to a more natural condition. Existing conditions of the site such as the historical and cultural aspects of the dam, the chemical composition of sediment behind the dam, and the potential for increased downstream flood hazard risk were also evaluated for this project.

Benefits of the Cobbs Creek Fish Passage Project would include: access to approximately 4 miles of spawning and foraging habitat for migrating fish; improved connectivity for other aquatic species (reptiles, amphibians, macroinvertebrates); an increase in habitat and food availability for aquatic species; and benefits to riparian species (e.g., wading birds) that depend on the creek for food and cover. In addition, removing the dam proactively would prevent any future dam failure and possible public safety hazard.

COORDINATION

The project was developed in partnership by the U.S. Army Corps of Engineers (Corps) and the Philadelphia Water Department (PWD). The draft Environmental Assessment (EA) for the project was forwarded to the U.S. Environmental Protection Agency (EPA), Region III, the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), Pennsylvania Department of Environmental Protection (PADEP), Pennsylvania Game Commission (PGC), Pennsylvania Fish and Boat Commission (PFBC), and all other known interested parties. In addition, a public notice discussing this project was emailed to members of the public who have signed up to receive copies of Philadelphia District public notices. There are currently approximately 350 parties registered on our public notice review email list.

ENDANGERED SPECIES IMPACT
Consultation with the USFWS and the NMFS has determined that no federally listed species are found in the proposed project area; hence, no impacts are anticipated to any fish, wildlife or plant, which is designated as endangered or threatened pursuant to the Endangered Species Act of 1973 as amended by P.L. 96-159.

WATER QUALITY COMPLIANCE
The Corps has determined that this project meets the terms and conditions of Nationwide Permit #27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities) for the construction of this project and with that permit, the Pennsylvania, Section 401 State Water Quality Certificate is automatically issued. In addition, any future maintenance requirements of the project undertaken by the non-federal sponsor, Philadelphia Water Department, will be covered by Nationwide Permit #3 (Maintenance).

WETLANDS
Wetlands are not found in the project area; and, thus, will not be impacted by the project.

COASTAL ZONE
Based on the information gathered during the preparation of the Environmental Assessment, the project is not located in the area defined under the Coastal Zone Management Act of 1972. Therefore, the project will not need a federal consistency determination in regards to the Coastal Zone Management Program of Pennsylvania.

CULTURAL IMPACTS
Based on the results of the cultural resource investigations, the USACE has determined that no historic properties will be affected by the proposed project in compliance with 36 CFR 800.4(d)(1). The Pennsylvania Historical and Museum Commission concurred with this determination in a letter dated 22 September 2010.

RECOMMENDATION
Because the Environmental Assessment concludes that the work described is not a major Federal action significantly affecting the human environment, I have determined that an Environmental Impact Statement is not required.

_____ _____

Michael A. Bliss, P.E. Date
Lieutenant Colonel, Corps of Engineers
District Commander

DRAFT
ENVIRONMENTAL ASSESSMENT
COBBS CREEK FISH PASSAGE PROJECT
SECTION 566, WATER RESOURCE DEVELOPMENT ACT OF 1996
PHILADELPHIA, PENNSYLVANIA

PREPARED BY:
PHILADELPHIA DISTRICT
U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA, PENNSYLVANIA 19107

April 2016

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1.0 Project Location

The project site is located along Cobbs Creek and involves modifications to the Woodland Dam in order to restore fish passage (Figure 1). The Woodland Dam is located close to the Cobbs Creek Parkway and Woodland Avenue. It is also the first impediment to fish passage on Cobbs Creek and serves as the demarcation between tidal and non-tidal influences along the creek (Figure 2). Cobbs Creek is a tributary of Darby Creek, which eventually flows through John Heinz National Wildlife Refuge to the Delaware River and is an urban watershed located in Philadelphia, PA. The dam is approximately 100 feet in length by 8 feet in height (Figure 3 and 4 and was originally a site of a mill dam.

2.0 Study Authority

The authority for this project is Section 566 of the Water Resources Development Act (WRDA) of 1996. Section 566 of WRDA 96 established a program to provide design and construction assistance for water-related environmental infrastructure, resource protection, and development projects for non-Federal interests in Southeastern Pennsylvania.

3.0 Purpose and Need for Action

The Woodland Dam is the first impediment to fish passage on Cobbs Creek and serves as the demarcation between tidal and non-tidal influences along the creek. As mentioned above, Cobbs Creek flows into Darby Creek, which eventually reaches the Delaware River. Historically, the project area and Cobbs Creek were an important location for early mill dams. The dam no longer serves the function as a mill dam or any other important purpose for the community. In 2003, the Philadelphia Water Department (PWD) biologists performed multiple surveys along the tidal and non-tidal portions of Cobbs Creek to determine the numbers and types of fish present and to assess the overall fish population diversity. Biologists collected nineteen species above the Woodland Avenue Dam and identified forty-three species in the tidal portions of Cobbs Creek. Most notable was the absence of anadromous and semi-migratory fish species in the non-tidal reaches (above Woodland Dam). Based on these surveys, its likely migratory fish traveled upstream of the current dam location prior to the construction of a dam at this location to forage (feed) and spawn (reproduce). The target fish species for the project is blueback herring (*Alosa aestivalis*), but many other aquatic species will benefit from the increased connectivity of the stream as a result of this project.

This project investigated the best alternative to reestablish fish passage along Cobbs Creek. Various alternatives were examined, but the most effective method of restoring fish passage is to remove the stream impediment and restore the channel to natural conditions. However, existing conditions such as the historical and cultural aspects of the dam, the chemical composition of sediment behind the dam, and the potential for increased downstream flood hazard risk influenced the selection of a recommended plan.

The Cobbs Creek Fish Passage Project would provide access to approximately four miles of spawning and rearing habitat for migrating fish with benefits to populations that historically spawned and foraged in the Cobbs Creek and its tributaries.

The owner of the property is the City of the Philadelphia and managed by the Fairmount Park Commission. The Corps would be responsible for design and construction of the project, while the non-federal sponsor, PWD, will be responsible for the operation and maintenance of the project.

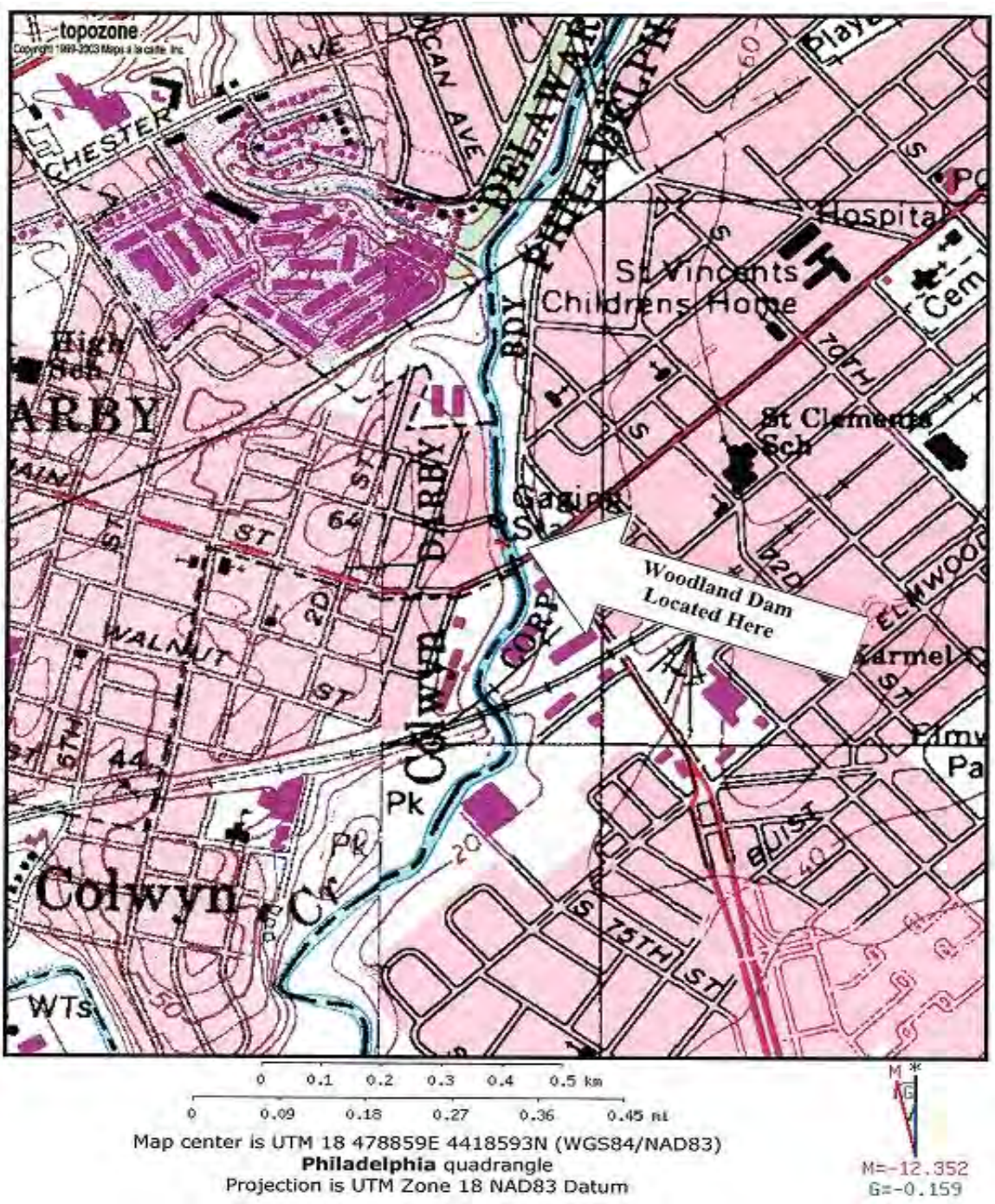

Figure 1. The USGS Quadrangle depicting the project location. Cobbs Creek acts as the boundary between the City of Philadelphia and Delaware County in the vicinity of the Woodland Dam.

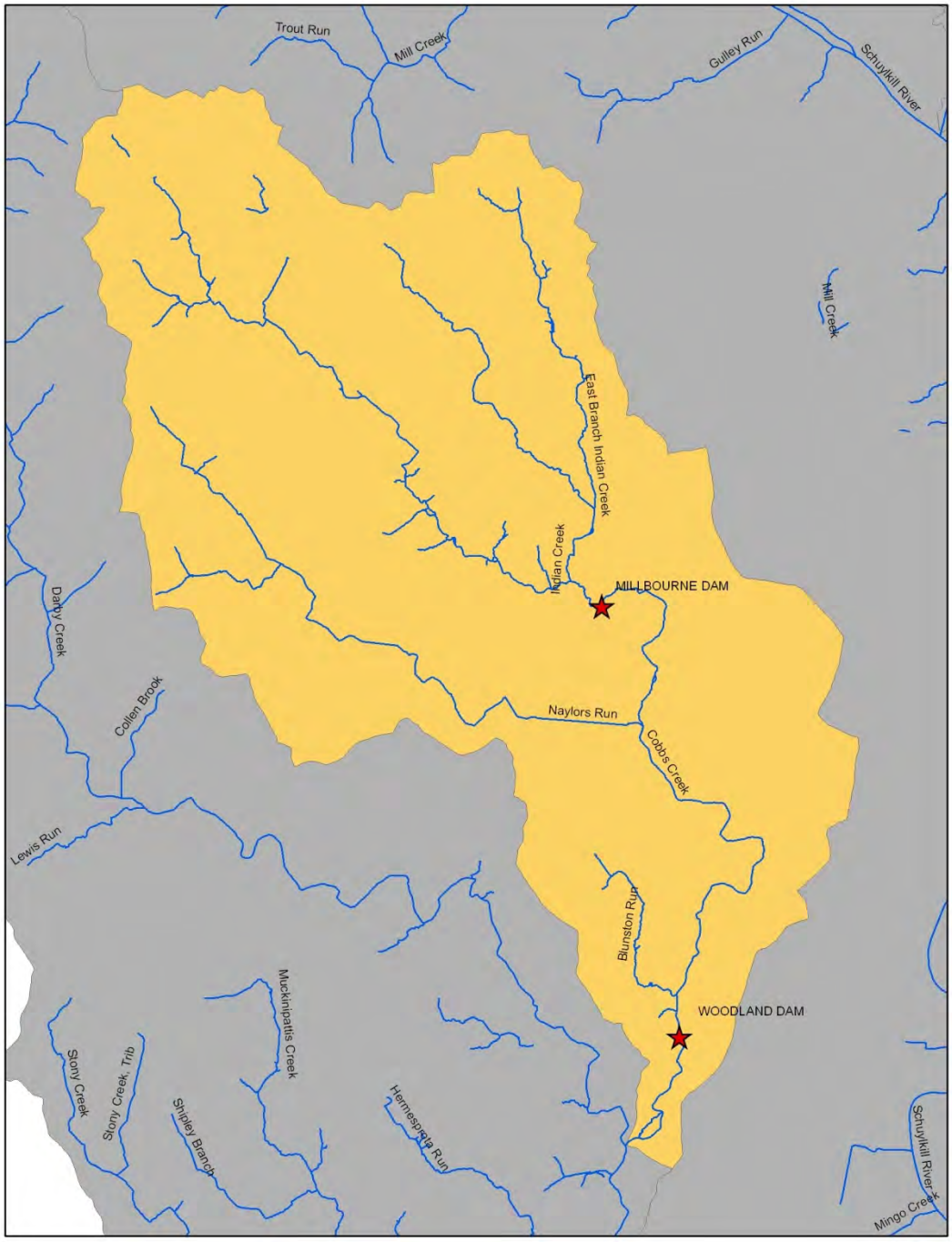

Figure 2. Map depicting Woodland Dam in relation to the Cobbs Creek Watershed.

Figure 3. Woodland Dam shown from the bank adjacent to the Blue Bell Inn.

Figure 4. Woodland Dam shown from the Woodland Avenue Bridge approximately 200 feet downstream of the dam.

4.0 Alternatives

4.1 No Action

The No Action Alternative (without project condition) is required to be evaluated as prescribed by the National Environmental Policy Act (NEPA) and Council of Environmental Quality (CEQ). The No Action Alternative serves as a baseline against which the Proposed Action and alternatives can be evaluated. Evaluation of the No Action Alternative involves assessing the environmental effects that would result if the proposed action did not take place. Without fish passage at the dam, the existing target species (blueback herring) will be unable to migrate to their historic spawning habitat upstream, thus preventing their reestablishment to the upper reaches of Cobbs Creek. The Corps considers this unacceptable.

4.2 Complete Dam Removal

This alternative involves the removal of approximately 100-foot in length, 6-foot high rock concrete dam and adjacent abutments. The Corps would remove debris to an offsite location for disposal. The site under this alternative will be left in a nearly natural, pre-dam state. The purpose of this alternative is primarily to restore a more natural river ecosystem with significant improvement to aquatic habitat.

As the dam is removed, the impoundment will drain and the upstream river channel will become narrower. In the new channel, velocity will increase and sediment transport will resume. The river will gradually develop fluvial features including a thalweg, localized pools, riffles, runs, and depositional areas. In an attempt to sequester most of the accumulated sediment behind the dam and insure the stability of the stream, an engineered rock riffle (pool and weir) will be created in the streambed at the location of the existing dam (Figure 5).

When the dam is removed, the elevation of the water surface in the impoundment will be lowered and it will expose banks, as well as sediments that are currently under water. A planting plan has been developed for this project using native vegetation to stabilize any exposed river banks or mudflats. The stabilization and restoration plan will involve planting trees and shrubs on unconsolidated exposed mudflats and banks upstream to create riparian habitat and provide erosion control upstream of the dam. Some likely shrubs and trees that will be planted within the riparian area may include, but are not limited to, black willow (*Salix nigra*), shadbush (*Amelanchier canadensis*), black gum (*Nyssa sylvatica*), elderberry (*Sambucus canadensis*), red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), winterberry (*Ilex verticillata*), buttonbush (*Cephalanthus occidentalis*), red chokeberry (*Pyrus arbutifolia*), and spicebush (*Lindera benzoin*). In addition, the plan will include the re-seeding of any exposed river banks with a native wetland seed mix.

4.3 Partial Dam Removal (Selected Plan)

This alternative involves the removal of only a portion of approximately 100-foot in length, 6-foot high rock and concrete dam. The abutments and associated rock walls would be kept intact

as part of this alternative. The Corps would remove debris to an offsite location for disposal. The site under this alternative will restore fish passage on Cobbs Creek while preserving any necessary, structural, historical or cultural aspects of the dam. The purpose of this alternative is primarily to restore a more natural river ecosystem with significant improvement to aquatic habitat.

As the dam is removed (Figure 5), the impoundment will drain and the upstream river channel will become narrower. In the new channel, velocity will increase and sediment transport will resume. The river will gradually develop fluvial features including a thalweg, localized pools, riffles, runs, and depositional areas. In an attempt to sequester most of the accumulated sediment behind the dam and insure the stability of the stream, an engineered rock riffle (pool and weir) will be created in the streambed at the location of the existing dam (Figures 6 and 7). The full project designs can be found in Appendix D.

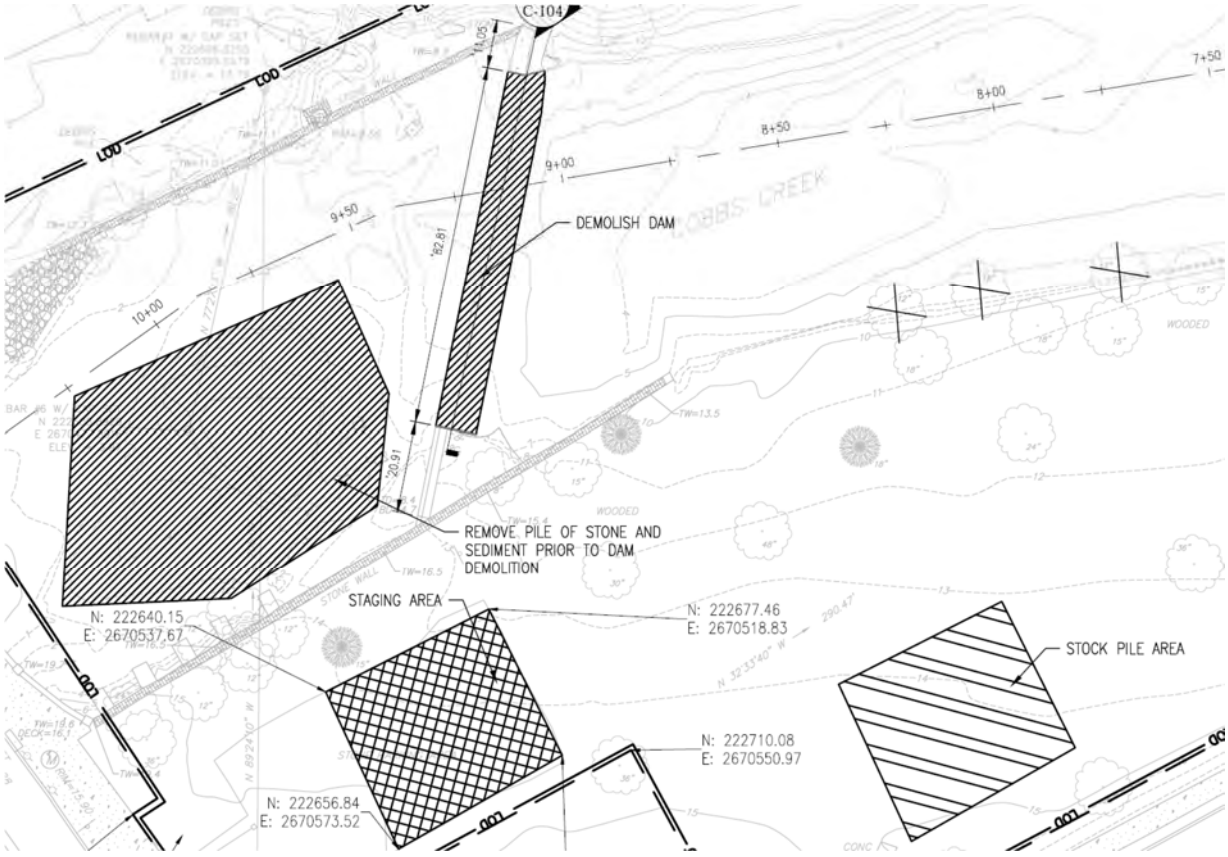

Figure 5. Demolition plan for Woodland Dam.

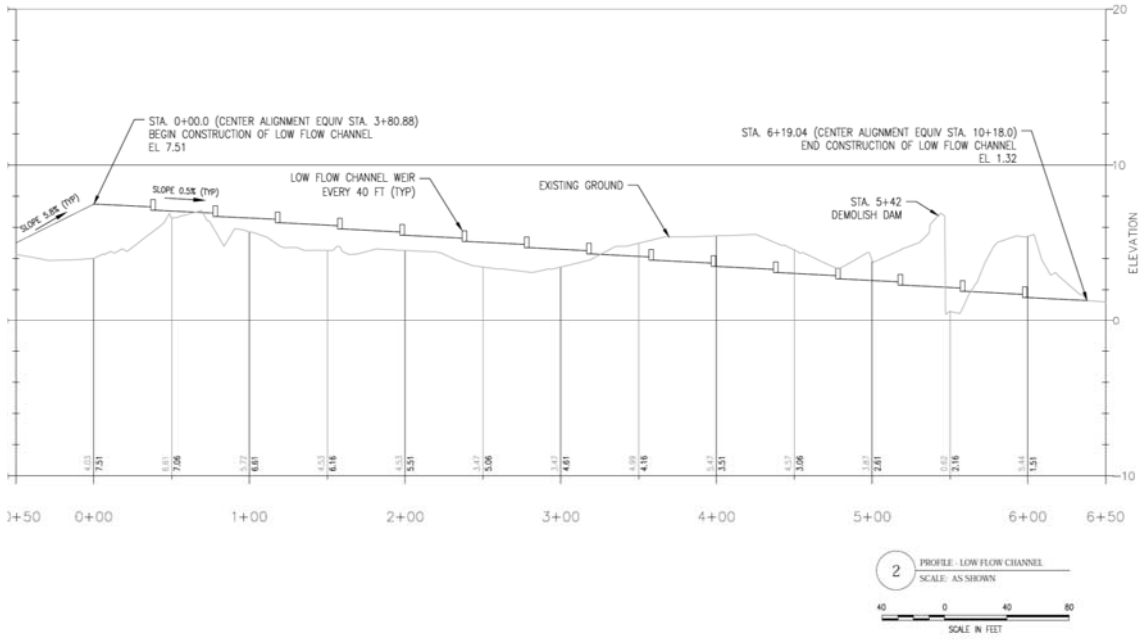

Figure 6. Typical profile of the new low flow channel.

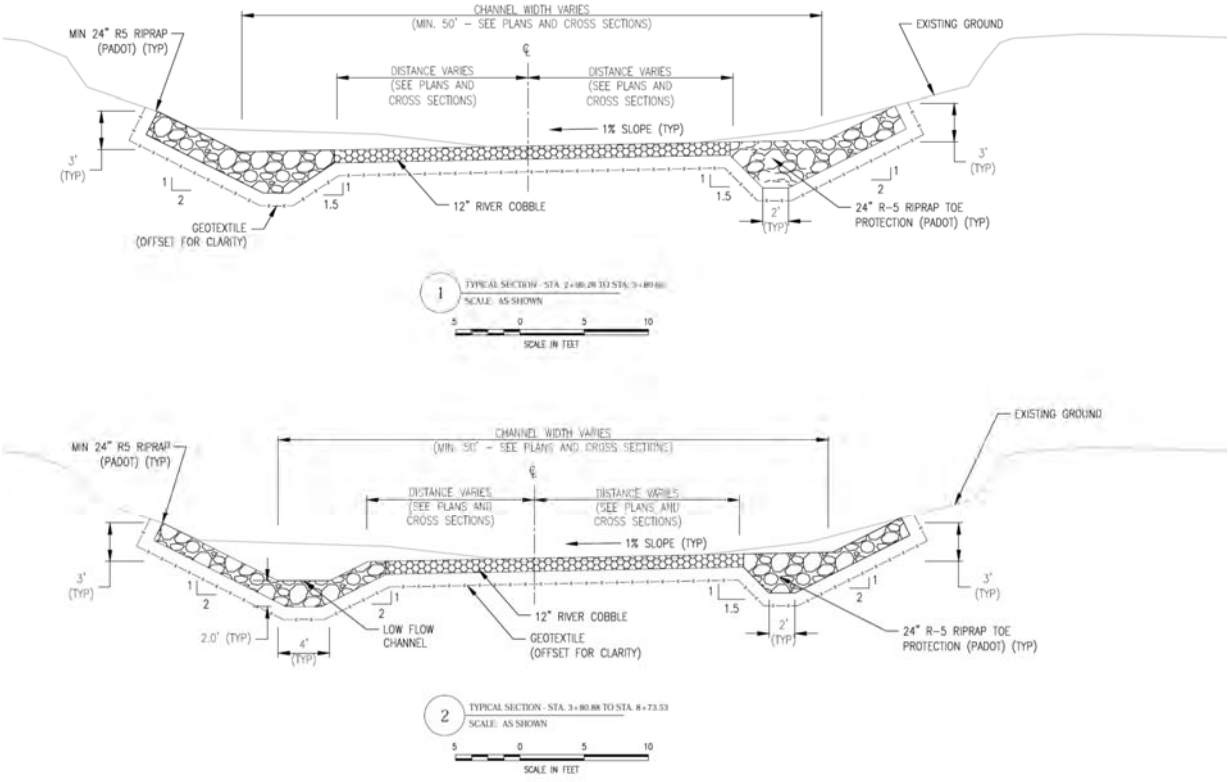

Figure 7. Typical cross sections of new low flow channel.

When the dam is removed, the elevation of the water surface in the impoundment will be lowered and it will expose banks, as well as sediments that are currently under water. A planting plan has been developed for this project using native vegetation to stabilize any exposed streambanks. The stabilization and restoration plan will involve planting trees and shrubs on exposed streambanks to create riparian habitat and provide erosion control upstream of the dam. Native plants will also be used to replant the disturbed riparian and forested areas of the project. Some of the species being planted include: American sycamore (*Plantus occidentalis*), river birch (*Betula nigra*), sweetbay (*Magnolia virginiana*), shadbush (*Amelanchier canadensis*), winterberry (*Ilex verticillata*), sweet pepperbush (*Clethra alnifolia*), red chokeberry (*Aronia arbutifolia*), red osier dogwood (*Cornus sericea*) wild hydrangea (*Hydrangea arborescens*), and spicebush (*Lindera benzoin*). In addition, any disturbed riparian and forest areas will be re-seeded with appropriate native seed mixes (for the full planting plan, see Appendix D).

A partial removal would not only provide all of the same benefits of a complete removal (i.e. passage for aquatic organisms and recreational boats, restoration of the impoundment, downstream movement of materials, elimination of a safety hazard), but would also provide several additional benefits listed below.

- The remaining sections would help to maintain the structural integrity of the existing embankments.
- The remaining sections would direct high flows toward the center of the river, diverting them away from the downstream bridge abutments.
- Remnants of the dam would be visible for appreciation as a historic resource, including the stone retaining walls.
- There will be less demolition material that requires re-use or disposal.

4.4 Fishways

Three management measures were considered in the preliminary stages of this project, but were found to be unable to meet the goals of the project. As such, they were not given any detailed consideration. The primary problem with all of these measures is that they would leave the dam in place and would not achieve the goals of promoting fish passage and creating a more natural stream condition. A brief summary of these measures and a discussion of the additional concerns that contribute to their infeasibility are provided below.

Fish Ladder

The installation of a fish ladder at the Woodland Dam is a method of addressing part of the study objective regarding the free passage of aquatic organisms, specifically fish. Traditional approaches to fish ladders involve the use of concrete baffles and compartments. The steep slopes and small compartments in these designs can make passage difficult for some fish species. In addition, fish ladders are never 100% efficient for passage of all fish (of any species). Furthermore, fish ladders typically require maintenance work to remove accumulated debris and can be labor intensive when compared to other restoration options. Finally, this measure would not allow the passage of other aquatic organisms such as amphibians, freshwater crustaceans,

and macroinvertebrates. Given these potential inadequacies, and the fact that it would only address part of a single planning objective, the fish ladder alternative was eliminated from further consideration.

Rock Ramp

Construction of a rock ramp involves the placement of rock on the downstream side of the dam to create a gentle slope from the existing downstream channel bottom to the crest of the dam. Natural Rapids or rock ramps consist of placing a series rocks and boulders in the creek to create the function and appearance of natural rapids. These rapids form a staircase of pools and eddies which reduces the flow velocity allowing fish to pass. Typically, rock ramps are constructed at a slope of 1:20 and are appropriate for small barriers. This type of a fishway that emulates natural rapids would not only promote passage of fish, but would create beneficial habitat for fish as well as aquatic insects. The placement of this rock "wedge" at the foot of the dam would also alleviate potential drowning hazards by eliminating the "hydraulic roller". A hydraulic roller is submerged hydraulic jump that forms a drowning hazard and public safety concern for low-head dams.

There are three major issues with this fish passage measure. The first is construction cost. Construction of a rock ramp with a slope gentle enough to allow fish passage requires the importation of large quantities of stone and gravel. The second is maintenance. Although it will not require maintenance as frequently as a fish ladder, a rock ramp will need to be monitored periodically to insure that the slope remains stable and passage remains possible. And the third is permitting. Any proposed filling within a watercourse is heavily scrutinized, and frequently opposed by state and federal regulatory agencies. These three issues rendered this measure infeasible.

Bypass Channel

Construction of a bypass channel has been used to provide fish passage at other sites across the nation. The term 'bypass channel' is used for fishways that bypasses a barrier and that are in the form of a natural-looking channel that mimics a natural river. Bypass channels are particularly suitable for the retrofitting of already existing dams where migration is to be restored by inserting a fishway since it generally requires no structural alterations of the dam itself. The bypass channel can be of considerable length depending on the height of the barrier you are trying to circumvent as they usually require a 1:20 or 1:30 slope for the channel. In addition, bypass channels are typically expensive due to the amount of excavation and available land needed for construction. Given these two factors and considering the lack of available land around the Woodland Dam, no further investigation was given to this measure.

A summary of the four alternatives can be found in Table 1. In addition, the projected benefits and potential issues are also displayed in this table.

Table 1. Alternative Analysis				
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
	No Action	**Complete Dam Removal**	**Partial Dam Removal**	**Fishway / Fish Ladder**
Benefits	● None	● Opens approximately 4 miles of habitat to migratory and resident fish species for foraging and spawning. Restores stream to a more natural condition. Also, will provide access for other aquatic organisms (turtles, amphibians, and macroinvertebrates).	● Opens approximately 4 miles of habitat to migratory and resident fish species for foraging and spawning. Restores stream to a more natural condition. Also, will provide access for other aquatic organisms (turtles, amphibians, and macroinvertebrates).	● Provides access for target migratory fish species, as well as some resident fish species.
Potential Issues	● Will not remove	● Sediment transport. ● Stream stability.	● Sediment transport.	● Not 100% effective at passing fish.

	impediment to fish passage. ● Ecosystem gets more degraded for local fish and wildlife populations.	● Potential historic resources issues with dam removal and associated structures.	● Stream stability. ● Potential historic resources issues with dam removal and associated structures.	Typically designed for a “target” species. ● Future operation and maintenance of the structure will be needed by non-federal sponsor. ● Does not restore the stream to a more natural condition.
Maintenance Costs	No cost	No cost	No cost	Medium
Wetland Impacts	0	0	0	0
Construction Cost	No cost	High	Medium	Medium
Conclusion	Not recommended	Not recommended	Recommended	Not recommended

4.5 Selected Plan

Based on an evaluation of the various alternatives (Table 1), including the environmental impacts, design elements, and costs, Alternative #3 - Partial Dam Removal was determined to be the selected plan. The other alternatives were eliminated because of cost and long-term maintenance issues. Alternative #3 most successfully achieves the project goals, which include enhancing the aquatic habitat, improving local/resident fisheries by providing access to additional habitat, restoring the river to a more natural conditions, and low future operational / maintenance costs.

The selected plan (Partial Dam Removal) has the following assumptions:

Design Assumptions

1.) Removal of the dam will occur during a low flow period and will not occur during a sensitive biological time period (fish migration). The current construction plan is to remove the dam "in the dry" with a Pennsylvania Department of Environmental Protection (PADEP) approved stream diversion plan.

2.) The sediment testing results were coordinated with PADEP and USFWS in 2010. Both agencies agreed that the contaminant levels were low enough to release the sediment downstream in a controlled, gradual manner. However, due to potential flooding concerns for downstream communities and the (potential) need to reuse onsite materials, the project team has chosen to construct an engineered rock riffle to sequester most of the sediment from behind the dam left in place.

3.) The section of the dam that will be removed will be excavated to the natural river bottom, which is assumed to be similar to the conditions immediately downstream of the dam (large cobbles). In addition, the point bar downstream of the dam will be excavated and the new low flow channel will be carried downstream of the dam site to tie-in with the existing low flow channel.

4.) There is only the single dam. There are no remnants of any previous dam adjacent to or immediately upstream of the dam within the project area.

5.) All non-hazardous material that can be used effectively and in an environmentally-acceptable way on site will be used. All of the demolished dam material requiring off-site disposal will be classified as non-hazardous and disposed off-site properly.

6.) The existing embankments for the dam will maintain their structural integrity and will not require any improvements. Some channel banks that are too steep in the project area will be regraded, protected, and planted, as appropriate.

7.) The removal of the dam will not result in any scour of the downstream bridge abutments and

the bridge will not require improvements. In addition, with the dam gone, the new flow pattern will be less erosive on the bridge.

8.) The removal of the dam or subsequent channel re-grading will not require the relocation of any utilities.

9.) The approximate amount of fill/rock used in the creek to create the rock riffle, sequester the sediment, and stabilize the banks will be 2600 cubic yards.

10.) Project will be constructed "in the dry" with a cofferdam. The current plan is to remove the dam last and it will be left in place during excavation and construction of the low flow channel behind the dam. This will allow the dam to function as a sediment trap during construction. In addition, with the dam in place, a siphon could be used instead of a pump. The coffer dam would likely be a Jersey barrier.

5.0 Existing Environment

5.1 Air and Water Quality

Ambient air quality is monitored by PADEP and is compared to the National Ambient Air Quality Standards (NAAQS) throughout the state, pursuant to the Clean Air Act of 1970. Six principal "criteria" pollutants are part of oxides of nitrogen (NO_x), particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb). Stationary sources include power plants that burn fossil fuels, factories, boilers, furnaces, manufacturing plants, gasoline dispensing facilities, and other industrial facilities. Mobile sources include vehicles such as cars, trucks, boats, and aircraft.

The Cobbs Creek Watershed Improvement Project is located within Philadelphia County, which is included in the Philadelphia-Wilmington-Atlantic City Nonattainment Area, PA-NJ-MD-DE (Philadelphia-Wilmington-Atlantic City Area) marginal ozone nonattainment for the 2008 8-hour ozone (oxides of nitrogen [NOx] and hydrocarbons [HC]) NAAQS.

<u>Water Quality</u>

The Darby-Cobbs Watershed drains approximately 80 square miles, through the Tinicum wetlands and finally to the mouth of the Darby Creek at the Delaware Estuary. This area includes portions of Chester, Delaware, Montgomery, and Philadelphia Counties. The watershed is often subdivided into the Cobbs Creek, Darby Creek, and Tinicum sub-watersheds for planning purposes. Cobbs Creek and its tributaries make up approximately 22 square miles of the Darby-Cobbs Watershed (Philadelphia Water Department – Office of Watersheds, 2010).

According to the Cobbs Creek Integrated Watershed Management Plan published by the Philadelphia Water Department Darby-Cobbs Watershed Partnership in 2004, the entire 18.75 miles of Cobbs Creek and its tributaries within the watershed are impaired due to urban runoff/storm sewers and habitat modification. There are water quality concerns including high fecal coliform during dry weather. The stream banks are noticeably full of trash when the water

surface is low during dry periods. There is limited diversity of fish and benthic life as well as degraded aquatic and riparian habitats. There are periodic, localized occurrences of low dissolved oxygen primarily associated with plunge pools and areas of stagnant water behind dams. Utility infrastructure is threatened by bank and streambed erosion. During wet weather water quality concerns include high fecal coliform as well as CSO impacts on the creek.

The Cobbs Creek Integrated Watershed Management Plan also uses benthos as an indicator of long-term water quality and the overall health of the aquatic system. Benthic organisms respond to changes in the aquatic environment making them good indicators of water quality conditions. PADEP classifies the Cobbs Creek watershed as moderately to severely impaired. The sources of impairment are primarily habitat modification, municipal point sources, and urban runoff/storm sewers based upon a year 2000 assessment.

5.2 Sediment

In 2009, an investigation of sediment contaminant concentrations and sediment quantity was conducted in Cobbs Creek behind Woodland Dam. Sediment volume measurements that were collected from the dam face to 500 feet upstream of the dam indicated that only a thin layer (less than 1 foot) of sediment exists behind the dam. Pockets of deeper sediments (around 4 feet) existed in a few isolated areas. Total sediment volume to 500 feet behind the dam was estimated to be 1,275 cubic yards. Additional information on the testing methodology can be found in Appendix B.

Figure 8. Sediment sampling locations for contaminant analysis at Woodland Dam. Transect lines indicate the locations of the sediment depth measurements.

5.3 Wetlands

According to the U.S. Fish & Wildlife Service's National Wetlands Inventory, there are no wetlands within the project site. In addition, multiple site visits confirmed that the impoundment behind the dam does not support any wetlands that would be affected by a drop in water level once the dam is removed.

5.4 Aquatic Resources

There are three fishery sample stations on Cobbs Creek, one on Naylor's Run, one on West Branch Indian Creek, and one in Harverford Township. In general, sampling results show that

fish abundance (number), richness (number of taxa) and species diversity (variety) varied greatly among the three locations. Though results indicate a relatively diverse community, four of the dominant species were classified as pollution tolerant. In fact, pollution tolerant or moderately tolerant fish assemblages dominated all five sites. No sampling sites "…contained individuals classified as pollution intolerant, indicating the probability of episodic periods of impaired water quality or habitat degradation" (Darby Creek Watershed River Conservation Plan 2004).

In 2003, Philadelphia Water Department (PWD) biologists performed multiple surveys along the tidal and non-tidal portions of Cobbs Creek to determine the numbers and types of fish present and to assess the overall fish population diversity. Biologists collected 19 species above the Woodland Avenue Dam and identified 43 species in the tidal portions of Cobbs Creek. Most notable was the absence of anadromous and semi-migratory fish species in the non-tidal reaches (above Woodland Dam). Biologists collected the following species in the tidal portions (below the Woodland dam) of Cobbs Creek:

Blueback herring (*Alosa aestivalis*)
American shad (*A. sapidissima*)
Striped bass (*Morone saxatilis*)
Gizzard shad (*Dorosoma cepedianum*)
White perch (*M. americana*)

In addition, resident and established species believed to have been removed from the non-tidal portions of the Cobbs drainage, as a result of the presence of Woodland Dam, were found in adequate numbers below the dam including:

Cutlips minnow (*Exoglossum maxilingua*)
Golden shiner (*Notemigonus crysoleucas*)
Eastern silvery minnow (*Hybognathus regius*)
Yellow bullhead catfish (*Ameiurus natalis*)
Rockbass (*Ambloplites rupestris*)
Smallmouth bass (*Micropterus dolomieui*)
Largemouth bass (*Micropterus salmoides*)

In addition to those species noted above that were believed to historically occupy the non-tidal portions of the Cobbs drainage, the following species occur downstream from the dam, in both the freshwater and saltwater sections of the river. These include the fathead minnow, (*Pimephales Promales*), the Mummichog (*Fundulus heteroclitus*) and the swallowtail shiner (Notropis procne). The fathead minnow thrive in waters downstream of the dam while the population is almost nonexistent upstream of the dam. The fathead minnow is a freshwater fish widely distributed in the United States and it is usually found in brooks, ponds, and small lakes. The species is tolerant of high turbidity, high temperatures, and low oxygen concentrations. The species seems to be most abundant in small streams where competition with other species is limited.

The Mummichog population in Cobbs Creek appears to be greatly affected by the dam. They thrive downstream of the dam in high numbers yet only a small population is living upstream. The mummichog is not a state or federally listed species; however, is an extremely important food source for many larger fish, wading and sea birds. Mummichogs have been known to consume as many as 2000 mosquito larvae a day, and can be used as a natural mosquito control in ponds and ditches. They are commonly found in saltwater marshes, tidal creeks and in sheltered shores.

The swallowtail shiner found in Cobbs Creek is found with a much larger population upstream of the dam. The preferred habitat of the swallowtail shiner is upland streams and small rivers. It is tolerant of sandy bottom and turbid water conditions, but it avoids deeper pools and torrential rapids. It is usually seen in schools near the bottom and is consumed by larger fish species. More information on the fish sampling can be found in the above referenced Darby Creek Watershed River Conservation Plan.

5.5 Wildlife Resources

Mammals are common in the Catskills and a few are restricted to the large tracts of forest habitat that remain there. White-tailed deer, black bear *(Ursus americanus),* coyote *(Canis latrans),* red and gray *(Urocyon cinereoargenteus)* fox, river otter *(Lontra canadenis),* bobcat (*Lynx rufus),* beaver *(Castor canadensis),* long-tailed weasel *(Mustela frenata),* Mink *(Mustela vision), , ,* muskrat, , and the opossum are all found in this region. Various types of moles, like the eastern mole *(Scalopus aquaticus)* and the star-nosed mole *(Condylura cristata)*, inhabit this section of the state as do voles, like the meadow vole *(Microtus pennsylvanicus)* and the woodland vole *(Microtus pinetorum).* Red squirrels *(Tamiasciurus hudsonicus)* and gray squirrels *(*are commonly seen and there are no less than four species *of* shrews (Soricidae spp.) found in the Catskills. Types of mice, like the white-footed mouse *(Peromyscus leucopus)* and the deer mouse *(Peromyscus moniculatus),* are common in this combination of forests, fields, and urban areas. Other smaller mammals found in the Catskills are the eastern cottontail rabbit, little brown bat, big brown bat, eastern red bat *(Lasiurus borealis),* hoary bat *(Lasiurus cinereus),* and silvered-haired bat *(Lasionycteris noctivagans).* The eastern porcupine *(Erethizon dorsatum)* is also an inhabitant of the area (U.S. Fish and Wildlife Service 2010a).

The white-tailed deer *(Odocoileus virginianus),* eastern chipmunk *(Tamias striatus),* woodchuck *(Marmota monax),* opossum *(Didelphis virginiana),* striped skunk (*Mephitis mephitis*), red fox *(Vulpes vulpes),* eastern cottontail *(Sylvilagus floridanus),* raccoon *(Procyon lotor),* big brown bat *(Eptesicus fuscus),* little brown bat *(Myotis lucifugis),* muskrat *(Ondatra zibethicus),* Norway rat (*Rattus norvegicus*), and the gray squirrel (*Sciurus carolinensis)* are common mammalian species that occur throughout the Cobbs Creek Watershed. These species are also known throughout the rest of the State. The watershed generally lacks species diversity as a direct result of the elimination of habitat. Few animals, other than those listed above, are able to co-exist with the level of human activity within most of the watershed.

5.6 Threatened and Endangered Species

Coordination with Pennsylvania Fish and Boat Commission (PFBC) has determined that four State-listed species (bog turtle (*Clemmys muhlenbergii*), red-bellied turtle (*Pseudemys rubriventris*), coastal leopard frog (*Rana kauffeldi*), and eastern mudminnow (*Umbra pygmaea*) may be found within the project vicinity.

The bog turtle is among the smallest North American turtles, and is almost exclusively found in the northern mid-Atlantic region. Bog turtles are listed as a State endangered species. Adults are four to 4 1/2 inches long. The upper shell is dark brown with yellow to orange markings and covered with ridged plates that are eventually worn smooth. The lower shell is dark brown or black, sometimes with scattered light markings. A large red-orange or yellow blotch behind each eye is the most conspicuous color feature of an otherwise brown body lightly marked with orange or yellow. Bog turtles live in relatively open portions of sphagnum bogs, swamps or marshy meadows with slow moving, spring fed streams or spring runs with soft bottoms. Adults and young feed on a variety of plant and animal food, such as berries, insects and even carrion. The primary reason for the bog turtle's status is the draining or other destruction of its habitat (Pennsylvania Fish and Boat Commission, 2010).

The red-bellied turtle is one of Pennsylvania's largest native aquatic turtles and is listed as a State threatened species. This turtle species is known to inhabit relatively large, deep streams, rivers, ponds, lakes, and marshes with permanent water and ample basking sites. Red-bellied turtles are restricted to the southcentral and southeastern regions of the Commonwealth. The existence of this turtle species is threatened by habitat destruction, poor water quality, and competition with aggressive non-native turtle species that share its range and habitat (e.g., red-eared slider). Red-bellied turtle presence within the project area is well documented, and ongoing studies from the PFBC are gathering more information about their habit uses (Pennsylvania Fish and Boat Commission, 2010).

Another species potentially in the project vicinity is the Coastal plain leopard frog. The Coastal Plain leopard frog (a.k.a. southern leopard frog) resembles the northern leopard frog, but has a distinguishing whitish spot in the center of its eardrum, fewer dark spots on its sides, and a longer, pointed head. It lives and breeds in shallow, freshwater habitats and slightly brackish coastal marshes, and occurs in southeastern Pennsylvania. Following an early spring mating season, adults may live away from water in summer, when vegetation provides shade and shelter. It is endangered primarily due to loss of its breeding habitat from development and industrial activity (Pennsylvania Fish and Boat Commission, 2010).

The third species that may be in the project area is the eastern mudminnow, which is highly secretive and inhabits very shallow water under vegetation and debris within marshes, weedy shores of lakes, or stagnant streams within the Delaware River drainage. The mudminnow occasionally leaps from the water while feeding. This species is rare due to habitat destruction and water pollution (Pennsylvania Fish and Boat Commission, 2010).

Correspondence received (2009) from the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have indicated that no federally listed species under their jurisdiction are known to occur in the project area. However, the NMFS list blueback herring (*Alosa aestivalis*) a species of Special Concern to NMFS under the Endangered Species Act in 2011. Blueback herring are found downstream (below the dam) of the project area.

5.7 Cultural Resources

The Area of Potential Effect (APE) encompasses the Woodland Dam and approximately 1.3 acres along Cobbs Creek immediately north of S.R. 3023 (Woodland Avenue/Main Street), mostly in Philadelphia and minimally in Darby Borough, Delaware County. Cobbs Creek marks the boundary between Philadelphia on the east and Darby on the west.

Precontact Context

Evidence from precontact sites in the eastern United States indicates a number of successive regional cultural traditions. Although the exact number and nature of these traditions, which varied locally, remains the subject of debate, three major cultural periods can be defined: Paleo-Indian, Archaic, and Woodland. These traditions are best viewed as responses to changing social and environmental conditions.

The Paleo-Indian Tradition, 12,000 - 8,000 BC. The earliest, widely recognized tradition in the northeastern United States is the Paleo-Indian. During the Paleo-Indian period, climatic conditions in Pennsylvania differed significantly from those of today. Large parts of northern North America were covered by continental glaciers, which produced a wetter, cooler climate in more southerly, non-glaciated regions. As a result of these conditions, spruce-pine-hemlock forests and Pleistocene, cold adapted animals, such as the mastodon, the woodland bison and the caribou, predominated. The Paleo-Indian tradition was characterized by small hunter-gatherer groups subsisting mainly on large mammals, many of which are now extinct or no longer present in the area (woolly mammoth, mastodon, and caribou). The artifact distinctive to this tradition is the fluted projectile point, lanceolate-shaped with a central flake removed from both faces along its longitudinal axis. This and related tools have been found in association with various floral and faunal resources in sites across the eastern U.S. (Funk 1969; Gardner 1974; Adovasio 1977; Dent and Kauffman 1978). This evidence suggests that these populations exploited a wide variety of terrestrial resources for subsistence.

Though a number of tools diagnostic of the Paleo-Indian tradition have been found in the Delaware and Schuylkill River Valleys (Mason 1959; Zatz et al. 1985), there is no published documentation of specimens for the immediate vicinity of the study area. Excavations in the southern sections of the Ridge and Valley Province reveal a complex of functionally specific sites. Settlement pattern components suggest that Paleo-Indian hunters occupied home ranges containing resource locations visited on a regular or semi-regular basis (Hatch et al. 1985). Some other generalizations have been formulated regarding the settlement subsistence patterning of the

American Indians within a temporal-periodization context. Starting with the Paleo-Indian and Early Archaic phase (about which very little is known) several types of sites have been identified from the Flint Run Paleo-Indian Complex, a series of Paleo-Indian sites located in the southern sections of the Ridge and Valley Province and excavated by Gardner (1974) and Carr (1975). These sites consist of a quarry, a quarry reduction station, and a quarry related base camp. In addition to lithic procurement and reduction sites, food procurement sites have been located in upland areas as well as bordering or overlooking floodplain zones (Hatch et al. 1985:102; Stewart 1981:324; Custer
1982:151).

The Archaic Tradition, 8,000 - 1,000 BC. The Archaic tradition emerged from the Paleo-Indian as a more generalized subsistence strategy in response to changing environmental and, perhaps, social conditions. Approximately 10,000 years ago, as glacial conditions slowly gave way to the warmer Holocene climate, hardwood forests gradually replaced the tundra-like vegetation (Sirkin 1977:214). Due to the disappearance of the megafauna and to the emergence of new subsistence items, resource procurement strategies changed. These changes, which included the exploitation of a wider range of floral and faunal resources than in the Paleo-Indian period, are reflected in material remains by new tool types. These new tool types, along with the new subsistence strategies, mark the beginning of the Archaic tradition (Bryan 1977:363).

Evidence suggests that Archaic peoples lived in small nomadic groups (Cushman 1981:9). The resources exploited varied on the basis of local availability. This factor, coupled with the types and quantities of the lithic materials employed in tool-making, results in different artifact assemblages at different sites; therefore, it is difficult to characterize a typical regional Archaic tool assemblage. Archaic assemblages are, however, clearly distinguished from those of the preceding Paleo-Indian period by the replacement of fluted Paleo-Indian points by smaller points of cruder materials, along with the emergence of grinding and ground stone tools (axes, chisels, and gouges). In general, tool assemblages from this tradition are marked by increasing diversification and specialization through time.

The increased number of sites dating to the Archaic period is evidence that population density was greater during the Archaic than in the preceding Paleo-Indian period. This increase was possible because, as climatic fluctuations stabilized and hardwood forests became established, the carrying capacity of the environment increased. Also during this period the rising sea level formed extensive marshes and estuaries along the Delaware River; in these, fauna thrived. As resources became more abundant in and around these major waterways, settlement patterns became increasingly focused along them (Kraft 1977; Gardner 1980). Despite this trend there is evidence of continued seasonal nomadism based on a resource scheduling strategy (Cushman 1981:12). The late Transitional Archaic also witnessed expanding trade networks and some new artifact forms, among them soapstone (steatite) vessels and non-local, lithic materials. These attributes are borne out by the large number of sites and by the more diverse cultural assemblages found in the Delaware Valley from this cultural period. A larger population with more diverse procurement activities is likely to have increased the importance of upland areas in the region during this period.

The Woodland Tradition, 1,000 BC - AD 1600. The beginning of the Woodland tradition in this region is marked by the introduction of ceramics (Gardner 1980:3) and by two major trends: increasing sedentism and the development of extensive agriculture (Curry and Custer 1982:4; Cushman 1981:14). In this tradition, permanent or semi-permanent settlements replaced the seasonal base camp of the Archaic. Settlement pattern formulations derived from sites dating to this period show an aboriginal site location preference along the major waterways (Curry and Custer 1982:1), where the exploitable biomass was the greatest. The harvesting of various plants, waterfowl, fish, and shellfish would have provided a more than adequate supply of food. These waterways supplied relatively easy transportation, facilitating trade and increasing the range and quantity of resources that could be exploited. During the Late Woodland, the floodplains of these waterways would serve as fertile fields for crops, primarily maize, beans, squash, and pumpkins. The fact that these areas were highly favored for habitation is demonstrated by the scarcity of sites in upland areas (Cushman 1981:13).

The Woodland tradition is also marked by the growth of trade networks and the elaboration of specific cultural practices. Late Archaic trade networks in exotic, primarily lithic, raw materials expanded and became an important Woodland feature. There is evidence of increased mortuary ceremonialism and of specialized artifact forms, apparently for ceremonial use (Curry and Custer 1982:4). These traits suggest the emergence of a sociopolitical organization that had not previously existed. There is also evidence of tribal affiliations during the Late Woodland period, probably between the Delaware, or Lenape, Indians and other tribes in the area. The Late Woodland period ended with European contact, which lasted from 1550 to 1750 and which appears in the archaeological record as an intrusion of European artifacts into Late Woodland assemblages. Studies by Kent (1984) and Custer (1986) are providing a great deal of information about the dynamics of this initial integration and the subsequent disintegration of Late Woodland cultures.

Historic Context

The APE and its immediate vicinity was a locus of cultural activities primarily related to milling and innkeeping for parts of several centuries, with the earliest of these activities as milling. The first documented use of a dam and watermill in Pennsylvania was constructed within the APE in 1646 by authorization of Johann Printz, Governor of the recently established colony of New Sweden along the Delaware River (Haavik 2000). The fate of the mill is not known at this time. It was believed to have washed away in a flood.

A lack of source material has inhibited the research of the mill/dam site during the eighteenth and early nineteenth centuries. During this time, the APE and vicinity was growing in importance as a village due to its location on the King's Highway (Woodland Avenue) between Philadelphia and the southern states. The growth of the area began with the construction of a number of community buildings, such as the Blue Bell Tavern, which is still located immediately east of the APE. A saw and grist mill located between the Blue Bell Tavern and Cobbs Creek was presumed to have been constructed in the early 1800s and disappears from historic maps

after 1909. Milling was always an important industry in this area but, after the Swedish Mill it is unclear how the Woodland Dam was integrated into the process (Haavik 2000).

A map of the area drafted in the 1930s by the Works Progress Administration (WPA) shows that the only structures still standing within the APE were the Woodland Dam and a pair of retaining walls lining Cobbs Creek from the dam to the Woodland Avenue bridge. The saw and grist mill building was no longer extant and the associated race had been filled in. The Blue Bell Tavern still stood, and enlarged by the construction of a three story ashlar stone addition. This addition was torn down in the 1940s to accommodate the construction of the Cobbs Creek Parkway.

Since the APE has been heavily utilized by both Native Americans and European colonists, the USACE recommended a cultural resource investigation to identify the presence of any resources present within the APE. A Phase I archaeological survey was conducted by Cultural Heritage Research Services, Inc. in the spring of 2010. A total of 16 shovel test units were excavated within the APE and yielded no intact culture bearing soils. The disturbances are likely associated with the modifications that have occurred from the seventeenth century to present. The significant amount of disturbance from construction, modification, destruction and flooding has resulted in a mix of soils with no intact natural stratigraphy. No precontact or historic archaeological sites were found in the APE.

Square anchoring holes which purportedly served the original seventeenth century Swedish Mill are reported on the downstream side of the dam. These features, photographed in 1926 were not visible at the time of the survey. It is likely that the features are present beneath mud and vegetation. The anchoring holes are unlikely to provide additional information to our understanding of local or regional history. No additional archaeological work is recommended.

Historic Resource Survey Forms were also completed for the Woodland Dam, the Retaining Walls, and a Historic Bridge Survey form was completed for the Woodland Avenue Bridge over Cobbs Creek. None of the resources assessed meets the Criteria for listing on the National Register of Historic Places.

6.0 Environmental Impacts

6.1 Air and Water Quality

As stated previously, Philadelphia County, Pennsylvania within which the Federal Action will take place is located in the Philadelphia-Wilmington-Atlantic City Area marginal 8-hour ozone nonattainment area.

Construction of the stream restoration project would cause temporary reduction of local ambient air quality due to fugitive dust and emissions generated by construction equipment. These temporary reductions in air quality would not have a significant impact on the long term air quality of the surrounding area.

General Conformity Review and Emission Inventory
Cobbs Creek Fish Passage Project

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a nonattainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS). In the case of the Woodland Dam Removal Project, the Federal Action is the removal of the Woodland Dam. The U.S. Army Corps of Engineers, Philadelphia District would be responsible for construction.

There are two types of Federal Conformity: Transportation Conformity and General Conformity (GC). Transportation Conformity does not apply to this project because the project is not funded by the Federal Highway Administration and it does not impact the on-road transportation system. GC however is applicable. Therefore, the total direct and indirect emissions associated with the Woodland Dam project must be compared to the GC trigger levels presented below.

General Conformity

Pollutant	Trigger Levels (tons per year)
NOx	100
VOC	50

To conduct a general conformity review and emission inventory for the Cobbs Creek Watershed Improvement Project, a list of equipment necessary for construction was identified. Table 1 (Appendix C) lists these pieces of equipment along with the number of engines, engine size (hp), and duration of operation. A Load Factor (LF) was also selected for each engine, which represents the average percentage of rated horsepower used during a source's operational profile. Load factors were taken from other General Conformity Reviews and Emission Inventories.

Table 1 (see Appendix C) shows the estimated hp-hr required for each equipment/engine category. Hp-hr was calculated using the following equation:

hp-hr = # of engines*hp*LF*hrs/day*days of operation

The second calculation is to derive the total amount of emissions generated from each equipment/engine category by multiplying the power demand (hp-hr) by an emission factor (g/hp-hr). The following equations were used:

emissions (g) = power demand (hp-hr) * emission factor (g/hp-hr)

emissions (tons) = emissions (g) * (1 ton/907200 g)

Tables 2 and 3 (see Appendix C) present the emission factors and emission estimates for NOx, and VOC respectively. The tables present the emissions from each individual equipment/engine category and the combined total.

The total estimated emissions that would result from the removal of Woodland Dam is 1.59 tons of NOx and 0.38 tons of VOC (Table 5 – Appendix C). Construction of the project will be completed in approximately 5 months. These emissions are well below the General Conformity trigger levels of 100 tons of NOx and $PM_{2.5;}$ and 50 tons of VOC per year. General Conformity under the Clean Air Act, Section 176 has been evaluated for the project according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this project because the total direct and indirect emissions from the project are below the conformity threshold values established at 40 CFR 93.153 (b) for ozone (NOx and VOC) in a Marginal Nonattainment Area (100 tons and 50 tons of each pollutant per year). The project is not considered regionally significant under 40 CFR 93.153 (i).

Water Quality

Implementation of this project will have temporary impacts to water quality. Temporary impacts to the water quality of Cobbs Creek will include elevated turbidity levels and suspended sediments. All necessary best management practices will be used during construction. The proposed project will not have any long-term adverse impacts on water quality in Cobbs Creek. It is likely that the project will result in a long-term positive impact on the stream as connectivity is restored to this section of Cobbs Creek.

6.2 Sediment

Sediment collections upstream and downstream of Woodland dam revealed that two inorganics, cyanide and chromium were above USEA Region III Freshwater Sediment Benchmark concentrations. No organic volatiles over sediment benchmarks were observed, however several semi volatile organics over sediment benchmark values occurred upstream and downstream of Woodland Dam. Given the urbanized watershed of Cobbs Creeks most of these contaminants probably originated from vehicle use on city streets. Five pesticides over benchmark concentrations were reported and Dieldrin was over its 1.9 µg/kg screening level in all upstream samples. Downstream sediments had similar inorganic and organic contaminant concentrations to upstream sediments. However, high resolution PCBs testing revealed that sediment downstream of Woodland Dam had concentrations over 30 times higher than the upstream sediments. PCBs found in the sediment may have originated from leaking electric transformers on city power transmission poles. There were high levels of PCBs and dioxin concentration reported in the downstream composite sample, but most of the sediment disruption and potential mobilization of contaminants from the dam removal project will occur in the thin layer of upstream sediments behind the dam. Dioxin levels upstream and downstream of Woodland Dam showed a similar trend. With the exception of PCBs and Dioxin, contaminant levels observed in the creek sediments were not unexpected since the Creek is located in heavily populated area. More information on the sediment testing data can be found in Appendix B.

Due to the small quantity of sediment found behind the dam and the relatively low contaminant levels observed, it is concluded that removal of the Woodland Dam would not release excessive contaminates into downstream habitats of Cobbs Creek. The sediment testing results were coordinated with PADEP and USFWS in 2010. Both agencies agreed that the contaminant levels were low enough to release the sediment downstream in a controlled, gradual manner (see Appendix A). However, due to potential flooding concerns for downstream communities, the project team has chosen to construct an engineered rock riffle to sequester most of the sediment from behind the dam in place to avoid any potential impacts downstream.

6.3 Wetlands

No wetlands are found in the project vicinity; therefore, no impacts to wetlands are expected as a result of this project.

6.4 Aquatic Resources

There will be temporary minor impacts to resident fish populations in Cobbs Creek during the construction of this project. However, the project will provide a long-term positive impact to fish populations in Cobbs Creek by improving water quality, habitat available, cover, and stream temperature, as well as connectivity.

There is no Essential Fish Habitat under the 1996 Magnuson-Stevens Act found in the project area. By restoring anadromous fish (blueback herring) to their historic habitat it will increase their populations, and have an overall positive effect and benefit on many EFH managed species, which use blueback herring for food in the marine environment.

As for other aquatic species, there will be a temporary, significant effect on benthos. The existing benthos will be buried under the newly constructed engineered rock riffle. It is anticipated that the area should recover in a relatively short time period (< 6 mos.). In addition, there will be temporary, significant effect on flow patterns and water availability within parts of the creek since the project will use a cofferdam and pump-around during construction. The project area should recover and reach a stabilized equilibrium in a relatively short time period.

6.5 Wildlife Resources

No long-term impacts to the wildlife resources in Cobbs Creek area are anticipated as result of this project. There will be noise and general disturbances in the stream area as a result of construction activities, but these will be temporary in nature and should not have a long term negative effect on wildlife in the area. Tree clearing will be kept to a minimum (only removed for access to the stream) and additional native plants will be planted in the riparian buffer as part of the project plan. Any wildlife species inhabiting the area are expected to re-locate to other

areas of similar habitat nearby. The project will provide a long-term positive impact to the wildlife in the Cobbs Creek with a restored stream and improved riparian corridor.

6.6 Threatened and Endangered Species

Previous correspondence with the USFWS and NMFS revealed no federally listed species under their jurisdiction in the project area. However NMFS has filed a petition to list blueback herring under the Endangered Species Act, and these fish would be found downstream of the dam. The proposed project, if completed outside of the spawning period of blueback herring (3/15 - 6/15), should have no negative impact on the species. When completed, this proposed project should have positive benefits on the blueback herring.

The PFBC has indicated the presence of state-listed species in the project area. We do not anticipate an impact on these species as a result of the project; however, additional coordination will occur with PFBC to insure this is the case prior to project construction.

6.7 Cultural Resources

Based on the results of the cultural resource investigations, the USACE has determined that no historic properties will be affected by the proposed project in compliance with 36 CFR 800.4(d)(1). The Pennsylvania Historical and Museum Commission concurred with this determination in a letter dated 22 September 2010 (see Appendix A).

6.8 Cumulative Impacts

According to CEQ regulations, the cumulative impact is defined as the impact on the natural and human environment, which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes these actions. The proposed action must be evaluated with the additive effects of other actions in the project area to determine whether all the actions will result in a significant cumulative impact on the natural and human environment of the area.

No other known significant activities are planned within the project area and region that could potentially cumulatively affect the Cobbs Creek Fish Passage Project. It is expected that positive cumulative effects, as a result of the dam removal in the project area will be realized. In addition, incidental positive cumulative effects from improved fishing and recreational use are expected. All negative impacts associated with this project are short-term and minor. As a result, it is anticipated that future environmental benefits in both the Cobbs Creek project area and surrounding watershed will be realized with respect to increased connectivity for aquatic organisms, improved aquatic habitats, and direct physical improvements in the riparian habitats. It has been determined that there will be no cumulative negative impacts as a result of this project and long term positive cumulative impacts will be realized.

7.0 Environmental Justice

In February, 1994 President Clinton signed Executive Order 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." This EO directs Federal agencies "to make achieving environmental justice part of its mission by identifying and addressing, as appropriate disproportionately high and adverse human health or environmental effects of programs, policies, and activities on minority populations and low income populations in the United States…." The purpose of this order is to avoid the disproportionate placement of adverse environmental economic, social, or health impacts from Federal actions and policies on minority and low-income populations. In order to prevent the potential for discrimination and disproportionately high and adverse effects on specific populations, a process must identify minority and low-income populations that might be affected by the implementation of a proposed action or alternatives.

As defined by the "Environmental Justice Guidance Under NEPA" (CEQ, 1997), "minority populations" includes persons who identify themselves as Asian or Pacific Islander, Native American or Alaskan Native, black (not of Hispanic origin), or Hispanic. Race refers to Census respondents' self-identification of racial background. Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, Central or South American.

A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population. Low-income populations are identified using the Census Bureau's statistical poverty threshold, which is based on income and family size. The Census Bureau defines a "poverty area" as a census tract with 20 percent or more of its residents below the poverty threshold and an "extreme poverty area" as one with 40 percent or more below the poverty level.

Based on census data collected for Philadelphia County, it shows that the project area is considered to be one of poverty (21%) (US Census Bureau 2013). There will be increased truck traffic (approximately 300 trucks), machinery, and noise during construction; however, those impacts will be temporary in nature. There will be no long term detrimental effects on the low-income population and there will be a positive long term benefit of removing an aging dam from the stream in a community park. In addition, the project will likely have a positive effect on the low-income population by improving the natural resources in Fairmount Park and creating a more healthy Cobbs Creek.

8.0 Relationship of Selected Plan to Environmental Requirements, Protection Statutes, and Other Requirements

Compliance with environmental quality protection statutes and other environmental review requirements is ongoing. Table 2 provides a listing of compliance with environmental statutes. The Corps has determined that this project meets the terms and conditions of Nationwide Permit #27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities) for the

construction of this project and with that permit, the Pennsylvania, Section 401 State Water Quality Certificate is automatically issued. In addition, any future maintenance requirements of the project undertaken by the non-federal sponsor, Philadelphia Water Department, will be covered by Nationwide Permit #3 (Maintenance). A Section 404(b)(1) analysis of the Clean Water Act, as amended (Public Law 92-500), was completed for this project based and included in this document.

Table 2. Compliance with Appropriate Environmental Quality Protection Statutes and other Environmental Review Requirements.

STATUTE	COMPLIANCE STATUS
Clean Water Act	Full
Coastal Zone Management Act	N/A
Endangered Species Act	Partial*
Fish and Wildlife Coordination Act	Partial*
National Historic Preservation Act	Partial*
National Environmental Policy Act	Partial*
Clean Air Act	Partial*

NOTE:
Full Compliance: Having met all requirements of the statute, E.O., or other environmental requirements for the current stage of planning.
Partial Compliance: Some requirements of the statute, E.O., or other policy and related regulations remain to be met.
*All applicable laws and regulations will be fully complied with upon completion of the environmental review, obtaining state water quality certification, coastal zone consistency determination, and concurrence with our determination on cultural resources.
Noncompliance: None of the requirements of the statute, E.O., or other policy and related regulations remain to be met.

9.0 Section 404(b)(1) Analysis

A review of the impacts associated with discharges to waters of the United States for the Cobbs Creek Fish Passage Project in Philadelphia, PA is required by Section 404(b)(1) of the Clean Water Act, as amended (Public Law 92-500).

I. PROJECT DESCRIPTION

A. Location. The project area is located in the Cobbs Creek Watershed in Philadelphia, PA.

B. General Description. The Cobbs Creek Fish Passage Project is located within the Cobbs Creek Watershed in Fairmount Park, West Philadelphia, Pennsylvania. The project involves the removal of the Woodland Dam. The removal will be completed using heavy machinery to demolish the dam and an engineered rock riffle will be created in place of the dam.

C. Purpose. This project had investigated the best alternative to provide fish passage along Cobbs Creek at the Woodland Dam. The most effective method of restoring fish passage is to remove the stream impediment and restore the channel to a more natural condition.

Environmental benefits of the Cobbs Creek Fish Passage Project would include: improved access to spawning and foraging habitat for migrating fish, improved access for other aquatic species (reptiles, amphibians, macroinvertebrates) with an increase in habitat and food availability, and benefits to riparian species (i.e. wading birds) that depend on the creek for food and cover.

D. General Description of Dredged or Fill Material.

1. General Characteristics of Material: rock/cobbles/gravel.

2. Quantity of Discharge: Creation of the engineered rock riffle and stabilizing the streambanks will result in a discharge of approximately 2600 cubic yards.

3. Source of Material: re-use of some material found on site and additional rock fill brought from outside the project area.

E. Description of Discharge Sites.

2. Location: Former impoundment behind the dam

3. Size (acres): The estimated limit of disturbance is 2 acres and the actual amount of fill to be used will be approximately 2600 cubic yards.

3. Type of Sites: Floodplain/Riparian Corridor

4. Type of Habitat: Floodplain/Riparian Corridor

5. Timing and Duration of Discharge: Intermittent over a 5-month construction period.

F. Description of Discharge Method. Creation of engineered rock riffle in former dam impoundment.

II. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations.

1. Substrate Elevation and Slope: varies

2. Sediment Type: rock/cobbles/gravel.

3. Fill Material Movement: Project will be constructed "in the dry" with a cofferdam. The current plan is to remove the dam last and it will be left in place during excavation and construction of the low flow channel behind the dam. This will allow the dam to function as a sediment trap during construction. In addition, with the dam in place, a siphon could be used instead of a pump. The coffer dam would likely be a Jersey barrier.

4. Physical Effects on Benthos: Temporary, significant effect on benthos. Existing benthos will be buried under the newly constructed engineered rock riffle. The area should recover in a relatively short time period (< 6 mos.).

5. Actions taken to Minimize Impacts: Best management practices will be used during construction to minimize any disturbance to the adjoining stream banks and floodplain. Stream banks and floodplain will be seeded and mulched soon after each section of riffle is constructed for the project.

B. Water Circulation, Fluctuation and Salinity Determinations.

1. Water:

a. Salinity – No effect

b. Water Chemistry – Temporary, major effect.

c. Clarity – Temporary, major effect

d. Color - No effect

e. Odor – No effect.

f. Taste - No effect.

g. Dissolved Gas Levels – Temporary, major effect

h. Nutrients – Temporary, major effect

i. Eutrophication - No effect.

j. Temperature- Temporary, major effect

2. Current Patterns and Circulation:

a. Current Patterns and Flow – Temporary, significant effect on flow and patterns with the use of a cofferdam and pump-around during

construction. The project area should recover and reach a stabilized equilibrium in a relatively short time period.

b. Velocity - Temporary, significant effect on flow and patterns with the use of a cofferdam and pump-around during construction. The project area should recover and reach a stabilized equilibrium in a relatively short time period.

c. Stratification - No effect.

3. Normal Water Level Fluctuations – Temporary, significant effect on flow and patterns with the use of a cofferdam and pump-around during construction. The project area should recover and reach a stabilized equilibrium in a relatively short time period.

4. Salinity Gradients – no effect.

5. Actions That Will Be Taken To Minimize Impacts: Best management practices will be used during construction to minimize any disturbance to the adjoining stream banks and floodplain. Stream banks and floodplain will be seeded and mulched soon after each section of riffle is constructed for the project.

C. Suspended Particulate/Turbidity Determinations.

1. Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Fill Site: Temporary, major effect with the use of a cofferdam and pump-around during construction.

2. Effects on Chemical and Physical Properties of the Water Column:

a. Light Penetration: No effect.

b. Dissolved Oxygen: Major effect.

c. Toxic Metals and Organics: No effect.

d. Pathogens: No effect.

e. Aesthetics: Temporary, major effects limited to the construction period.

f. Temperature: Temporary, major effect.

3. Effects on Biota:

a. Primary Production, Photosynthesis: Temporary, major effect with the use of a cofferdam and pump-around during construction.

b. Suspension/Filter Feeders: Temporary, major effect with the use of a cofferdam and pump-around during construction.

c. Sight feeders: Temporary, major effect with the use of a cofferdam and pump-around during construction.

4. Actions Taken to Minimize Impacts: Best management practices will be used during construction to minimize any disturbance to the adjoining stream banks and floodplain. Stream banks and floodplain will be seeded and mulched soon after each section of riffle is constructed for the project.

D. Contaminant Determinations.

Due to the small quantity of sediment found behind the dam and the relatively low contaminant levels observed, suggest that removal of the Woodland Dam would not release excessive contaminates into downstream habitats of Cobbs Creek.

E. Aquatic Ecosystem and Organism Determinations.

1.Effects on Plankton: No effect.

2. Effects on Benthos: Temporary, significant effect on benthos. Existing benthos will be buried under the newly constructed engineered rock riffle. The area should recover in a relatively short time period (< 6 mos.).

3. Effects on Nekton: No effect

4. Effects on Aquatic Food Web: Temporary, significant effect on benthos. Existing benthos will be buried under the newly constructed engineered rock riffle. The area should recover in a relatively short time period (< 6 mos.).

4. Effects on Special Aquatic Sites:

(a) Sanctuaries and Refuges: None.

(b) Wetlands: None

(c) Tidal flats: None.

(d) Vegetated Shallows: None.

6. Threatened and Endangered Species: No effect.

7. Other Wildlife: Temporary, minor effect.

8. Actions to Minimize Impacts: Best management practices will be used during construction to minimize any disturbance to the adjoining stream banks and floodplain. Stream banks and floodplain will be seeded and mulched after construction is completed in the different sections of the project.

F. Proposed Disposal Site Determinations (N/A – no dredging will be conducted)

1. Mixing Zone Determinations:
    a. Depth of water:
    b. Current velocity:
    c. Degree of turbulence:
    d. Stratification:
    e. Discharge vessel speed and direction:
    f. Rate of discharge:
    g. Dredged material characteristics:

2. Determination of Compliance with Applicable Water Quality Standards: A section 401 Water Quality Certificate will be obtained from PADEP for this project prior to construction.

3. Potential Effects on Human Use Characteristics:

    a. Municipal and Private Water Supply: No anticipated effect.

    b. Recreational and Commercial Fisheries: Temporary, minor effect during construction.

    c. Water Related Recreation: Temporary, minor effect.

    d. Aesthetics: Temporary, major effect.

    e. Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves: No effect.

G. Determination of Cumulative Effects on the Aquatic Ecosystem.
No significant adverse effects are anticipated.

H. Determination of Secondary Effects on the Aquatic Ecosystem.

No significant secondary effects are anticipated.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. Adaptation of the Section 404(b)(1) Guidelines to this evaluation - No significant adaptation of the guidelines were made relative to this evaluation.

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem - The selected plan was determined from a detailed evaluation of alternatives to have the least amount of environmental impacts and the best chance for success.

C. Compliance With Applicable State Water Quality Standards - The selected plan is not expected to violate any applicable state water quality standards in Pennsylvania.

D. Compliance With Applicable Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act - The proposed discharge is not anticipated to violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. Compliance With Endangered Species Act of 1973 -The selected plan will comply with the Endangered Species Act of 1973. Informal Section 7 consultation with the U.S. Fish and Wildlife Service has been completed on this project.

F. Compliance With Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972 - No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are located within the project area.

G. Evaluation of Extent of Degradation of Waters of the United States - The selected plan will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, and recreational and commercial fishing, plankton, fish and shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and wildlife will not be adversely affected. Significant adverse impacts on aquatic ecosystem diversity, productivity and stability, and recreation, aesthetics and economic values will not occur as a result of the project.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem - Appropriate steps (as described above) will be taken to minimize potential adverse impacts of discharging material in the aquatic ecosystem.

10.0 References

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11.0 Clean Air Act Statement of Conformity

CLEAN AIR ACT STATEMENT OF CONFORMITY
COBBS CREEK FISH PASSAGE PROJECT
PHILADELPHIA COUNTY, PENNSYLVANIA

I have determined that the selected plan conforms to the applicable State Implementation Plan (SIP). The Environmental Protection Agency had no adverse comments under their Clean Air Act authority. Comments from the State air quality management district were received during coordination of the draft environmental assessment and addressed in the final environmental assessment. The selected plan would comply with Section 176 (c)(1) of the Clean Air Act Amendments of 1990.

Date

Michael A. Bliss, P.E.
Lieutenant Colonel, Corps of Engineers
District Commander