STATEMENT OF FINDINGS

FOR

EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS)

Restoration of Canal Operations at Hancock MP 122.12 to 124.59

Chesapeake & Ohio Canal National Historical Park

Washington County, Maryland

Recommended:

Superintendent, Chesapeake & Ohio Canal National Historical Park

Date 5/7/15

Certification of Technical Adequacy and Servicewide Consistency:

Chief, Water Resources Division

Date 03/13/2015

Approved:

Regional Director, National Capitol Region

Date 6/3/15

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List of Acronyms and Abbreviations

BMP	Best Management Practices
C&O Canal NHP	Chesapeake and Ohio Canal National Historical Park
DO	Director's Order
EA Engineering	EA Engineering, Science, and Technology, Inc.
EO	Executive Order
MDE	Maryland Department of the Environment
NEPA	National Environmental Policy Act
NPS	National Park Service
NRCS	National Resource Conservation Service
NWI	National Wetlands Inventory
PEM1	Palustrine, Emergent, Persistent
PEM1/2	Palustrine, Emergent, Persistent/Nonpersistent Wetland
PFO1	Palustrine, Forested, Broad-Leaved Deciduous
PM	Procedural Manual
R2SB4/5	Perennial Stream Channel
R4SB4/5	Intermittent Stream Channel
SAV	Submerged Aquatic Vegetation
SOF	Statement of Findings
USFWS	U.S. Fish and Wildlife Service

1.1 INTRODUCTION

1.2 WETLANDS

Executive Order (EO) 11990: *Protection of Wetlands*, issued 24 May 1977, directs all federal agencies to avoid to the maximum extent possible the long- and short-term adverse impacts associated with the occupancy, destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. In the absence of such alternatives, parks must modify actions to preserve and enhance wetland values and minimize degradation.

To comply with EO 11990 within the context of the agency's mission, the National Park Service (NPS) has developed a set of policies and procedures found in *Director's Order (DO)#77-1: Wetland Protection* (NPS 2002) and *Procedural Manual (PM) #77-1: Wetland Protection* (NPS 2012a). These policies and procedures emphasize: 1) exploring all practical alternatives to building on, or otherwise adversely affecting, wetlands; 2) reducing impacts to wetlands whenever possible; and 3) providing direct compensation for any unavoidable wetland impacts by restoring degraded or destroyed wetlands on other NPS properties. If a preferred alternative would have adverse impacts on wetlands, a Statement of Findings (SOF) must be prepared that documents the above steps and presents the rationale for choosing an alternative that would have adverse impacts on wetlands.

2.0 PROJECT AREA

The Chesapeake and Ohio Canal National Historical Park (C&O Canal NHP) is located along the Potomac River from the mouth of Rock Creek in Georgetown, Maryland upriver for 184.5 miles to Cumberland, Maryland in Allegheny County (Figure 1). The project area consists of two sites, the Hancock site and the wetland mitigation site.The Hancock site begins at Mile 122.12 and ends at Mile 124.59 of the towpath, along the Potomac River (Figure 2). This area includes Locks 51 and 52, the Bowles (Little) Farm, the Tonoloway Aqueduct, canal prism, canal boat basin, parking area at Little Tonoloway Picnic Area/Boat Ramp, and the park's maintenance compound. The project area is approximately 84 acres and follows the C&O Canal NHP towpath for approximately 2.5 miles. The area is bordered to the north by the town of Hancock and Main Street and to the south by the Potomac River. The project area is located within Washington County, Maryland. In addition, the project area includes an 11.42 acre site located at Mile 43 within the park. This site includes an artificially-drained wetland that is proposed for wetland mitigation for this project.

3.1 ALTERNATIVES

The purpose of this project is to improve the visitor experience and rehabilitate and restore the historic structures at the Hancock area. The proposed project would be undertaken in a phased approach and would include actions and project components characterized as canal operations, visitor experience, access roads, and maintenance as described below for each alternative.

3.2 ALTERNATIVE 1 – NO-ACTION ALTERNATIVE

The no-action alternative is required for the National Environmental Policy Act (NEPA) process to review and compare feasible alternatives to the existing conditions. Under the no-action alternative, the canal facilities at Hancock would continue to be maintained in their current conditions. The Tonoloway Aqueduct would remain partially collapsed and Locks 51 and 52 would remain non-functioning. In addition, the canal would remain vegetated and unwatered or unimproved between Lock 51 (Mile 122.12)

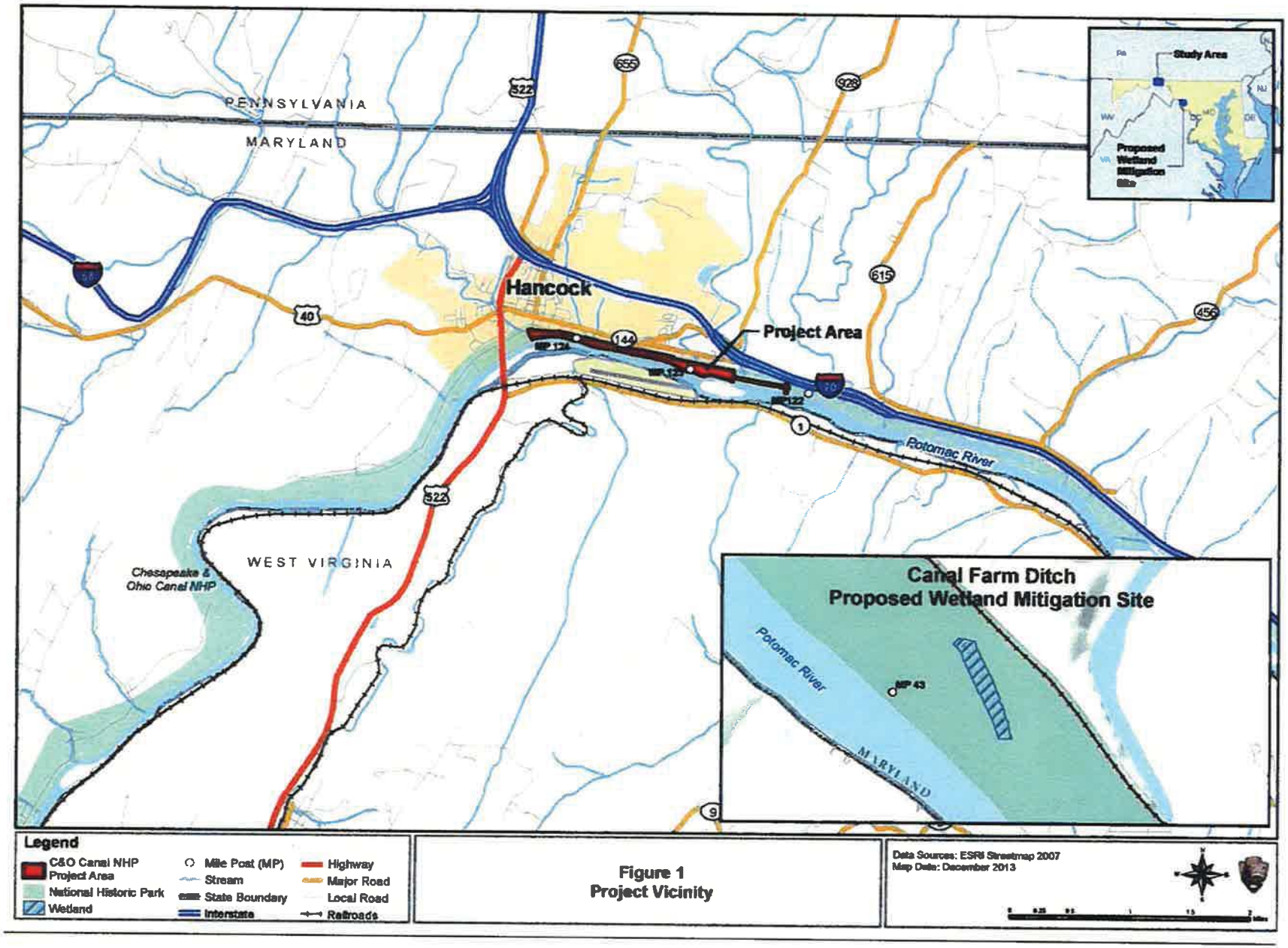


Figure 1
Project Vicinity

Legend

C&O Canal NHP Project Area

Major Road

Data Sources: ESRI Streetmap 2007
Aerial: ArcGIS Map Service 2012
Map Data: December 2013

0 MilePostMarker

Figure 2
Hancock Project Area

and the existing rewatered section (Mile 124.10-124.59). The Hancock Visitor Center would continue to operate within the first level of the Bowles House using temporary exhibits. The Bowles Property would continue to offer limited visitor services. The maintenance compound would remain in the current location at Bowles Farm. No changes would be made to the Tonoloway Picnic Area and Boat Ramp.

3.3 ALTERNATIVE 2 – PREFERRED ALTERNATIVE

Alternative 2, the preferred alternative, takes into account the recommendation of previous planning documents to rewater as much of the canal as possible and includes a complete rewatering of the canal prism in the Hancock area. It would provide the highest access to and interpretation of the canal of the alternatives analyzed. Under alternative 2 the following actions would occur:

3.2.1 Canal Operations

- The existing rewatered section (Mile 124.10 – 124.59) would be extended downstream to Lock 51 (Mile 122.12).
- Locks 51 and 52 would be made functional with repointing, selective repairs, and installation of gates.
- Bypass flumes and waste weirs would be made operational.
- Existing waste weir #22 and culvert #174 would be restored to allow for natural outfall to occur and canal operations.
- All work on the historic structures and canal prism would meet the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.
- All trees within the canal prism and on the towpath embankment abutting the canal prism would be removed. No clearing would occur along the river-side embankment. A geotechnical investigation would be completed as part of the design process to evaluate the structural capability of the existing embankment to adequately retain water and the degree of stabilization required, if needed.
- If needed, the NPS would work with the Town of Hancock to upgrade the town's existing water intake and pump facility within the existing footprint to supply sufficient water to the expanded canal operations. If needed, the NPS would work with the Town of Hancock to upgrade the town's existing water intake and pump facility on the Potomac River within the existing footprint to supply sufficient water to the expanded canal operations. Although it is expected that the quantity of water needed to rewater proposed section of the canal at Hancock would be comparable to the proposed diversion at Williamsport of approximately several cubic feet per second, the actual diversion requirements at Hancock would be determined based on final design for the rewatered section of the canal. Any in-stream work would be in accordance with review and approval from federal and state review agencies. A portable dewatering system may need to be employed during construction for a small area of the Potomac River, less than 0.1 acre. An overflow pipe would be constructed through an above grade earthen dike below Lock 51 to allow water to be returned to the river a half mile downstream of Lock 51, at historic waste weir #22/culvert 174 (Mile 122.12). Untreated water would be discharged, as it was historically, into an existing drainage that leads to the Potomac River.
- The canal prism would be restored to historic specifications and a clay liner would be installed to provide a waterproof lining.

- The Tonoloway Aqueduct would be restored to carry the canal across the Tonoloway Creek. The towpath and parapet walls, as well as, the barrel vault would be preserved to provide sound stability. Restoration of the aqueduct would resemble the 1870s time period; however, global climate change is expected to increase rainfall intensity and duration leading to increase runoff. This increase would increase flooding within the watershed above the aqueduct. Because the aqueduct is historic, increasing the available open waterway is not an option; therefore, backwater would be increased as well as possible debris loads from the watershed. The replacement spandrel and parapet walls would require strengthening beyond what was historically constructed. The historic parapets were constructed of stone with a relatively weak lime based mortar. Typically the inner and outer parapet walls were constructed simultaneously, with the space between them filled with a low bonding material of puddling clay, sand and a weak lime mortar. The replacement parapet would contain reinforced concrete with a wood cladding or similar materials that would be many times stronger than the original construction thereby limiting the risk of structural failure.

3.2.2 Visitor Experience

- The Bank Barn ruins would be stabilized and preserved as ruins as either short- or long-term preservation strategy.
- The second floor of the Bowles House, basement, and outbuildings would be rehabilitated and continue to house the Hancock Visitor Center. Permanent exhibits would be created and installed.
- The final preservation specifications to both the interior and exterior of the Bowles House, beyond the temporary work completed in 2010 would be completed. Rehabilitation of the Bowles house would mostly involve interior work and restoration of the smokehouse/wash house.
- The Bowles Farm cultural landscape would be reflective of the 1870s through opening views to the canal and river, as well as clearing areas for grassy meadows. These changes would result in a more appropriate setting for the house and farm buildings.
- The visitor parking area at Bowles Farm would be expanded into the current maintenance compound area. The substrate used for the parking lot addition would include a permeable surface treatment.
- A new cross over pedestrian bridge would be located at the Bowles House/Lock 52 area to connect the towpath to the Visitor Center. The bridge would also be designed to accommodate boat operations.
- NPS or concession-run boat operation would provide interpretive programs and connect the Bowles House to the Little Tonoloway area. Boat docks located at the Bowles House and Little Tonoloway would be constructed to accommodate operation. The boats would cross the Aqueduct and "lock through" Lock 52. A kiosk/operational booth would be constructed at Little Tonoloway.
- A walk-in campground with approximately 15 campsites would be established on approximately 2 acres within the existing maintenance compound. Limited utilities (water and sewer) would tie into lines that currently serve the maintenance compound.
- Improvements to the parking area for the Little Tonoloway Picnic Area/Boat Ramp would include formalizing an area currently used for parking for approximately 5 boat trailers. The surface of the boat parking lot would remain permeable.

- Work with the Town of Hancock to identify pedestrian access routes and possible improvement by the Town such as signing or striping of existing pavement along existing roadways from municipal parking lots.
- The ruins of the Little Warehouse and stone wall would be cleared of vegetation and stabilized.

3.2.3 Access Roads

- To improve visitor access to the Bowles Property, the existing single lane road from Route 144 into the park would be widened to two lanes along an approximate 0.1 mile section of the existing road.
- A new single lane maintenance access road would be constructed to replace the existing access road. The new access road would be relocated downstream of Lock 51, though existing woodlands. The access road would cross the canal prism on a dike with through pipes that would carry canal discharge water downstream to the outfall.

3.2.4 Maintenance

- The existing park maintenance compound which occupies approximately 2 acres is currently located within the 100-year floodplain on the former Bowles Farm Property. The park maintenance operations would be relocated to an area outside the floodplain, most likely within the town of Hancock. The park will evaluate possible future maintenance facility locations at such time as funding for the project becomes available. Park law enforcement offices would move from a temporary office trailer in the maintenance parking lot and co-locate within the new maintenance compound. The existing maintenance compound would be removed from Bowles Farm.

The preferred alternative includes a full rewatering of the historic canal between the Bowles Farm and the Tonoloway Boat Ramp area of the park (Miles 122.12-124.59). The project area incorporates the existing one-half mile of existing rewatered canal at the boat ramp area. The rewatering of the canal would enable replica canal boat interpretive programming, which would demonstrate the relationship between the Bowles Farm, the town of Hancock, and the C & O Canal to the visiting public.

3.3 Alternative 3 – Partial Re-Watering of Canal Prism

Alternative 3 includes a partial rewatering of the canal prism in the Hancock area and would include a moderate level of visitor interpretation and a high level of access to the canal through the addition of a campground as recommended by several previous planning documents (NPS 1976, 1989). An additional portion of the canal between Lock 51 and upstream of the Tonoloway Aqueduct would be rewatered (Miles 122.12 – 123), but the portion between the existing rewatered portion of the canal and the newly restored portion would remain unwatered and wooded. In the newly restored portion, locks, bypass flumes, and waste weirs would be made operational, and a new water intake would be installed in the Potomac River for the Lock 51 and 52 portion of the canal. The Tonoloway Aqueduct would be restored under alternative 3. A cross-over pedestrian bridge would be built at the Bowles House/Lock 52 Area, and a replica of a canal barge would be located in the Bowles House vicinity as an interpretive exhibit. An interpretive wayside to show the succession of natural resources over time would be constructed, and a walk–in campground would be established. This alternative would also include the construction of a new maintenance access road downstream of Lock 51. Table 1 below provides a comparison of the project components under each alternative. For a more detailed description of alternative 3, please see chapter 2 of the Environmental Assessment.

Table 1 . Project Components by Alternative

Project Components	Alternative 1 (No Action)	Alternative 2 (Preferred)	Alternative 3	Alternative 4
Canal Operations				
Rewater Canal Mile 123 - 124.10 (Phase 2)		X		
Rewater Canal Mile 122.12 - 123 (Phase 2)		X	X	
Restore Operation of Locks 51 and 52 (Phase 1)		X	X	
Minimal Preservation of Locks 51 and 52 (Phase 1)				X
Restore Bypass Flume and Waste Weirs (Phase 1)		X	X	
Restore Canal Prism and Install Clay Liner (Phase 2)		X	X	
Install New Water Intake (Phase 2)			X	
Restore and Harden Tonoloway Aqueduct (Phase 2)		X	X	
Restore Existing Waste Weir #22 and Culvert #174 (Phase 2)		X	X	
Work on Historic Structures and Canal Prism will meet Secretary of Interior's Standards for the Treatment of Historic Properties (Phase 2)		X	X	X
Remove Trees within Canal Prism and adjacent Towpath (Phase 1)		X		
Update Town's Existing Water Intake and Pump Facility (Phase 2)		X		
Visitor Experience				
Preserve and Stabilize Bank Barn Ruins		X	X	X
Rehabilitate and Create/Install Permanent Exhibits at Bowles House for Visitor Center (Phase 1)		X	X	X
Cultural Landscape to Reflect the 1870s (Phase 2)		X	X	X
Formalize Pedestrian Access along Existing Roadways from Parking Lots (Phase 1)		X	X	X
Establish Walk-In Campground within Existing Maintenance Compound (Phase 2)		X	X	
Establish a Picnic Area within Existing Maintenance Compound (Phase 2)				X
Improve Parking Area for the Little Tonoloway Picnic Area/Boat Ramp (Phase 1)		X	X	X
Install boat dock at Bowles House and Little Tonoloway Picnic Area for operation of launch boats (Phase 2)		X		
Install New Pedestrian Bridge (Phase 2)		X	X	
Improve Natural Resources Interpretation (Phase 1)			X	

Project Components	Alternative 1 (No Action)	Alternative2 (Preferred)	Alternative 3	Alternative 4
Clear Vegetation and Stabilize the Ruins of the Little Warehouse and Stone Wall (Phase 1)		X	X	X
Maintenance				
Move Existing Maintenance Compound (Phase 2)		X	X	X
Expanded Visitor Parking (Phase 2)		X	X	X
Access Road				
Widen Access Road from Route 144 to Two Lanes (Phase 1)		X	X	X
Construct New Maintenance Access Road (Phase 2)		X	X	

3.4 ALTERNATIVE 4 – CLEARED/MOWED PRISM IMPROVEMENTS

Alternative 4 includes minimal preservation of canal features and minimal improvements to visitor interpretation, but would still be in keeping with previous planning documents for the Hancock area. The existing canal prism between the Tonoloway Aqueduct and Lock 51 would remain unwatered and mowed. No additional rewatering of the canal would occur. Locks 51 and 52 would receive minimal preservation stabilization. A picnic area would be established within the existing maintenance compound. No new access roads would be constructed. Table 1 below provides a comparison of the alternatives, and a more detailed description of alternative 4 can be found in chapter 2 of the Environmental Assessment.

4.1 DESCRIPTION OF WETLANDS IN THE PROJECT AREA

For the NPS, any area that is classified as a *wetland* according to the U.S. Fish and Wildlife Service's (USFWS) "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin et al. 1979) is subject to NPS DO #77-1: *Wetland Protection* (NPS 2002). Deepwater habitats are not subject to DO #77-1. Under the Cowardin definition, a wetland must have one or more of the following three attributes:

1. At least periodically, the land supports predominantly hydrophytes (wetland vegetation);
2. The substrate is predominantly undrained hydric soil; or
3. The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The Cowardin wetland definition encompasses more aquatic habitat types than the definition and delineation manual used by the Corps of Engineers for identifying wetlands subject to Section 404 of the Clean Water Act. The 1987 *Corps of Engineers Wetlands Delineation Manual* requires that *all three* of the parameters listed above (hydrophytic vegetation, hydric soil, wetland hydrology) be present in order for an area to be considered a wetland (USACE 1987). The Cowardin wetland definition includes such wetlands, but also adds some areas that, though lacking vegetation and/or soils *due to natural physical or chemical factors* such as wave action or high salinity, are still saturated or shallow inundated environments that support aquatic life (e.g., unvegetated stream shallows, mudflats, rocky shores).

The soils in the project area are predominately Bigpool silt loam and Monogahela silt loam, but other soils found include Atkins silt loam, Klinesville-Calvin channery loams, Lindside silt loam, Philo gravelly sandy loam, and Pope gravelly loam (Table 2). According to the National Resource Conservation Service's (NRCS) Web Soil Survey for Washington County, six soil types exist in the vicinity of the project area that are listed as hydric and include the following: Atkins silt loam, Bigpool silt loam, Klinesville-Calvin channery loams, Lindside silt loam, Philo gravelly sandy loam, and Pope gravelly loam. Atkins silt loam is commonly found within floodplain areas, while Bigpool silt loam, Philo gravelly sandy loam, and Pope gravelly loam are commonly found in depressions (USDA NRCS 2010a; USDA NRCS 2010b). Monogahela silt loam is also found in the project area, but is not characterized as a hydric soil (USDA NRCS 2010b).

Table 2. Mapped Soil Types in Project Area

Soil Series	Symbol	Drainage Class	Hydric Soil?
Atkins silt loam	At	Poorly drained	Yes
Bigpool silt loam	Bp	Moderately Well Drained	Yes
Klinesville-Calvin channery loams	KcF	Well Drained	Yes
Lindside silt loam	Ln	Moderately Well Drained	Yes
Monogahela silt loam	MgC	Moderately Well Drained	No
Philo gravelly sandy loam	Ph	Moderately Well Drained	Yes
Pope gravelly loam	Po	Well drained	Yes

Source: USDA NRCS 2010a; USDA NRCS 2010b

The National Wetlands Inventory (NWI) of the USFWS produces information on the characteristics, extent, and status of the nation's wetlands and deepwater habitats. The USFWS definition of wetlands is similar to the NPS definition of wetlands in that only one of three parameters (hydric soils, hydrophytic vegetation, and hydrology) is required to characterize an area as a wetland, based upon the Cowardin Classification of Wetlands (Cowardin et al. 1979). The USFWS objective of mapping wetlands and deepwater habitats is to produce "reconnaissance-level information on the location, type and size of these resources" (USFWS 2010). NWI maps are prepared by the USFWS from the analysis of high altitude imagery and wetlands are identified based on vegetation, visible hydrology and geography. The NWI maps identify three NWI wetlands in the vicinity of but not within the project area, with the exception of the Potomac River. In the vicinity of Hancock, Maryland, the Cowardin Classification on the NWI maps for the Potomac River is a riverine, unknown perennial, unconsolidated bottom, permanently flooded wetland (USFWS 2010).

4.2 WETLAND FUNCTIONS AND VALUES

Wetlands serve a wide range of ecological functions. They are valuable as holding areas for rising floodwaters. Wetland vegetation reduces floodwater velocity and depletes its destructive energy, thereby protecting mainland and upland areas. Wetland vegetation also forms buffers against erosion by absorbing current and storm energy, stabilizing substrates, and trapping sediments. Filtration of sediments, nutrients, pollutants, and toxic substances has the added advantage of improving water quality. Wetland functions are physical, chemical, and biological processes or attributes of wetlands that are vital to the integrity of a wetland system, while wetland values are attributes not necessarily important to the integrity of a wetland system but perceived as valuable to society. A brief description of the common function and values is provided below:

- **Groundwater recharge/discharge** — The potential for the wetland to contribute water to an aquifer or potential for the wetland to serve as an area where groundwater can be discharged to the surface.
- **Floodflow alteration (Storage & Desynchronization)** — Effectiveness of the wetland in reducing flood damage by attenuation of floodwaters for prolonged periods following precipitation events.
- **Fish and shellfish habitat** — Effectiveness of seasonal or permanent water bodies associated with the wetland in question for fish and shellfish habitat.
- **Sediment/toxicant/pathogen retention** — Prevents degradation of water quality relating to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens.

- **Nutrient removal/retention/transformation** — Ability for the wetland to prevent adverse effects of excess nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.
- **Production export (Nutrient)** — Wetlands ability to produce food or usable products for humans or other living organisms.
- **Sediment/shoreline stabilization** — Effectiveness of a wetland to stabilize stream banks and shorelines against erosion.
- **Wildlife habitat** — The wetlands ability to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered.
- **Recreation (Consumptive and Non-Consumptive)** — Ability for the wetland and associated watercourses to provide recreational opportunities such as canoeing, boating, fishing, hunting, and other active or passive recreational activities. Consumptive activities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland, whereas non-consumptive activities do not.
- **Educational/scientific value** — Value of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research.
- **Uniqueness/heritage** — Ability for the wetland or its associated water bodies to produce certain special values. Special values may include such things as archaeological sites, unusual aesthetic quality, historical events, or unique plants, animals, or geologic features.
- **Visual quality/aesthetics** — The presence of visual and aesthetic qualities of the wetland for society.

4.3 WETLAND DELINEATION AND FUNCTION/VALUE ASSESSMENT

In addition to reviewing the NWI maps, a wetland delineation was also conducted at the project area. In July 2010, EA Engineering, Science, and Technology, Inc. (EA Engineering), delineated all natural and artificial wetlands in the project area according to the guidance in NPS DO #77-1 without regard to regulatory jurisdiction (EA Engineering 2010). This wetland delineation was conducted by a wetland delineator (Sarah T. Koser) who has received a certificate of training from a recognized wetland delineation training provider, has over 12 years of wetland delineation experience, and is now a Professional Wetland Scientist certified by the Society of Wetland Scientists Certification Program. Wetlands were identified in accordance with the 1987 Corps of Engineers Wetland Delineation Manual (USACE 1987) and in conjunction with USFWS's Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979). The area that was surveyed for wetlands included the canal prism on both sides of the canal from park Mile 122.12 to Mile 124.59 (approximately a 100-foot wide corridor) which included the shoreline of the Potomac River, the Tonoloway Boat Ramp and Picnic Area east to the Old 522 Bridge, and the canal prism on both sides of the canal from Lock 51 east to Culvert 174. A total of 10 wetlands (wetlands A through L) were identified and flagged during the survey. In general, wetlands at the site are located along the Potomac River, along tributaries to the Potomac River, and within the historic C&O Canal. Two small stream channels were also mapped that did not have associated wetlands beyond the channels. The majority of the wetlands at the site are forested wetlands with a mature tree canopy. Wetlands A through L are described briefly in the paragraphs that follow, in table 3 and in figures 3a-d. Wetlands shown on figures 3a-d meet the NPS definition of a wetland described above. Some of these wetland areas may also meet the definition of the USACE wetlands/waters of the U.S. A USACE jurisdictional determination will be completed during the project design phase.


CULVERT 162
BOAT BASIN IN HANCOCK
BRIDGE OVER CANAL/HANCOCK
144
B
E
A
MM 123.75
Mile Post 124
MM 123.50
G
MM 123.25
A
A
Potomac River
F
L
A
Mile Post 122
1


MM 124.25
B
C
A
Little Tonoloway Picnic Area/Boat Ramp
Little/Tanney Warel
Culvert 182


E
A
MM 123.75
E
E
A
A


Mile Post 123
Tonoloway Aqueduct
Flume\Lock 52


Flume\Lock 51
A
A
MM 122.5
J

Table 3. Emergent and Forested Wetlands Delineated in the Project Area

Delineated Feature	Resource/Cowardin Classification*	Acres
Wetland A	PFO1/PEM1	1.75
Wetland B	PFO1	0.08
Wetland C	PFO1	0.03
Wetland D	PFO1	0.04
Wetland E	PFO1	1.91
Wetland G	PFO1	1.14
Wetland H	PFO1	0.04
Wetland J	PFO1	1.44
Wetland K	PFO1	N/A - Outside of Project Area
Wetland L	PEM1/2	0.04
TOTAL WETLANDS IN PROJECT AREA		**6.47**

*PFO1/PEM1 = perennial stream shoreline with emergent/forested wetlands; PFO1 = forested wetland
PEM1/2 = emergent wetland

In addition to the standard wetland delineation methods, EA Engineering personnel performed a Function and Value Assessment of the wetlands delineated within the study area. EA Engineering utilized the methodology from the New England District of the USACE, *The Highway Methodology Workbook Supplement, Wetland Functions and Values: A Descriptive Approach*. Generally the wetlands delineated onsite have the primary function of groundwater recharge and provide suitable habitat for wildlife. During the wetland delineation effort, a wide range of wildlife species or evidence of species presence was observed. Wetland values are attributes not necessarily important to the integrity of a wetland system but perceived as valuable to society and are described for each delineated wetland in the paragraphs that follow. Descriptions for wetlands A through L as well as functions and values are included in the paragraphs that follow, in table 3 below, and in figures 3a-d.

4.4 DESCRIPTION OF WETLANDS IN THE PROJECT AREA

Wetland A: Wetland A is a mosaic system of narrow wetlands located along the shoreline of the Potomac River from the Tonoloway Boat Ramp at the western-most portion of the project area to Lock 51, the eastern-most portion of the project area along the Potomac River. This wetland was identified as a rocky shoreline consisting of pockets of forested and emergent wetlands located above the ordinary high water mark of the Potomac River and is classified as a palustrine, forested, broad-leaved deciduous/palustrine, emergent, persistent (PFO1/PEM1) wetland. Wetland A consisted of a predominantly hydrophytic vegetation overstory dominated by mature specimens of silver maple (*Acer saccharinum*), boxelder (*Acer negundo*), and sycamore (*Platanus occidentalis*) along a narrow portion of the shoreline of the Potomac River; understory herbaceous areas were dominated by smallspike false nettle (*Boehmeria cylindrica*). Small pockets of herbaceous wetland areas also exist within wetland A where suitable substrate accumulates, thus supporting hydrophytic vegetation such as lizard's tail (*Saururus cernuus*), water willow (*Justicia americana*), and common three-square sedge (*Scirpus americanus*). In the immediate shoreline areas of shallow water (beyond project area), three species of submerged aquatic vegetation (SAV) were also observed and included: hydrilla (*Hydrilla verticillata*), wild celery (*Vallisneria americana*), and water stargrass (*Heterantha dubia*). The soils within wetland A are listed on both the National and local hydric soils list by USDA. At least two of the following wetland hydrology indicators were observed in the four areas sampled within wetland A: inundation, saturation in the upper 12 inches,

water marks, drift lines, sediment deposits, and drainage patterns. The source of hydrology for wetland A appeared to be water level fluctuations of the Potomac River. The primary function of wetland A appeared to be *Sediment/Shoreline Stabilization* due to the narrow areas of vegetation protection along shoreline, although extremely steep adjacent slopes occur immediately inland. Secondary functions included: *Floodflow Alteration* (due to location within the floodplain of the Potomac River), *Fish and Shellfish Habitat* (due to proximity to the Potomac River shoreline, particularly in areas inhabited by SAV species where snails and crayfish were observed), and secondary values included: *Wildlife Habitat* (the riverine portion of Potomac River provides excellent wildlife value, particularly for fish and aquatic bird species). This wetland also had the following values, generally due to its location within a National Historical Park: *Educational/Scientific Value*, *Uniqueness/Heritage*, and *Visual Quality/Aesthetics*.

Wetland B: Wetland B is a small, forested wetland (PFO1) with an herbaceous understory that exists as a depressional area between the canal and the Potomac River; a small drainage swale connects wetland B to the Potomac River. The source of hydrology for wetland B appeared to be runoff from the nearby parking lot and towpath and potentially from groundwater as well. Wetland B consisted of a predominantly hydrophytic vegetation overstory dominated by mature specimens of silver maple, boxelder, and sycamore; the shrub layer was dominated by spicebush (*Lindera benzoin*), the vine layer was dominated by Japanese honeysuckle (*Lonicera japonica*), and the herbaceous understory was dominated by jewelweed (*Impatiens capensis*) and moneywort (*Lysimachia nummularia*). The soils within wetland B are listed on both the National and local hydric soils list by USDA. The following wetland hydrology indicators were observed within wetland B: saturation in the upper 12 inches, drainage patterns, and oxidized root channels in the upper 12 inches. The primary function of wetland B appeared to be *Groundwater Recharge/Discharge* due to groundwater seeping out of the ground and providing hydrology for the wetland. Secondary values included: *Wildlife Habitat* and *Uniqueness/Heritage* (generally due to its location within a National Historical Park). It is important to note that this wetland supports a state endangered sedge species known as Short's sedge (*Carex shortiana*). The Environmental Assessment discusses Special-Status Species in detail.

Wetland C: Wetland C is a small, forested wetland (PFO1) with an herbaceous understory that exists as a depressional area beyond the shoreline of the Potomac River but within the riparian/floodplain area of the river; a small drainage swale connects wetland C to the Potomac River. During the field review ground water was observed seeping out of the river bank of the Potomac River directly below wetland C. Only a small portion of this wetland was identified to contain hydric soils. Wetland C consisted of a predominantly hydrophytic vegetation overstory dominated by mature specimens of boxelder and silver maple; the herbaceous understory was dominated by Japanese knotweed *(Polygonum cuspidatum)*, jewelweed, wingstem (*Verbesina alternifolia*), silver maple and Japanese stiltgrass (*Microstegium vimineum*). The soils within wetland C are listed on both the National and local hydric soils list by USDA. The following wetland hydrology indicators were observed within wetland C: saturation in the upper 12 inches, inundation, drainage patterns, and oxidized root channels in the upper 12 inches. The source of hydrology for wetland C appeared to be from both runoff and groundwater. Therefore, the primary function of wetland C appeared to by *Groundwater Recharge/Discharge* due to ground water observed seeping out of the river bank of the Potomac River directly below wetland C. Secondary functions included *Sediment/Shoreline Stabilization* and secondary values included *Wildlife Habitat*.

Wetland D: Wetland D is a very narrow, forested wetland (PFO1) with an herbaceous understory that exists as a depressional area beyond the shoreline of the Potomac River but within the riparian/floodplain area of the Potomac River; a small drainage swale connects wetland D to an unnamed tributary to the Potomac River. Wetland D consisted of some hydrophytic vegetation (exactly 50 percent, not greater than 50 percent) with an overstory dominated by mature specimens of boxelder; and herbaceous species in the understory consisting of Japanese knotweed, dames rocket (*Hesperis matronalis*), ground ivy (*Glechoma hederacea*), garlic mustard (*Alliaria petiolata*), and Japanese stiltgrass. The soils within

wetland D are listed on both the National and local hydric soils list by USDA. The following wetland hydrology indicators were observed within wetland D: water marks, drift lines, and drainage patterns. Because of the presence of hydrology, sporadic wetland vegetation, and a defined connection to a nearby stream channel, this area was identified as a NPS wetland. The source of hydrology for wetland D appeared to be from both runoff and groundwater. However, the primary function appeared to be *Floodflow Alteration* because this area is a topographic depression and described as a vegetated drainage swale. Secondary functions included *Groundwater Recharge/Discharge*.

***Wetland E*:** Wetland E is a narrow, forested wetland (PFO1) with an understory that is herbaceous in some areas and bare in other areas within the historic C&O Canal. This area has been historically disturb ed due to the excavation and construction of the C&O Canal. Although this disturbance occurred in the 1830s, the canal has generally been left fallow since 1924. Wetland E consisted of a predominantly hydrophytic vegetation overstory dominated by mature specimens of boxelder and slippery elm (*Ulmus rubra*); the vine layer was dominated by riverbank grape (*Vitis riparia*) and the herbaceous layer was dominated by Japanese knotweed, moneywort, fox sedge *(Carex vulpinoidea),* lizard's tail, and awlfruit sedge *(Carex stipata)*. The soils within wetland E are listed on both the National and local hydric soils list by USDA. The following wetland hydrology indicators were observed within wetland E: water marks, drift lines, and drainage patterns. Although standing water was not observed in the canal during the July 2010 wetland delineation, standing water was observed in the canal during the spring terrestrial plant survey that was conducted in early June 2010. Noteworthy observations at wetland E included two wood turtles (*Clemmys insculpta*) observed within the canal during the July 2010 wetland delineation and three wood turtles observed within the canal during the June 2010 terrestrial plant survey. The primary value of this wetland was *Wildlife Habitat* due to the presence of numerous wood turtles observed in the wetland. The location of the wetland within the C&O Canal, also indicates that *Uniqueness/Heritage* is a primary value of wetland E. Secondary functions included: *Groundwater Recharge/Discharge*, *Floodflow Alteration* as well as *Sediment/Toxicant Retention* and *Nutrient Removal* (due to observations of culverts with runoff from highways that flow into the canal). Secondary values included: *Recreation*, *Educational/Scientific Value*, and *Visual Quality/Aesthetics*.

***Riverine Wetlands F and I*:** Wetland F consists of a riverine wetland described as a perennial stream channel (R2SB4/5) identified as Tonoloway Creek from the Potomac River and inland until outside of the project area. Wetland I is a riverine wetland described as a narrow intermittent stream channel (R4SB4/5) with a forested overstory (beyond the stream channel) that is an unnamed tributary to the Potomac River. There are no impacts expected to riverine wetlands F or I; these stream channels are therefore not discussed further in this document.

***Wetland G*:** Wetland G is a narrow, forested wetland (PFO1) with an understory that is herbaceous in some areas and bare in other areas within the historic C&O Canal. Similar to wetland E, this area has been historically disturbed due to the excavation and construction of the C&O Canal. Wetland G consisted of a predominantly hydrophytic vegetation overstory dominated by mature specimens of boxelder and slippery elm; the vine layer was dominated by riverbank grape and the herbaceous layer was dominated by clearweed (*Pilea pumila*), smallspike false nettle, nodding smartweed (*Persicaria lapathifolium*), lady's thumb (*Persicaria maculosa*) and the following sedge species: *Carex vulpinoidea*, *Carex intumescens*, and *Carex rosea*. The soils within wetland G are listed on both the National and local hydric soils list by USDA. The following wetland hydrology indicators were observed within wetland G: water marks, drift lines, and drainage patterns. Noteworthy observations at wetland G included a total of five wood turtles observed during the 2010 wetland delineation and rare plant survey periods. The primary value of this wetland was *Wildlife Habitat* due to the presence of numerous wood turtles observed in the wetland. The location of the wetland within the C&O Canal, also indicates that *Uniqueness/Heritage* is a primary value if Wetland G. Secondary functions included: *Groundwater Recharge/Discharge*, *Floodflow Alteration* as well as *Sediment/Toxicant Retention* and *Nutrient Removal*

(due to observations of culverts with runoff from highways that flow into the canal). Secondary values included: *Recreation, Educational/Scientific Value*, and *Visual Quality/Aesthetics*.

Wetland H: Wetland H is a small, isolated forested wetland (PFO1) with an herbaceous understory that exists as a depressional area beyond the canal and near the southwestern portion of the maintenance area. Wetland H consisted of a predominantly hydrophytic vegetation overstory dominated by mature specimens of boxelder, green ash (*Fraxinus pennsylvanica*), and slippery elm; the vine layer was dominated by poison ivy (*Toxicodendron radicans*), the shrub layer was dominated by spicebush, and the herbaceous layer was dominated by Japanese stiltgrass. The soils within wetland H are listed on both the National and local hydric soils list by USDA. The following wetland hydrology indicators were observed within wetland H: saturation in the upper 12 inches, water marks, drainage patterns, and water stained leaves. The source of hydrology for wetland H appeared to be runoff from the impervious surfaces at the maintenance area and parking lot. Therefore, the primary function of Wetland H was *Groundwater Recharge/Discharge* due to groundwater recharge and collecting water from a nearby impervious surface. A secondary function in *Sediment/Toxicant Retention* due to adjacency to the maintenance yard and possible treatment of runoff; a secondary value is *Wildlife Habitat*.

Wetland J: Wetland J is a narrow, forested wetland (PFO1) with an understory that is herbaceous in some areas and bare in other areas within the historic C&O Canal. Similar to wetlands E and G, this area has been historically disturbed due to the excavation and construction of the C&O Canal. Wetland J consisted of a predominantly hydrophytic vegetation overstory dominated by mature specimens of boxelder; numerous silver maple seedlings dominated the understory; the shrub layer was dominated by spicebush and the herbaceous layer was dominated by clearweed and lizard's tail. The soils within wetland J are listed on both the National and local hydric soils list by USDA. The following wetland hydrology indicators were observed within wetland J: saturation in the upper 12 inches, water marks, sediment deposits, drainage patterns, oxidized root channels in the upper 12 inches and water stained leaves. Although standing water was not observed in the canal during the July 2010 wetland delineation, standing water (between 6 in to 12 in deep) was observed in the canal during the spring terrestrial plant survey that was conducted in early June 2010. The western portion of wetland J ends at the mowed/maintained area of the canal and the eastern portion ends at culvert 174; beyond this area is outside of the project boundary. Due to the location of the wetlands within the C&O Canal, the primary value observed includes *Uniqueness/Heritage*. Secondary functions included: *Groundwater Recharge/Discharge, Floodflow Alteration* as well as *Sediment/Toxicant Retention* and *Nutrient Removal* (due to observations of culverts with runoff from highways that flow into the canal). Secondary values included: *Recreation, Educational/Scientific Value*, and *Visual Quality/Aesthetics*.

Wetland K: Wetland K is a narrow, forested wetland (PFO1) with an understory that is herbaceous that receives runoff from the nearby roadways and drains westward into the Tonoloway Creek. This wetland is outside of the study area and is not discussed further in this document.

Wetland L: Wetland L is a small, narrow, palustrine, emergent, persistent/nonpersistent wetland (PEM1/2) along the eastern shoreline of the Tonoloway Creek. This wetland exists as a pocket along the steep shoreline of the creek due to groundwater seepage from and down the banks, which supports both hydrophytic vegetation and hydric soils. Wetland L consisted of a hydrophytic vegetation dominated by pink knotweed (*Persicaria pensylvanicum*), clearweed, smallspike false nettle, and moneywort. The soils within wetland L are listed on both the National and local hydric soils list by USDA. The following wetland hydrology indicators were observed within wetland L: groundwater seeping from banks, saturated in the upper 12 inches, and free water observed in the soil pit. This wetland exists as a pocket along the steep shoreline of the creek due to groundwater seepage from and down the banks, which supports both hydrophytic vegetation and hydric soils. Therefore, the primary function of this wetland was *Groundwater Recharge/Discharge* as a result of groundwater discharging from bank to Tonoloway

Creek. The primary value of this wetland is *Visual Quality/Aesthetics* because the historic aqueduct can be viewed from shoreline. Secondary functions include *Sediment/Shoreline Stabilization* (shoreline stabilized with herbaceous vegetation) and secondary values include *Recreation* (can kayak and fish in creek), and *Uniqueness/Heritage* (wetland is within viewshed of C&O Canal NHP).

5.1 USE OF THE WETLANDS

5.2 HISTORICAL USE OF THE PARK

The C&O Canal NHP is the last towpath that remains fully intact from the mule-drawn barge transportation era in the United States. The NHP was established in 1971 and is located along 184.5 miles of the Potomac River's Maryland shoreline from the mouth of Rock Creek in Georgetown, Maryland to Cumberland, Maryland. The C&O Canal NHP is historically significant primarily because it embodies nineteenth-century engineering and architectural technology. The canal operated from the 1820s to the 1920s as a route for transporting coal, lumber, and agricultural products, such as grain, from western Maryland to the port of Georgetown and to the navigable lower reaches of the Potomac River. During this time, the C&O Canal provided jobs and opportunities for people throughout the Potomac River Valley. The canal included 74 lift locks, 11 stone aqueducts built to carry the canal prism over the Potomac River tributaries, and 241 historic culverts built to carry small streams and roads under the canal. Today the canal's remaining historical structures tell the story of the canal's important role in many aspects of American history, including transportation, engineering achievement, and commerce. The park also provides a place to recreate and enjoy nature.

5.3 PROPOSED USE OF THE PARK

The NPS is proposing to rehabilitate and restore historic structures of the C&O Canal NHP at Hancock, Maryland.

The purpose of this project is to expand visitor opportunities for learning about the C&O Canal NHP and canal operations in the 19th century. Physical improvements to the canal's historic structures and development of more extensive interpretive/educational opportunities would help the visitor more fully understand, appreciate, and enjoy the canal and its heritage. The project addresses the potential for development and rehabilitation of the following structures in and around the park's property:

- Bowles Property
- Lock 51
- Lock 52
- Canal prism from mile post (Mile) 122.12 to 124.59
- Tonoloway Aqueduct
- Parking Area at Little Tonoloway Picnic Area/Boat Ramp
- Park Maintenance Compound
- Little Warehouse and Stone Wall

These actions are needed to improve visitor experience and fully realize the potential of Hancock as an interpretive venue of C&O Canal NHP. This area of the park has had only basic preservation of historic structures and limited interpretive/educational opportunities. Mile 122.12 through 124.59 contains significant canal structures including two locks and an aqueduct, all of which are in disrepair. Interpretive

and educational services were located outside of the park until the May 2010 opening of a new visitor center at the Bowles House. The restoration and rehabilitation of historic structures would fulfill the vision of the park's 1976 *General Plan* that identified the location as a "National Interpretive Center." This concept is further supported by the 1989 *Hancock Development Concept Plan* (NPS 1989). Hancock contains historic restoration opportunities where visitors would be able to see a functioning canal in a historic setting. Hancock could become a destination location for students and canal enthusiasts. Furthermore, Hancock could also be a venue for those interested in transportation, industrial, and agricultural heritage in the United States.

6.1 INVESTIGATION OF ALTERNATIVES

For this project, a no-action alternative (alternative 1), a preferred alternative (alternative 2), and two additional action alternatives (alternatives 3 and 4) were considered and investigated. Along with the four alternatives considered, additional components of the alternatives were identified during the design process and internal and public scoping process. Some of these were determined to be unreasonable, or much less desirable than similar options included in the analysis, and were therefore not carried forward for analysis in the Environmental Assessment. The following suggestions of interpretive opportunities received during the public scoping period were considered but dismissed from further analysis:

- Mule pulled boat rides with mules being housed at Bowles Farm
- Off road vehicle trail
- Dog Park
- Children's Playground
- Swimming Area
- Petting Zoo
- Animal Hospital

7.0 WHY ALTERNATIVE 2 WAS IDENTIFIED AS THE PREFERRED ALTERNATIVE

While all of the alternatives were developed in a way that would fulfill the park's mission, alternative 2 was identified as the preferred alternative, as it best allows the park to accomplish the goals of the 1976 *General Plan* and the Development Concept Plan to increase visitor understanding of the operation of the canal and preservation of the historic resources. The General Plan identified the location as a "National Interpretive Center" and identified the Hancock area as Zone B, a Cultural Interpretive Zone. This zone identifies sections of the park containing a high density of historic resources that are not necessarily accessible by road or do not have adequate parkland surrounding them. The General Plan stated that rewatering of this section of the canal is desirable to recreate the historic scene as it passes near the historic town of Hancock, Maryland (NPS 1976). This concept was further supported by the *Hancock Development Concept Plan* (NPS 1989). Hancock contains major historic restoration opportunities where visitors would be able to see a functioning canal in a historic setting. Therefore, the park's mission would also be fulfilled by the preferred alternative through the preservation and protection of the cultural and historic resources of the park. In addition, alternative 2 gives the park the most options available for enhancing the Hancock area and is consistent with management plans and/or Environmental Assessments at other areas of the C&O Canal NHP such as Williamsport, Maryland and Cumberland, Maryland.

8.1 PROPOSED IMPACTS TO WETLANDS IN THE PROJECT AREA

Impact analysis and the conclusions for possible impacts to wetlands were based on review of existing literature and studies, information provided by park staff and other agencies, and on-site investigation. Where possible, locations of wetlands were overlain with the proposed actions to determine impacts to wetlands.

As a result of the wetlands impacted by the proposed project, a Joint Federal/State Application for the Alteration of any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland would be submitted as well as applicable permits obtained from the Maryland Department of the Environment (MDE) and the USACE prior to initiating any construction activities. All regulated activities within waters of the U.S. and waters of the State, including the 100-year floodplain and jurisdictional wetlands, would be conducted in accordance with permit conditions and *Maryland's Waterway Construction Guidelines* (MDE 2000).

8.2 NO-ACTION ALTERNATIVE

Under the no-action alternative, there would be no effect on wetlands, since wetlands would not be disturbed (table 4). The continued visitor use of the existing facilities is not expected to result in new impacts to the wetlands under existing management practices.

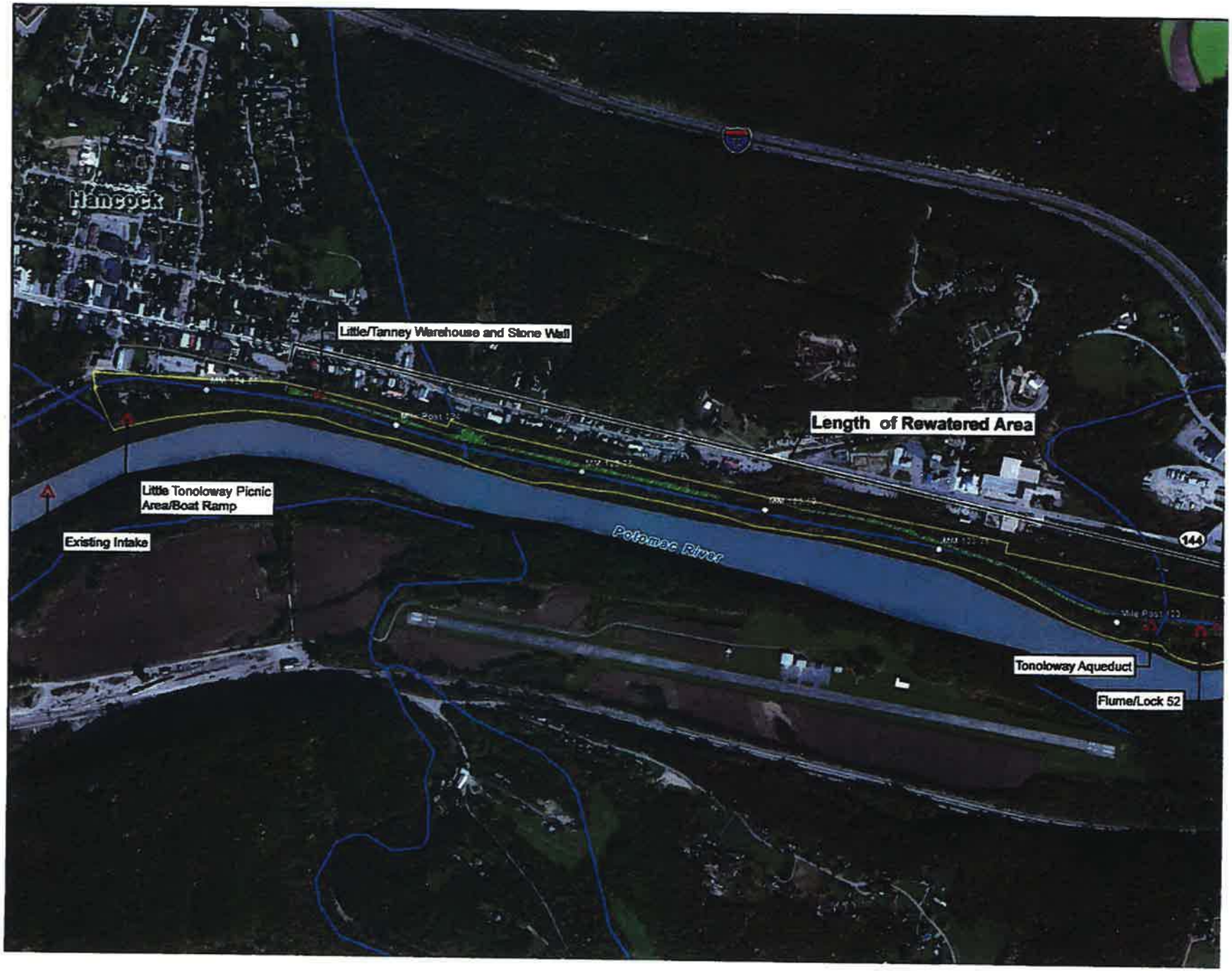
Table 4. Wetland Impacts by Alternative

Alternative	Wetland Name and Type	Project Component Affecting Wetland	Wetland Impacts (acreage) by Type	Total Impacts (acreage)
No Action	N/A	N/A	None	**0**
Alternative 2	Wetland A (PFO1/PEM1)	• water intake and outfall structures	<0.10	**3.15***
	Wetland E (PFO1)	• restoring canal prism • rewatering canal	1.91	
	Wetland G (PFO1)	• restoring canal prism • rewatering canal	1.14	
Alternative 3	Wetland A (PFO1/PEM1)	• water intake and outfall structures	<0.10	**0.10***
Alternative 4	N/A	N/A	0	**0**

* Wetland impacts to Wetland A along the Potomac River are expected. The design plans for these structures are not yet available so the exact acreage of impacts to Wetland A cannot be calculated at this time. These impacts cannot be completely discounted because they will not be zero since excavation would occur, but it is sufficient to say that a total of less than 0.10 acres of Wetland A would be expected as a result of these activities.

8.3 PREFERRED ALTERNATIVE (ALTERNATIVE 2)

Project components specific to alternative 2 that would adversely affect wetlands include restoring the canal prism and rewatering the canal from Mile 122.12 to Mile 124.10 and updating the town's existing water intake. Total wetland impacts associated with the activities described above are detailed in table 4 and figure 4, but it is important to note that wetland impacts discussed in this section represent the most current approximations at this time; however, this acreage may increase/decrease after final design. Under alternative 2, there are no impacts to wetlands B, C, D, F, H, I, J, or L.


Hancock
Little/Tanney Warehouse and Stone Wall
Length of Rewatered Area
Little Tonoloway Picnic Area/Boat Ramp
Existing Intake
Potomac River
Tonoloway Aqueduct
Flume/Lock 52

Rewatering of the canal from Mile 122.12 through Mile 124.10 would impact the entire 3.05 acres of wetlands E and G which are currently within the footprint of the canal prism. The restoration of the canal prism would require the removal of the hydrophytic vegetation and other vegetation, along with some excavation of soils. It is estimated that 2,233 trees and saplings would be removed from the rewatering area. The majority (60%) of these trees have a diameter at breast height (DBH) of less than 10 cm; less than 1% were greater than 30cm DBH. The area would technically remain a wetland, as the water would be less than 2 meters deep, but would be converted in both form and function from a vegetated and forested palustrine wetland, to a riverine or lacustrine open water wetland. Habitat conversion is considered a wetland impact because most of the wetland functions and values would change (including fish and wildlife productivity and habitat, special status species habitat, vegetation habitat, water purification, and streamflow). Tree removal in the canal prism in the forested wetlands would change wetland functions and values through reduction of the vegetation canopy over these wetlands, which would reduce the biomass and change the species composition of the wetland (Cutlip 1986, cited in Jordan et al. n.d., 153). The reduction in biomass would potentially alter the vegetation and wildlife species that use this wetland. This shift in the vegetation could lessen available resources for wildlife species that depend on the conditions currently found in the wetland. The existing forested wetlands provide habitat for macroinvertebrates, wildlife, habitat for floral species, supports special-status species (wood turtle and Short's sedge, as described in the Special-Status Species section of the Environmental Assessment) and allows for groundwater recharge.

Once rewatered, the open water wetland of the canal would provide more habitat for macroinvertebrate and other aquatic species, including the potential for some SAV, but would provide less groundwater recharge and no emergent vegetation species. Therefore, measurable changes to the abundance and diversity of wetland vegetation would occur. These areas would continue to function as open-water wetlands, but there would be a reduction in the abundance and diversity of wetland vegetation, which could directly affect use of the area by wildlife and special-status species. The conversion of the wetland in the canal prism from vegetated to open water would require a joint USACE/MDE permit for the alteration of any floodplain, waterway, tidal or nontidal Wetland Impacts as a result of the rewatering the canal would have adverse impacts to wetlands E and G. However, numerous mitigation measures would be employed, including a wetland restoration within the park that is discussed in more detail in Section 9.

Although the restoration of the Tonoloway aqueduct crosses the Tonoloway Creek, the canal is dry and dominated by mowed/maintained grass and therefore not mapped as a wetland area and would not impact wetlands. In addition to restoring the aqueduct, wetland impacts (less than 0.10 acre) to wetland A along the Potomac River would result from restoring bypass flume and waste weirs, installing water intake and outfall structures (as described below), installing boat ramp at Bowles property, and improving the Little Tonoloway boat ramp.

Alternative 2 includes updating the town's existing water intake and pump facility near Mile 124.4. Updating the intake on the Potomac River may require amending the existing water supply and use permit from the state of Maryland. Additional waterway construction permits for disturbance in the Potomac River (which is a water of the United States) may also be needed. The pipe for the intake would be located along the narrow Potomac River shoreline wetland (wetland A), which is subject to NPS procedures for implementing DO # 77-1 (NPS 2011c). There is also SAV in the river in this area, with three commonly found SAV species: wild celery (*Apium graveolens*), hydrilla (*Hydrilla* spp.), and water stargrass (*Heteranthera dubia*). Impacts to the SAV and shoreline wetland would depend on construction methods, where the intake pipe is placed and how deep it is placed.

The design plans for the intake structure are not yet available so the exact acreage of impacts on wetland A cannot be calculated at this time. This activity would impact wetlands due to excavation in wetland A

that would occur as a result of this project component. These impacts cannot be completely discounted since excavation would occur, but it is sufficient to say that a total of less than 0.10 acres of wetland A would be impacted as a result of the updated intake structure. The updtaed intake structure would be permanent and may require some excavation activities prior to construction that may only be partially located within wetland areas. The updated intake structure is located in a small, discrete location along the Potomac River. Wetland A would continue to function as a shoreline wetland with buffering abilities and the Potomac River would continue to provide hydrological support to wetland A. The pipe for the updated intake located along the Potomac shoreline wetland (wetland A) may require some pipe footers that would be necessary for support within wetland areas.

Mitigation measures would be employed during construction when appropriate to minimize impacts on wetlands and are provided in more detail in Appendix C. Additional mitigation for the pipe and intake structure would also include a silt curtain, which would be placed in the river to prevent impacts on the aquatic environment from silt and sediment that might be stirred up during construction. Guidelines for waterway construction published by the MDE (*Maryland's Waterway Construction Guidelines,* MDE 2000) would also be followed. The park would keep the limits of the area disturbed by the intake to as minimal as possible. Installation of silt curtains immediately downstream of the project area would minimize offsite sedimentation impacts on downstream SAV. SAV is expected to reestablish naturally in all areas except where the permanent pipe structure and filter is placed.

Overall, approximately 3.05 acres (+ less than 0.10 acres) of wetlands would be impacted as a result of all components of alternative 2. When considering the proposed mitigation measures, including the wetland restoration site, alternative 2 would result in overall adverse impacts. Although mitigation measures would be employed, the permanent conversion of wetlands in the canal from palustrine to open water, would result in a change to vegetation and hydrology, which affects the function and value of wetlands. This would cause a change in the resource, including the numerous trees of varying ages within the forested wetland in the canal prism that would be removed and the loss of wetland habitat within the canal that provides habitat for special-status species. However, the canal would remain characterized as a wetland and the wetland restoration site would create an additional wetland area within the park.

8.4 ALTERNATIVE 3

Impacts to wetlands under alternative 3 would occur from installing a new water intake. Installing a new intake to the Potomac River may require amending the existing water supply and use permit from the state of Maryland. Additional waterway construction permits for disturbance in the Potomac River (which is a water of the United States) may also be needed. The pipe for the new intake would be located along the narrow Potomac River shoreline wetland (wetland A), which is subject to NPS procedures for implementing DO # 77-1 (NPS 2011c). SAV including wild celery, hydrilla, and water stargrass are also found in the area. Impacts to the SAV and shoreline wetland would depend on construction methods, where the intake pipe is placed and how deep it is placed.

The design plans for the intake structure are not yet available so the exact acreage of impacts on wetland A cannot be calculated at this time. This activity would have an impact (less than 0.10 acres) on wetland A as a result of excavation. Wetland A would continue to function as a shoreline wetland with buffering abilities and the Potomac River would continue to provide hydrological support to wetland A. The pipe for the new intake located along the Potomac shoreline wetland (wetland A) may require some pipe footers that would be necessary for support within wetland areas. Under alternative 3, there are no impacts on wetlands B, C, D, E, G, H, J, or L.

Mitigation measures and BMPs as described in Appendix 2 of DO #77-1 would be employed during construction when appropriate to minimize impacts on wetlands. These BMPs would be similar to those described above for alternative 2.

Overall, the wetland impacts as a result of all components of alternative 3 (less than 0.10 acres) would result in a long-term negligible adverse impact. It is possible that a Joint Federal/State Application for the Alteration of any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland may be required as well as applicable permits obtained from the MDE and the USACE prior to initiating any construction activities. All regulated activities within waters of the U.S. and waters of the State, including the 100-year floodplain and jurisdictional wetlands, would be conducted in accordance with permit conditions and *Maryland's Waterway Construction Guidelines* (MDE 2000).

8.5 ALTERNATIVE 4

Project components associated with alternative 4 would have no impact to wetland A through L, as noted in table 4.

9.0 MITIGATION MEASURES

Implementation of the preferred alternative would involve impacting wetland areas. During the construction activities for the preferred alternative, BMPs would be employed to minimize impacts to hydrology, water quality, threatened and endangered species, and cultural resources as described in detail in Chapter 5 of the Environmental Assessment to comply with both *PM #77-1: Wetland Protection* and *PM #77-2: Floodplain Management*. If necessary, a sediment and erosion control plan would be prepared prior to construction and submitted to appropriate local and state agencies. Whenever possible, construction activities, including heavy equipment use and stockpiling of materials, would be conducted outside of wetland areas.

For the purposes of implementing EO 11990, the NPS has determined that any area classified as wetland habitat according to the USFWS *Classification of Wetlands and Deepwater Habitats of the United States* is subject to *DO #77-1: Wetland Protection* and the implementation procedures outlined in the *PM #77-1: Wetland Protection*. DO #77-1 states that for new actions where impacts to wetlands cannot be avoided, proposals must include plans for compensatory mitigation that restores wetlands on NPS lands at a minimum acreage ratio of 1 to 1. For this project, the estimated impact to wetlands is estimated at 3.15 acres. The wetland impacts discussed in this section represent the most current approximations at this time; however, this impact and compensation acreage may increase or decrease after final design. Whenever possible, every effort is made to assure that the same wetland restoration proposal meets the compensation requirements of both the NPS and the USACE processes to avoid any duplication of effort. Additional mitigation measures, such as silt fencing and construction methods for waterways would be used, and the location and extent of any additional mitigation would be determined when permitting is completed.

Potential wetland mitigation sites have been located within the vicinity of the project, within C&O Canal NHP, and also in the nearby adjacent areas of the Potomac River. In April 2012, NPS staff visited various degraded wetland areas on park property to determine wetland restoration potential. Five disturbed areas were identified, that when restored could serve as compensation for wetlands that would be impacted as a result of the proposed project (NPS 2012b). The Canal Farm Ditch wetland was chosen for proposed wetland mitigation and restoration.

The Canal Farm Ditch wetland is an 11.42-acre site located at Mile 43 within the park (figure 5). This site contains a very old terrace in the floodplain of the Potomac River that has evolved into a broad depressional

area. European settlers cleared the fields on both sides of the low drainage area. In order to dry out and reduce the amount of groundwater holding capacity of the depressional area, landowners cut a ditch down the middle of the linear low area. There is no evidence that a stream or drainage channel existed before the landowner dug the ditch. Digging the ditch exposed the groundwater table and essentially created a conduit, or a path of least resistance, for the ground water to flow. The ditch is approximately 12 inches deep at one end and travels towards the Potomac River where it deepens to approximately six feet. An existing forested wetland is located above the start of the ditch. Draining the site allowed the landowner to narrow the width of the forested wetland area which in turn expanded the amount of arable land on either side of the drainage area. By dropping the groundwater elevation, the landowner also created dryer soils within the forested wetland. During the site visit, the area appeared to have a good potential source of hydrology due to the high water table at the site and evidence of bank full flows (NPS 2012b).

In May 2013 a wetland delineation was completed at the proposed restoration site by Dr. Peter J. Sharpe, a wetland scientist at NPS in the Natural Resources and Science Division in, Fredericksburg, VA. Tree species identified during the wetland delineation included boxelder, pin oak (*Quercus palustris)*, and green ash, with paw paw (*Asimina triloba*) in the shrub layer. Herbaceous species included moneywort, *Carex* species, and Virginia wildrye (*Elymus virginicus*). The following wetland hydrology indicators were observed at the sampling site within the wetland area: sediment deposits, drift deposits, water-stained leaves, and geomorphic position. However, no water was found within 20 inch depth, as the site appears to be under the influence of the adjacent ditch and therefore lacks groundwater indicators of hydrology, but has wetland features.

Restoration of the natural hydrologic condition of a wetland bisected by a drainage ditch will include filling the existing ditch and eliminating the ground water drain, thus bringing the water table back to a near surface elevation and reestablishing the wetland character. Short segments of the ditch would be left intact to provide linear ponds. The area would then be revegetated with native wetland plant species appropriate to the region. Not only would the restoration convert upland on either side of the ditch into wetland and convert marginal wetland into a more functional system, it would also reconnect two functional wetland areas that are currently separated by a strip of upland created by the ditch. Restoration efforts would have beneficial impacts to wetlands within the Canal Farm area. The preferred alternative would constitute an adverse impact to 3.15 acres of wetlands. It is estimated that 4.6 acres of wetlands would be restored at the Canal Farm ditch wetland mitigation site, thus wetland compensation for this project would occur at a greater than 1:1 ratio.

The loss of forested wetlands within the canal prism in Hancock would create a loss of a variety of wetland functions, including shrub and tree canopy structure for wildlife habitat, water quality function, and aquatic wildlife habitat function. The restoration of the Canal Farm site could provide functions that would be similar to those lost at the canal prism impact sites. Therefore, the Canal Farm ditch compensation effort would be considered in-kind with the wetland functions being lost at the impact site. NPS would be required to obtain a joint USACE/MDE Permit for the alteration of any floodplain, waterway, tidal or nontidal wetland. *PM #77-1: Wetland Protection* states that compensating for the loss of forested wetlands using restored forested wetlands is appropriate but may require more than one acre of restoration for one acre of impact (NPS 2012a). The USACE or MDE may also require more compensation per acre of impact to satisfy their regulatory and permitting needs. The exact ratio would be determined by the regulatory agency (USACE, or MDE) and based on the results of a function and value assessment applied to the impact and compensation site.

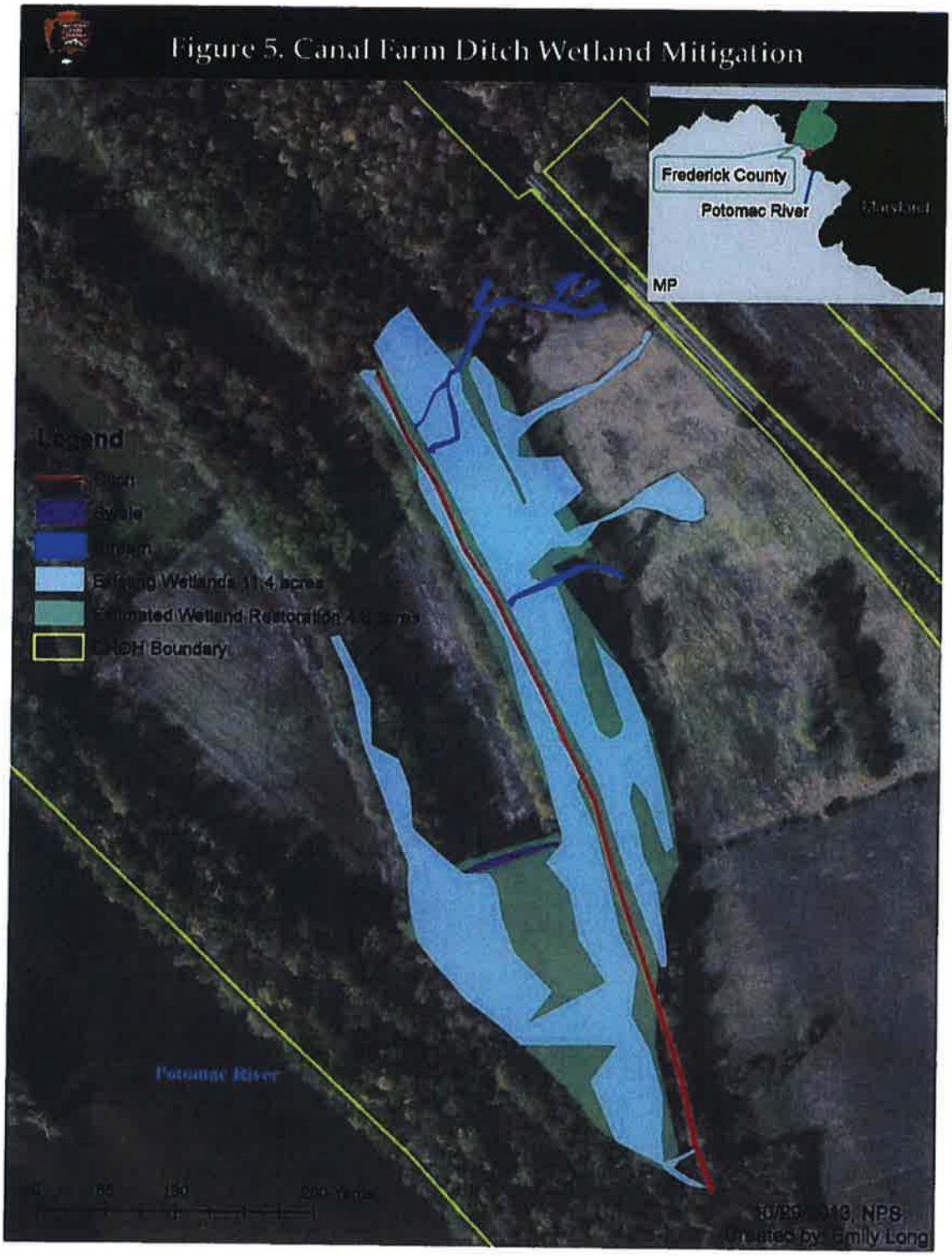


Figure 5. Canal Farm Ditch Wetland Mitigation
Frederick County
Potomac River
Maryland
MP
Legend
Ditch
Swale
Stream
Existing Wetlands 11.4 acres
Estimated Wetland Restoration 4.6 acres
C&O NHP Boundary
Potomac River
0 85 170 340 Meters
10/29/2013, NPS
Created by: Emily Long

10.0 SUMMARY

The purpose of this project is to expand visitor opportunities for learning about the C&O Canal NHP and canal operations in the late 1800s. Physical improvements to the canal's historic structures and development of more extensive interpretive/educational opportunities would help the visitor more fully understand, appreciate, and enjoy the canal and its heritage. The project addresses the potential for development and rehabilitation of several structures in and around the park's property, including the Bowles Property, Locks 51 and 52, the canal prism from Mile 122.12 to Mile 124.59, the Tonoloway Aqueduct, and the parking area at Little Tonoloway Picnic Area. The project would restore, rehabilitate, and allow historic structures and cultural resources to be interpreted and enjoyed by visitors. This project would result in beneficial impacts to floodplains, socioeconomics, transportation, visitor use and experience. Adverse impacts would occur to vegetation, wetlands, and special-status species.

Approximately 3.15 acres of wetlands would be impacted as a result of all components of the preferred alternative. It is estimated that 4.6 acres of wetlands would be restored at the Canal Farm ditch wetland mitigation site, thus wetland compensation for this project would occur at a greater than 1:1 ratio.

As stated previously, the footprint of the preferred alternative as discussed in this document and the Environmental Assessment are approximate and may change during the more detailed design phase of this project. The wetland impacts discussed in this document represent the most current approximations at this time. The mitigation proposed in exchange for the wetland impacts would assure no net loss of wetlands and a greater than 1:1 compensation ratio. When considering the proposed mitigation measures, including the wetland restoration site, the preferred alternative would result in adverse impacts. Although mitigation measures would be employed, the permanent conversion of wetlands in the canal from palustrine to open water, would result in a change to vegetation and hydrology, which affects the function and value of wetlands. This would cause a change in the resource, including the numerous trees of varying ages within the forested wetland in the canal prism that would be removed and the loss of wetland habitat within the canal that provides habitat for special-status species. However, the canal would remain characterized as a wetland and the wetland restoration site would create an additional wetland area within the park at a greater than 1:1 wetland compensation ratio. The schedule for project completion, the funding sources, and other details relating to wetlands compensation will be determined at a later stage and in consultation with the NPS and appropriate resource agencies. The exact compensation ratio would be determined by the appropriate regulatory agency (USACE or MDE). The NPS therefore finds that the preferred alternative, as stipulated, is consistent with EO 11990 and the policies and procedures found in DO #77-1 and PM #77-1.

11.0 REFERENCES

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