US Army Corps of Engineers
Pittsburgh District

DRAFT

PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

Regional Emergency Streambank Protection Program

Pursuant To

Section 14 of the 1946 Flood Control Act, As Amended

September 2016

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I. BACKGROUND AND PROJECT DESCRIPTION

A. INTRODUCTION

Section 14 of the Flood Control Act of 1946 authorizes the U.S Army Corps of Engineers (USACE) to design and execute emergency streambank erosion protection projects in conjunction with a local sponsor through a cost-sharing agreement. The Pittsburgh District prepared this Programmatic Environmental Assessment (PEA) to satisfy National Environmental Policy Act (NEPA) compliance associated with the implementation of its regional emergency streambank erosion protection program (Program). Programmatic NEPA documentation was warranted because the District performs streambank restoration on a regular basis and may perform more than one project simultaneously. This PEA was prepared consistent with 40 CFR 1500.4, 1502.20, and 1508.28. Agencies may prepare programmatic NEPA documentation for such reasons including, but not limited to reducing repetitive analysis of a category of similar issues or actions or focusing on the actual issues ripe for discussion at each action level. Because it is broad in scope, this PEA may not treat in sufficient detail all environmental issues encompassed by the program for every specific project. If the specific project meets the standard Section 14 project criteria discussed in section 1G, a project-specific FONSI to tier off this PEA will be prepared, documenting that there are no significant impacts. If the specific project doesn't meet the standard Section 14 project criteria discussed in section 1G, additional project specific NEPA documentation, likely an EA/FONSI, will be prepared to address those environmental conditions(e.g., project characteristics exceed those detailed in this PEA). In such cases, the project-specific EA will tier off this PEA and concentrate only on the issues specific to the project that exceed the section 1G criteria. Project-specific coordination with environmental and cultural resource agencies (to include federally recognized tribes with an affinity to the region) on site-specific conditions will also be accomplished as necessary. This PEA assists USACE in project planning by evaluating the purpose and need of the project, as well as any potential environmental impacts and their significance. As defined by the Council on Environmental Quality (CEQ), the significance of a federal action is determined by the context of the action in relation to the overall project setting, as well as the intensity of direct, indirect, and cumulative effects resulting from the action. If the USACE determines that the selected alternative would not result in a significant impact, a Finding of No Significant Impact (FONSI) would be prepared approving the selected alternative. If the action is found to result in significant impacts, a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) would be prepared.

B. BACKGROUND

This PEA was developed in accordance with 40 CFR 1502-1508 and 33 CFR 230, the CEQ and USACE regulations implementing NEPA. It replaces an earlier version dated August 2006. In order to implement the Section 14 Regional Emergency Streambank Protection Program (Program), the District has prepared this PEA and Public Notice to support the Program. This document will be reviewed to determine the need for supplementation in accordance with 40 CRF 1502.9 every five years unless factors, legal or otherwise necessitate supplementation at an earlier date. The five-year review will be documented and available upon request.

NEPA documents for future section 14 projects under this PEA will be tiered off this PEA, as described in 40 CFR 1502.20 and 1502.28. As discussed above, if the project meets the criteria set forth in section 1.G., a project-specific FONSI will be prepared, tiering off this PEA and documenting that there are no significant impacts. If the specific project doesn't meet the standard Section 14 project criteria discussed in section 1G, additional project specific NEPA documentation (EA or EIS) will be prepared to address those environmental conditions. Tiering is a staged approach to NEPA that addresses broad programs in initial or systems-level analysis, and analyzes site-specific proposals and impacts in subsequent tiered studies. The use of tiering enables USACE to avoid repetitive discussions and focus only on project specific environmental issues and address those environmental issues that don't meet the section 14 criteria.

The scope of this PEA is to evaluate the Section 14 projects that meet the general project description in Section 1.G. Section 14 project that don't meet these criteria will require site-specific environmental analysis. These projects however, will may still be tiered off this PEA to avoid duplicative discussions, as applicable.

Section I.G. of this PEA describes the criteria that generally apply to work performed under the Section 14 Program, Section II describes the alternatives considered, Section III describes the present environment setting for the Proposed Action, Section IV presents environmental impacts analysis, and Section V outlines coordination.

C. PROJECT AUTHORITY

Section 14 of the Flood Control Act of 1946, as amended, authorizes the USACE to study, design and construct bank protection works in the interest of protecting public facilities (e.g. churches, roads, bridges, known cultural sites, public construction utilities, etc.). Erosion caused by the design or operation of the facility itself, by inadequate drainage, or due to lack of reasonable maintenance, is not eligible. In addition, repair of the facility itself is excluded.

D. PURPOSE AND NEED

The federal action is implementation of the Section 14 Program. Section 14 work corrects bank and shore erosion that endangers a public or nonprofit facility, including highways, bridge approaches, other public works, churches, hospitals, schools, and other nonprofit public services. Bank protection typically is provided by the placement of riprap, quarry-run stone, gabions, retaining walls, bioengineering techniques, or rigid linings such as concrete or grout bags.

The purpose of this federal action is to designate classes of projects typically designed and constructed under the District's streambank protection program. Figure 1 provides a map of the Pittsburgh District boundary by watershed.

The need for the Program is to allow more effective use of limited Section 14 resources and timelier implementation of stabilization projects to protect endangered public or non-profit facilities. When these types of facilities are constructed along streams, they are typically threatened with erosion and/or undercutting of the adjacent streambanks. This stream movement is generally caused by changing land use conditions in the contributing watershed. Based on historical needs in the Pittsburgh District, it is anticipated that up to five investigations will be conducted annually and that two or three of these will result in a constructed project. Each project is limited in scope by statute (maximum of $5 million Federal allocation for any project; WRRDA 2014). By completing the PEA of the proposed program, the need to perform an estimated 30 site-specific EAs (over a 10-year period) will be eliminated, saving those resources for project implementation while enabling the Pittsburgh District to more quickly address emergency streambank problems.

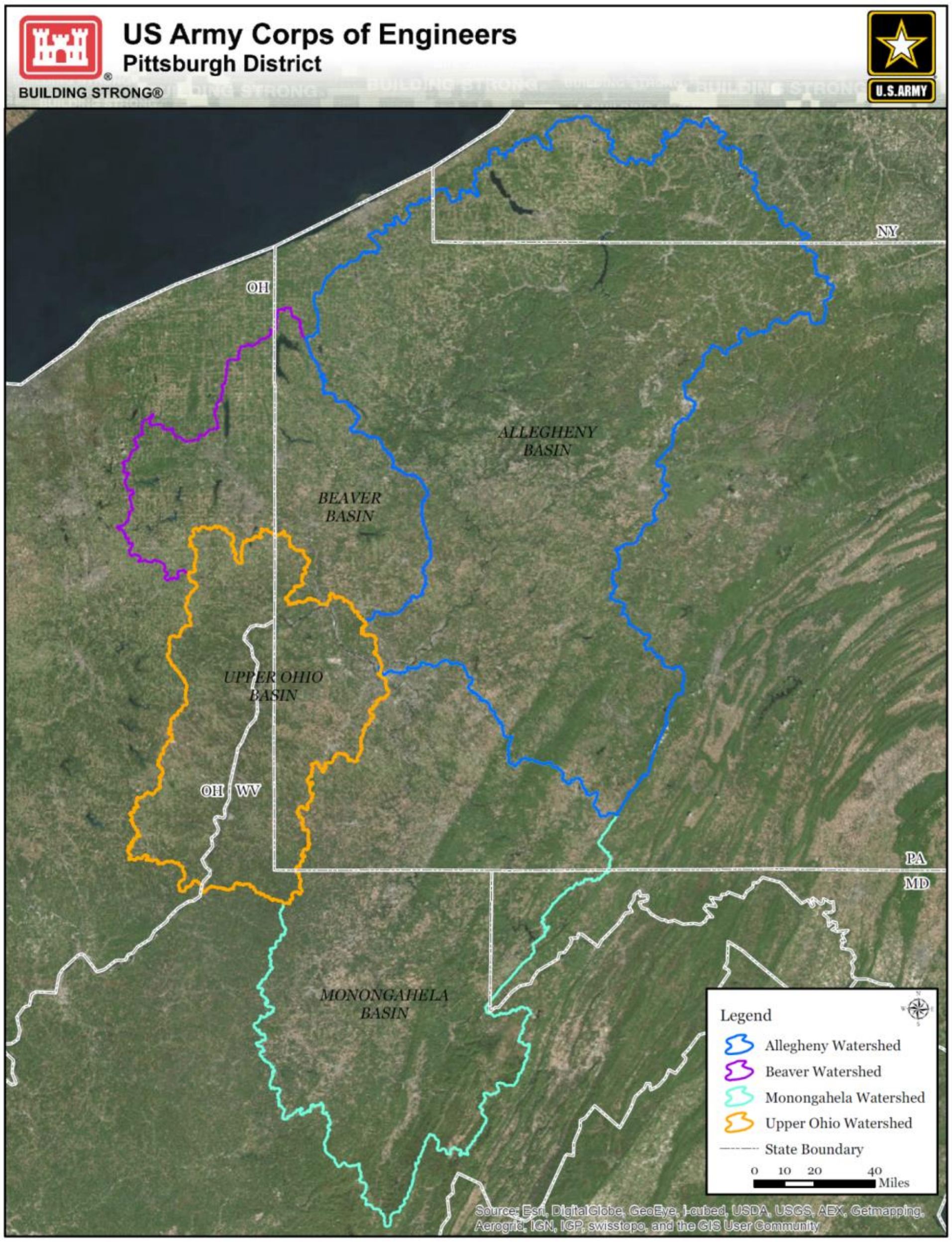

Figure 1. Pittsburgh District Boundary by Watershed

E. PREVIOUS NEPA DOCUMENTS

The Pittsburgh District has executed two previous PEAs for the Section 14 Program. In 2000 the original PEA was circulated for public review and comment, and coordinated with numerous Federal and State offices in five states in which the Pittsburgh District lies (portions of New York, West Virginia, Pennsylvania, Ohio, and Maryland). Responses to the original Public Notice and PEA issued in 2000 did not raise any objections or significant issues providing the general project conditions were implemented. The District re-issued the PEA in 2006 for a 10-year period. A Finding of No Significant Impact (FONSI) was signed 14 September 2006.

F. PROJECT CONSTRUCTION METHODOLOGIES

Typical engineering practice applies a variety of structural and non-structural techniques to protect streambanks from damage caused by erosive water forces and velocities. These techniques either seek to place materials resistant to these forces in susceptible regions or create and restore natural storage and meander mechanisms to reduce these forces and velocities within the channel area. Use of these techniques occurs either as a proactive procedure or to repair and rehabilitate already damaged or eroded streambank sections.

The following techniques represent the class of engineering practices covered by this PEA, and include: application of rock riprap, quarry-run stone riprap, gabion baskets, gabion mattresses, retaining walls, bioengineering, and rigid linings. The materials placed in the stream channel are subject to federal regulations as discharges. Individual project conditions and needs will determine which technique or combination of methods would be used. Environmental impacts may vary for each technique but are not expected to be more than minimal.

1. Rock Riprap

Rock riprap forms a protective barrier between high-velocity flows and the streambed or streambank material. Riprap is typically placed in locations along a stream where streambank or streambed erosion is anticipated or observed. Riprap has a higher shear-resistance than the streambank or streambed and is sized to be stable during the maximum anticipated stream velocity.

Determining riprap size, thickness, and slope requires consideration of anticipated river discharges, streambank geometry, and associated water surface elevations within the channel. Correct specification of these factors, combined with proper placement, provides adequate streambank protection.

Design Discussion

Typical riprap design practice specifies categories such as rock size or weight as a means to express required rock qualities, quantities and type of application[1]. Specifications for riprap size require computation of the desired mean rock size *(D_{50})*, maximum rock size *(D_{100} or D_{max})*, and sometimes

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[1] Typically, each state in the Pittsburgh District has a slightly different specification or description of riprap characteristics. ASTM describes riprap using weight, size, and gradation. Federal Highway Administration (FHWA) uses class ranges referred to as ***Facing, Light, ¼—Ton, ½-Ton,.*** *1-Ton,* and ***2-Ton*** (FHWA Hydraulic Engineering Circular 11, 1989).

the 10-percent size *(D_{10}).* As an alternative to size, specifications can refer to the weight of the D_{50} and D_{100}. For example, a riprap classification may specify an average weight (W_{50}) of 75 pounds and a maximum size weight (W_{100}) of 200 pounds. Highway crossing situations may require application of *2-Ton* Riprap size and weight specification that would consist of a D_{50} of 3.60 feet (W_{50} equal to 4000 pounds) and D_{100} of 4.50 feet (W_{100} equals 8000 pounds). Conversions between size and weight specifications typically are a function of the specific weight and geometry of the material. Specification of well-graded riprap rock, from smallest to largest, ensures better applicability to a project.

Riprap shape also is a design consideration. Shape specifications include rounded, angular, or crushed rock. Angular rock typically provides greater stability than smooth or rounded rock as they better provide mutual support between individual stones. Properly graded crushed rock provides stability similar to that of angular rock.

Oversize stone, even in isolated areas, may cause riprap failure by providing excessive voids, or failing to provide interlocking support. Riprap layer thickness should not be less than 1½ times the D_{50} stone size. Typical riprap layer thickness ranges from a minimum of 18 inches to a maximum of 38 inches on bank slopes. A greater riprap thickness at the toe and in the channel resists higher shearing forces present at these locations. In regions of potential ice and debris, both riprap rock size and thickness may be increased to promote additional stability.

The maximum slope of riprap layers is dependent on the size and shape of the riprap used. A maximum slope of 2:1 (horizontal to vertical) is used for most bank stabilization projects. If bank geometry does not permit a slope of less than 2:1, other protection measures such as a retaining wall or rigid lining would be more feasible. Excessive slopes can result in translational slide failure of the riprap section. The vertical extent of the riprap will depend upon stability, potential wave run-up, water superelevation, and freeboard considerations.

Typical practice places riprap along the banks and within a transition into the toe and stream bottom to maximize the protected extent. Extent of protection should also consider the longitudinal transitions upstream and downstream of the area of vulnerability. These transition distances typically extend 1-channel width upstream and 1½-channel widths downstream.

Riprap may be trucked or barged to the site and placed with a clamshell, crane, or dragline, then dressed with a backhoe, grade-all, or hand labor. Simply dumping riprap down the streambank slope causes segregation of rock by size and weight, reducing effectiveness. Riprap stone placement normally requires only minimal bank preparation. This preparation consists of excavating bank overhangs, smoothing out eroded areas, and removing brush, scrub, and trees located in the bank between the water and the vertical limit of stone placement at the top of the bank. Removal of trees is avoided whenever possible. Depending on site conditions, excavation may also require removal of unsuitable fill material and excavation at the toe of a steep bank to key in the stone protection. Minimal and short-term in-water work is required when excavating the toe of the streambank for placement of riprap. This in-water work is typically completed from the bank and does not require equipment to enter into the river.

Using riprap usually requires placement of a geotextile filter that conforms to the original (or newly excavated) stream section. Where bank degradation has occurred, the desired channel section shape may be built up by using a granular fill. The granular fill consists of sand, sandy soil, gravel or screenings composed of hard durable particles reasonably free of injurious amounts of soft or flaky particles, dust, lumps, or organic or other deleterious substances. A bedding layer of granular material may be required to prevent riprap stone from rupturing the geotextile.

As a final placement measure, riprap can be keyed or plated to produce a more regular surface. Keying or plating consists of placing a large plate of steel on the riprap face and placing this plate under compression. The compression of the face fractures some of the stone, filling voids in the overall blanket. Figure A.1 shows typical design features and details of rock riprap.

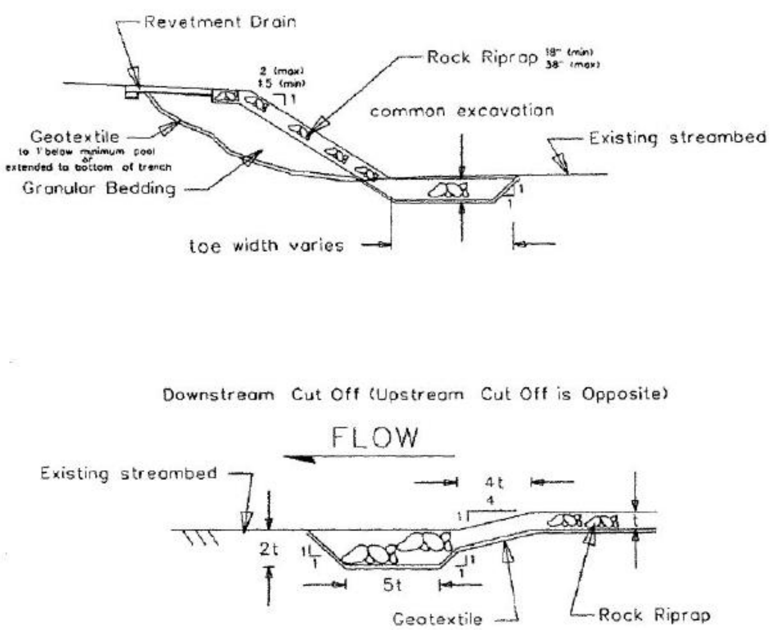

Figure A.1. 2 Typical riprap protection details (Programmatic Environmental Assessment for the Regional Emergency Streambank Protection Program, 2006)

Figure A.1. 1 Example of riprap bank protection (Nanty-Glo Non-Federal Local Flood Protection Project, 2015)

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Figure A.1 – Riprap streambank protection
Not to Scale
Emergency Streambank Protection Programmatic EA

2. Quarry-run Stone Riprap

Quarry-run stone riprap provides another material category available to produce riprap-style streambank stabilization structures. Determining riprap size, thickness, and slope requires consideration of anticipated design discharges and associated water surface elevations within the channel. Correct specification of these factors, combined with proper placement provides adequate streambank protection.

Design Discussion

The primary difference between rock riprap and quarry-run stone riprap is the more complete gradation of the quarry stone. The quarry-run material typically represents a higher proportion of crushed rock. This allows a higher angle of repose (slope) over a wider range of D_{50} values. The more complete gradation within quarry-run stone riprap reduces need for the quantities of granular bedding used between the geotextile and riprap blanket. Figure A.2 shows typical design features and details of quarry-run stone riprap.

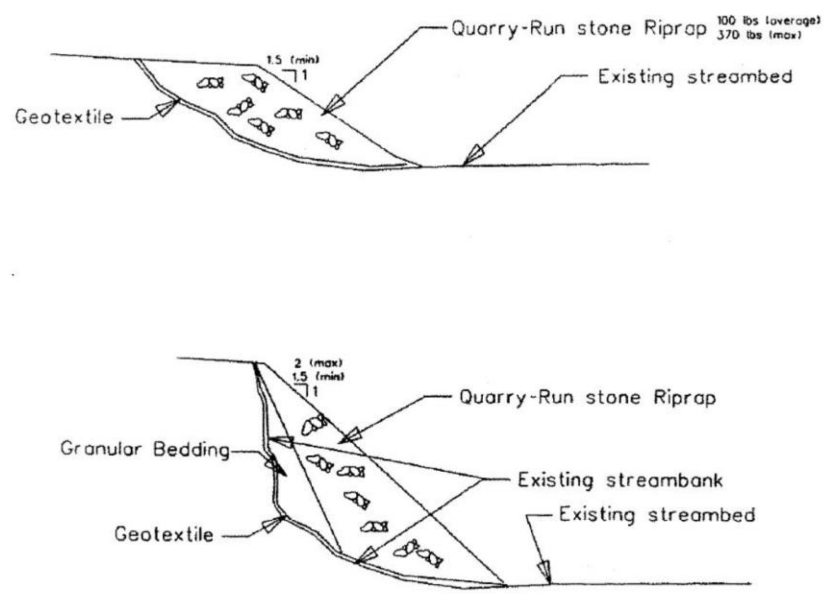

Figure A.2. 1 Quarry Run Stone Riprap (Programmatic Environmental Assessment for the Regional Emergency Streambank Protection Program, 2006)

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Pittsburgh District

Figure A.2 – Quarry Run Stone Riprap streambank protection
Not to Scale
Emergency Streambank Protection Programmatic EA

3. Gabion Baskets

Gabion baskets are stone-filled, compartmentalized, rectangular “baskets” made of galvanized mesh wire, stacked and tied together along the streambank. Wire or “staples” mechanically tie each individual gabion basket with adjoining neighbors. Gabion structures are more expensive than riprap but may require a smaller shelf for a base and could be placed at higher slopes than a typical riprap section. Determining gabion (and interior stone) size requires consideration of anticipated design discharges, potential scour depths, and associated water surface elevations within the channel.

Design Discussion

Specifications for stone size require computation of desired mean and maximum rock size *(D_{50} and D_{100})*. Typically, these D_{50}’s range from a 4- to 8-inch diameter stone. The gabion baskets may be filled either by hand or mechanically with a clamshell, backhoe, or dragline. Commercially available gabion basket sizes start at a 3-foot high, 3-foot deep and 3½-foot wide unit.

Gabions require minimal bank preparation (similar to that required for riprap and quarry-run stone). However, a gabion structure is often keyed-in at the toe of the bank. The depth of excavation should consider the potential scour depth at this location. For example, this might involve excavating a 3-foot trench along the length of the bank to be protected.

A gabion structure usually requires a filter material or geotextile placed along the original bank. As in riprap, granular bedding is added between the geotextile and the gabions. After placing the gabions, the excavated streambed material is replaced to backfill the trench.

Gabion baskets are normally built in one of two configurations. If the bank to be protected is moderately sloped, the gabions are placed directly on the bank (covering the filter fabric and granular backfill material). However, for steeply sloped banks (e.g., 2:1 or greater), the gabions would be stepped back against a crushed stone or sand and gravel backfill. In this second case, the bottom layer of gabions is placed several feet from the bank with each additional level of gabions stepped back toward the bank. In either case, the height of the stacked gabions should not exceed 20 feet. Structural and hydraulic analyses should determine the internal and external stability of the resulting gabion structure. Figure A.3 shows typical design features and details of gabion baskets.

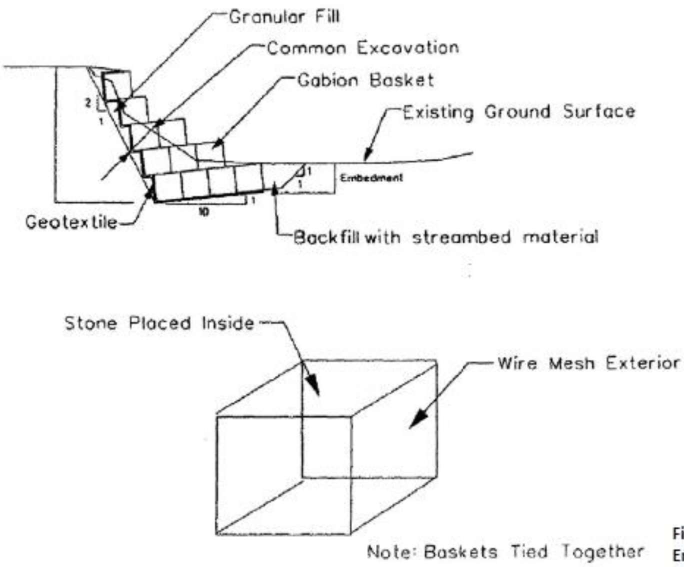

Figure A.3. 1 Gabion Baskets (Programmatic Environmental Assessment for the Regional Emergency Streambank Protection Program, 2006)

Figure A.3. 2 Photo of a completed gabion wall (http://estruct.com.au/retaining-walls/gabions-and-rock-mattresses/, 2015)

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Pittsburgh District

Figure A.3 – Gabion Basket streambank protection
Not to Scale
Emergency Streambank Protection Programmatic EA

4. Gabion Mattresses

As opposed to the more "box-like" gabion baskets, gabion mattresses are thinner and wider in shape. Gabion mattresses consist of stone-filled, compartmentalized, rectangular sections made of heavily galvanized mesh wire, tied together along the streambank. Gabion mattress structures are more expensive than riprap for most hydraulic conditions. Determining gabion (and interior stone) size requires consideration of anticipated design discharges and associated water surface elevations within the channel,

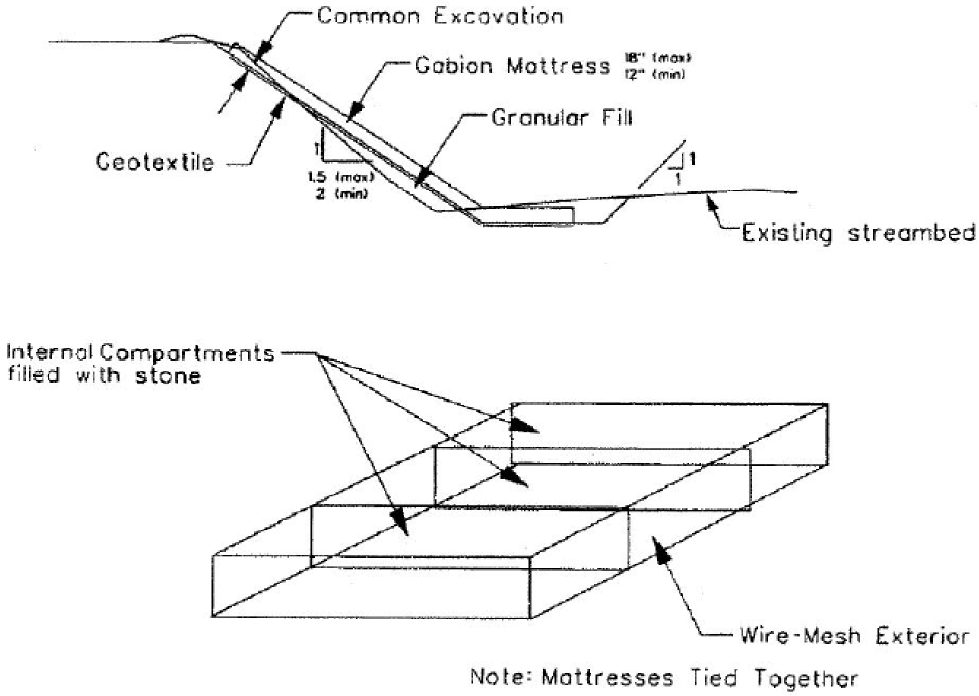
Design Discussion

Specifications for stone size require computation of desired mean and maximum rock size *(D_{50} and D_{100}).* Typically, these D_{50}'s range from 4- to 8-inch diameter stones. The gabion mattresses may be filled either by hand or mechanically with a clamshell, backhoe, or dragline. Alternatively, mattresses may he placed using cranes or pontoons.

Gabion mattresses typically come in 6- by 8-foot sections, with thickness or depth ranging from 12 to 18 inches. The mattresses use internal compartments or diaphragms that assist in containing the stone. The rock material should not exceed the mattress thickness. Hydraulic analyses generally determine the thickness of the mattress. Where use of liners or geotextiles are not specified, thickness is also a function of the type of soil underlying the mattress – less cohesive soils requiring thicker mattresses. Applicability of gabion baskets versus mattresses depends on several design factors with bank slope a primary consideration.

Gabions mattresses require minimal bank preparation (similar to that required for riprap and quarry-run stone). However, a gabion structure is often keyed-in at the toe of the bank. For a gabion mattress, this involves excavating a toe trench along the length of the bank to be protected. Generally, construction equipment would not need to enter the river to construct small gabion walls. Steep, tall, or gabion walls installed in locations with limited space may require equipment to enter the stream to construct the bank, key-in the toe, and install the gabion baskets. A gabion structure usually requires a filter material or geotextile placed along the original bank. As in riprap, granular bedding is added between the geotextile and the gabion mattresses.

Gabion mattresses are placed on the same geotextile and granular fill base materials as specified for gabion baskets. Appropriate bank slope ranges for gabion mattresses are 1:1½ to 1:2 values. The gabion mattress should continue from the bank, past the toe, and into the streambed to allow proper protection of these maximal shearing regions. Edge treatment, upstream and downstream of the stabilization area protects the installation from undermining and outflanking. This edge treatment typically is in the form of thicker mattress sections at the beginning and end of the protection area. Often, soil and plants are placed on these edge sections to promote stability. Figure A.4 shows typical design features and details of gabion mattresses.



A.4. 1 Gabion Mattress Detail (Programmatic Environmental Assessment for the Regional Emergency Streambank Protection Program, 2006)

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Pittsburgh District

Figure A.4 – Gabion mattress streambank protection
Not to Scale
Emergency Streambank Protection Programmatic EA

5. Retaining Walls

Several types of retaining walls are typically used for streambank stabilization. These types include pre-cast concrete panels, pre-cast concrete blocks, or cast-in-place concrete walls. Retaining walls present an erosion resistant face to the stream. Numerous (mostly commercial) sources provide a variety of panel, facing, and other structural configurations and elements for constructing these walls.

Design Discussion

Depending upon its design height, a retaining wall requires a base of relatively level ground. This level-ground is achieved by either excavating or encroaching into the channel or backwards toward the streambank. A concrete or granular leveling pad is required beneath the retaining wall to provide a level and structural surface. In some cases, existing bedrock material can provide adequate foundation strength for the retaining wall so grout, concrete, or granular material is used only for leveling purposes.

Pre-cast concrete block retaining wall: A precast concrete block wall is a standard retaining wall type that uses precast blocks, keyed so that adjacent blocks fit together. The blocks are stacked on top of each other, sometimes staggered, but may be in line with each other depending on the manufacturer and design. The interlocking modular design of the blocks allows these types of retaining walls to be placed at very steep, near vertical slopes typically around 1:8 (horizontal to vertical). Once the leveling pad is established, the precast concrete blocks can be placed. The blocks come in many different styles and sizes. For a particular block wall manufacturer, the blocks are 6 feet long, 3 feet wide, and 2 foot high, and are connected with a tongue-and-groove type system. A granular drainage layer wrapped with geotextile is usually laid along the slope side of the concrete blocks to reduce water surcharge on the wall. The slope remaining above the wall can be re-vegetated with grasses and shrubs to promote stability.

Cast-in-place concrete retaining wall: The cast-in-place concrete wall is formed and placed on-site. There are many geometric variations of this type of wall but typically these types of walls are either vertical or near vertical and may use rock anchors or tie backs for stability purposes depending on the overall height, soil characteristics, and surcharge. A granular drainage layer wrapped with geotextile will be installed for drainage. The slope above the wall would be re-vegetated with grasses and shrubs.

Post and panel retaining wall: A post and panel wall, also called a soldier pile wall, uses vertically-mounted W-shape soldier piles or H-piles inserted into a concrete-filled drilled shaft. A 4 to 6 inch concrete or granular leveling pad would be installed on top of the drilled shaft concrete to provide a level surface for the precast panels. Precast concrete panels are then inserted into the space between the pile supports to the full-height of the retaining wall. Depending on the height of the wall, soil characteristics, and surcharge, rock anchors or tie-backs may be installed for additional support against overturning. Gravel or a geocomposite drainage material would be installed between the pre-cast panels and the existing ground. The slope above the wall would be re-vegetated with grasses and shrubs.

The granular material is normally well-graded, freely draining material, such as crushed stone. The top layer normally consists of compacted material. If the base of the wall were to be in water, a small cofferdam, consisting of sandbags or some other approved method, would be used during construction so that the work could be completed in the dry.

Relative to other techniques, retaining walls are more expensive. Application of retaining walls becomes cost effective in eases of limited space, very steep streambank geometry, or should local, state, or other Federal programs or policies specify disturbed area conditions at the project site. Figure A.5 shows typical design features and details of retaining walls.

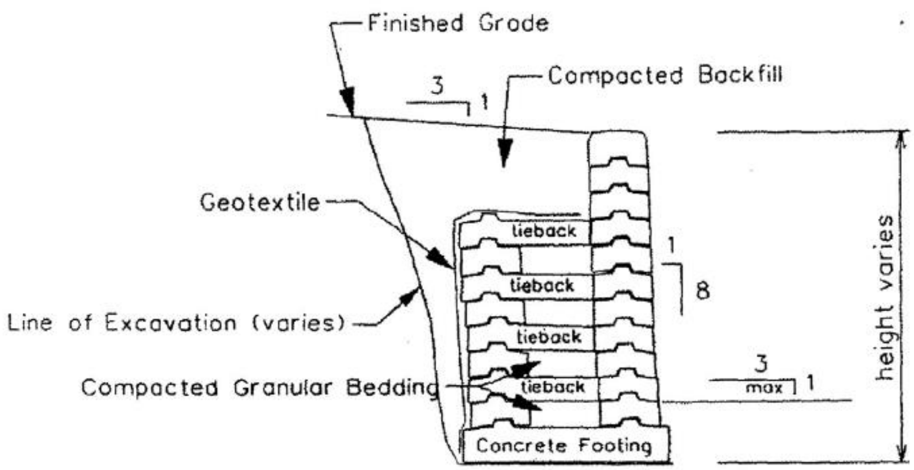

Figure A.5. 1 Block Retaining Wall (Programmatic Environmental Assessment for the Regional Emergency Streambank Protection Program, 2006)

Figure A.5. 2 Photo of a completed block retaining wall (RisiStone, 2010)

US Army Corps of Engineers Pittsburgh District	**Figure A.5 – Retaining Wall streambank protection** Not to Scale Emergency Streambank Protection Programmatic EA

6. Bioengineering

Bioengineering uses living plants, or plants in combination with dead or inorganic materials, to reduce destructive hydraulic effects on streambanks. The intent of bioengineering is to prevent these effects by more closely simulating natural channel characteristics.

The practice brings together biological, ecological, and engineering concepts to produce living, functioning systems to prevent erosion, to control sedimentation, and/or to provide habitat in difficult settings. Bioengineering applies “hard” or “soft” techniques to achieve these goals. The use of bioengineering is a relatively recent technique; effective design guidelines continue to be developed as new experience is gained with the techniques.

Bioengineering is often used in conjunction with natural stream channel design and stream restoration. Natural stream design incorporates stable stream parameters (dimension, pattern and profile) and stream deflection devices patterned after natural features. Streams with such stable stream parameters are able to transport sediment load and maintain their features thereby avoiding aggregation and degradation. By reconstructing channels so that they have proper width/depth ratios, depth, width, slope, and meander geometry, they can transport flow and sediment in an effective manner. Bioengineering is often applied to establish and maintain natural stream channel geometry.

Design Discussion

Some of the “harder” types of treatment used in bioengineering are: turf reinforcement mats, coir, blankets and mats, geogrids and geotextiles, articulated block systems, and cellular confinement systems. Turf reinforcement mats are synthetic mats that resist erosion and anchor root systems. Coir is a very strong yet biodegradable organic geotextile that confines and stabilizes soil until vegetation can establish. Blankets and mats are biodegradable slope coverings that promote the growth of vegetation using natural and/or synthetic materials. Geogrids are synthetic fabrics used for reinforcement, stabilization, and load spreading. Articulated block systems are concrete blocks linked by cables or other configurations that are flexible and can accommodate growth of herbaceous and woody vegetation. Cellular confinement systems are honeycomb structures that can be filled with concrete, aggregate or soil. They can also he planted with vegetation.

Some of the “softer” approaches are live stakes, wattles, brush layering, brush mattressing, live cribwalls, tree revetments, boulder placement, and a variety of combinations of plantings. Live stakes are live limbs or posts, which are driven into the ground to sprout and root. Wattles are sometimes called fascines. This technique uses bundles of live branch cuttings, which are bound together and anchored in trenches. The trenches are backfilled to provide good soil contact so sprouting and rooting can occur. Brush layering uses live branches placed in excavated terraces, covered with soil and compacted to form a series of reinforced benches. Brush mattressing involves placing a mattress-like layer of branches on the streambank. Live cribwalls combine a structural element of logs or timbers with live branch cuttings to form a reinforced wall. Tree revetments use dead trees and root balls to protect banks from scour and undercutting and to promote the deposition of sediment and subsequent revegetation of hydrophilic and native plants.

Figures A.6 through A. 10 show typical design features used in bioengineered approaches.

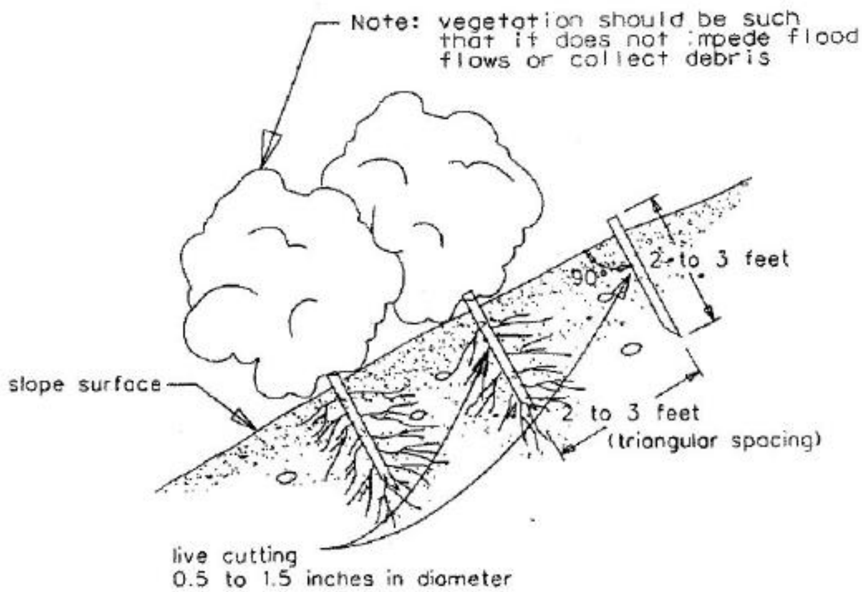

Figure A.6. 1 Live Cuttings (Programmatic Environmental Assessment for the Regional Emergency Streambank Protection Program, 2006)

Figure A.6. 2 Photo of live cutting and wattle placement (http://www.fs.fed.us/t-d/pubs/htmlpubs/htm06232815/page09.htm, 2015)

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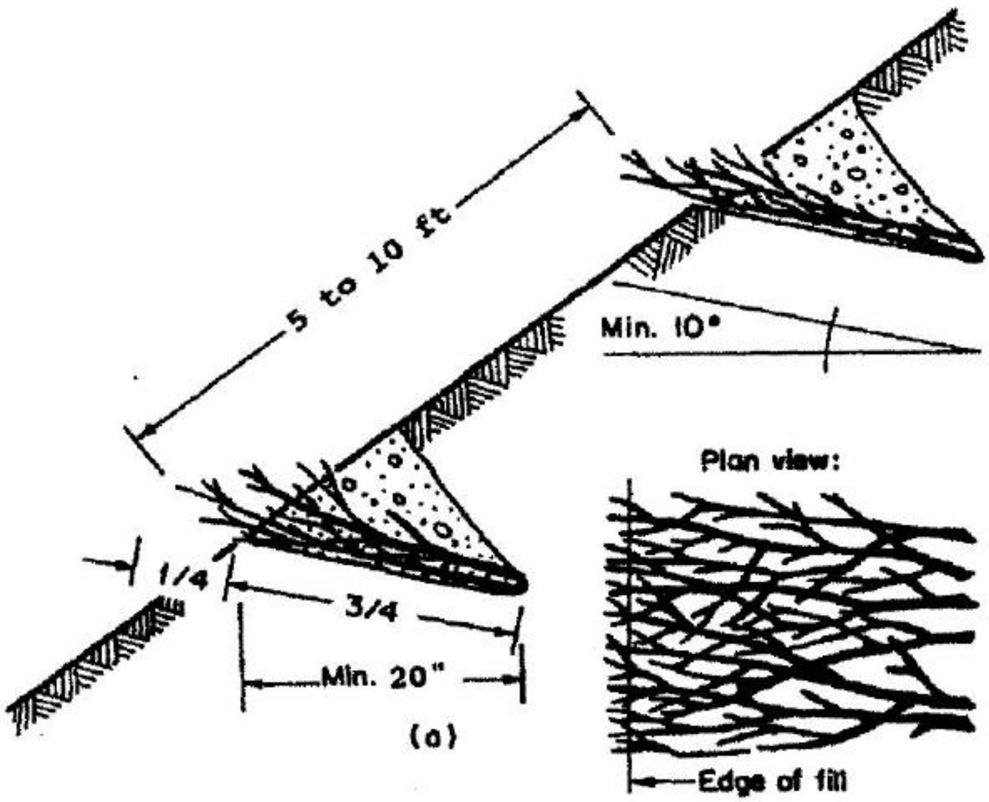
Pittsburgh District

Figure A.6 – Bioengineering Live Cuttings
Not to Scale
Emergency Streambank Protection Programmatic EA



Brushlayer installation guidelines

Slope	Slope distance between benches Wet slopes (ft)	Dry slopes (ft)	Maximum slope length (ft)
2:1 to 2.5:1	3	3	15
2.5:1 to 3:1	3	4	15
3.5:1 to 4:1	4	5	20

Figure A.7. 1 Brush layering installation (Programmatic Environmental Assessment for the Regional Emergency Streambank Protection Program, 2006)

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Figure A.7 – Bioengineering Brush Layer Installation
Not to Scale
Emergency Streambank Protection Programmatic EA

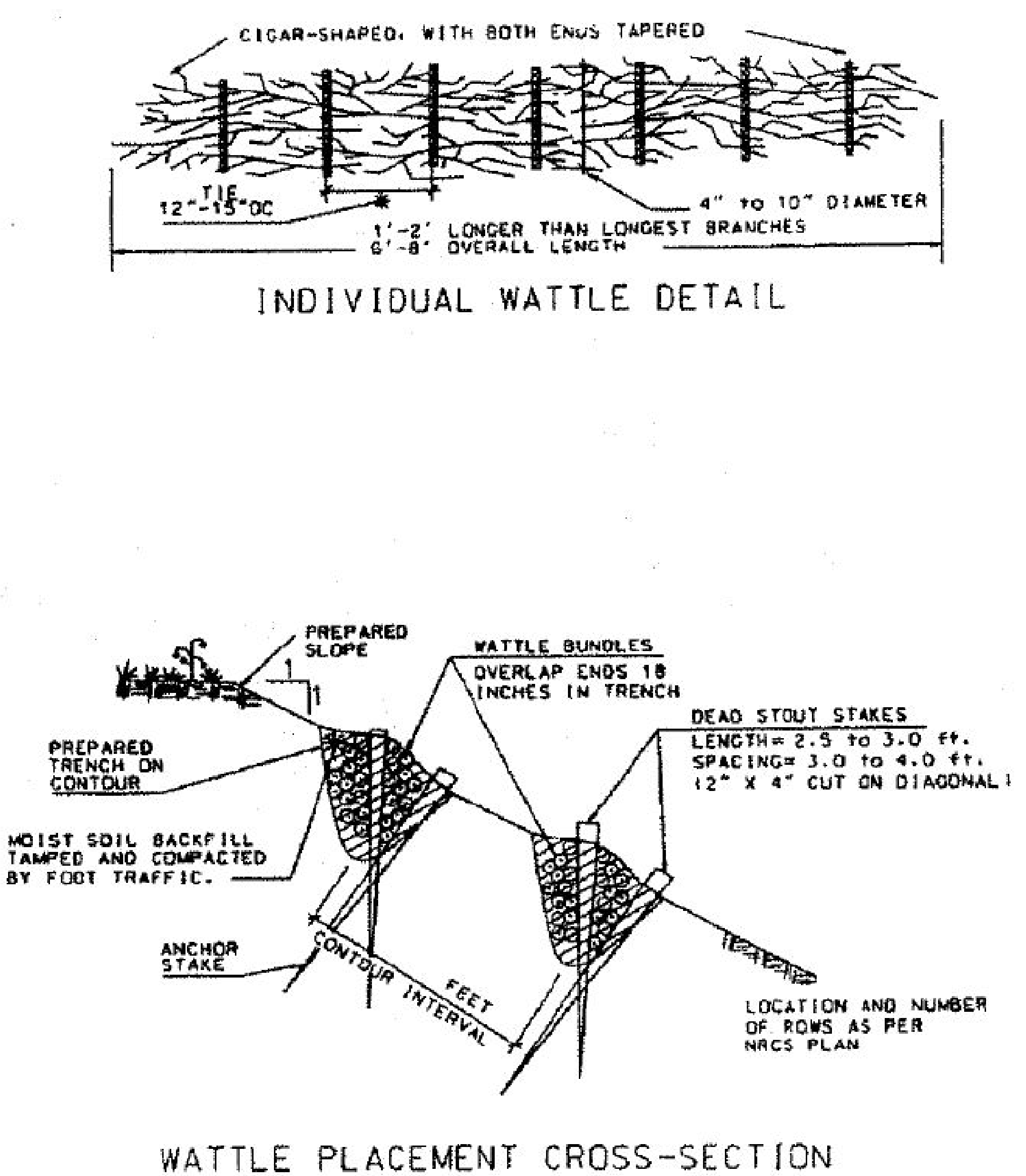

Figure A.8. 1 Wattling Layout (Programmatic Environmental Assessment for the Regional Emergency Streambank Protection Program, 2006)

US Army Corps of Engineers
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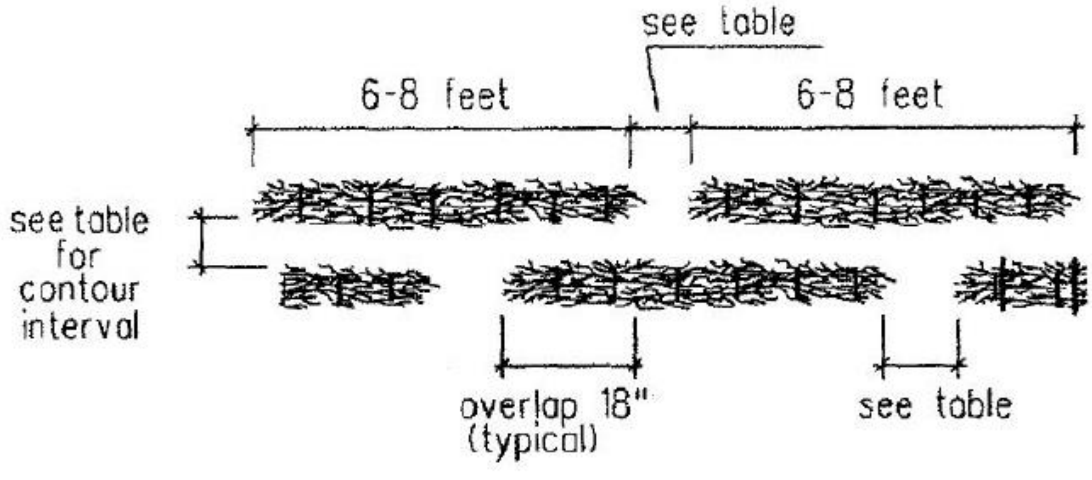
Figure A.8 – Bioengineering Wattling Layout
Not to Scale
Emergency Streambank Protection Programmatic EA



DESIGN TABLE					
SLOPE	1:1	2:1	3:1	4:1	6:1
CONTOUR INTERVAL	3	4	5	6	8

Figure A.9. 1 Wattling Placement (Programmatic Environmental Assessment for the Regional Emergency Streambank Protection Program, 2006)

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Figure A.9 – Bioengineering Wattling Placement and Spacing
Not to Scale
Emergency Streambank Protection Programmatic EA

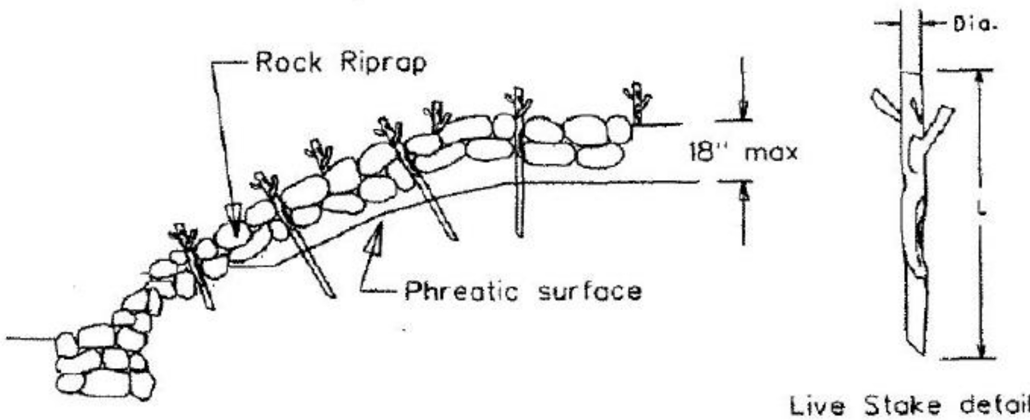

Figure A.10. 1 Joint Planting (Programmatic Environmental Assessment for the Regional Emergency Streambank Protection Program, 2006)

Figure A.10. 2 Photo of joint planting / vegetated riprap
http://www.terraerosion.com/vegriprapCottonwoodCreek.htm

US Army Corps of Engineers
Pittsburgh District

Figure A.10 – Bioengineering Joint Planting
Not to Scale
Emergency Streambank Protection Programmatic EA

7. Rigid Linings

Although not normally suitable for emergency streambank stabilization use due to the cost and construction effort required, individual cases and sites may need specification of rigid linings to protect the channel from erosive forces where other methods are not adequate. Rigid linings consist of cast-in-place concrete, precast concrete panels, slush-grouted riprap, or fabric-formed grout bag revetments used to protect the streambank from erosive damage.

Design Discussion

Concrete: Suitable for many applications, particularly when channel geometry consists of steep banks or when the relative “smoothness” aids hydraulic efficiency. The rigid nature of the material lacks the ability of more “flexible” techniques, such as riprap or bioengineering, to resist failure from hydrostatic pressure, subsidence, and undermining. Additionally, protection is at the cost of aesthetic and economic factors.

Grouted Riprap: Grouted riprap is constructed similar to regular rock riprap and quarry-run stone riprap except a highly-workable mixture of aggregate (sand, gravel), cement, and water is placed into the voids of the riprap or quarry-run material. The resulting structure adds stability, enhanced protection from erosive forces, and enhanced hydraulic properties to the streambank. A downside to the use of slush-grouted riprap is that the revetment is more susceptible to failure from undermining or subsidence effects.

Fabric-formed concrete systems: Fabric-formed concrete systems are tube or pillow forms made from a geotextile material, prefabricated to job specifications and dimensions. The forms are used to provide the initial setting of the concrete and may be designed to be permanent or biodegradable, leaving behind just the concrete. Prior to installing the concrete, the fabric forms are placed over the embankment in the area to be stabilized. Individual fabric panels can be sewn together with a heavy nylon thread. For steeper or structural repair installations, rebar can be added to connect adjacent fabric layers. Starting at the toe, ready-mix concrete is injected into the fabric envelope through self-closing inlet valves. An advantage to this type of system is that it can be installed either in wet (underwater) or dry (use of a cofferdam) conditions. Fabric-formed concrete systems can be used for streambank protection or for structural repairs of existing streambank protection systems that are in danger of failing.

Concrete lining: Concrete lining may be installed as cast-in-place or pre-cast panels. The existing stream bank is graded and then compacted. A gravel filter or drainage layer is installed under the concrete lining. The concrete is either formed for cast-in-place systems or placed and key-in for pre-cast systems over the gravel filter. The vertical extent of the lining will depend upon stability, potential wave run-up, water superelevation, and freeboard considerations. These lining types usually consist of a concrete monolith at the toe of the slope for stability and to prevent undermining. The concrete is reinforced with reinforcing steel. The installation will generally require the use of cofferdams or other dewatering structure so that concrete can be placed in the dry.

Figures A.11 and A. 12 show typical design features used in rigid lining approaches.

Figure A.11. 1 Fabriform concrete bags (James G. Fulton Local Flood Protection Project, 2008)

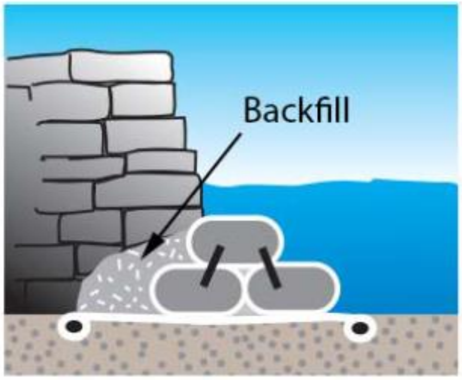

Figure A.11. 2 Fabric-formed Concrete System for streambank protection (http://www.fabriform1.com/, 2015)

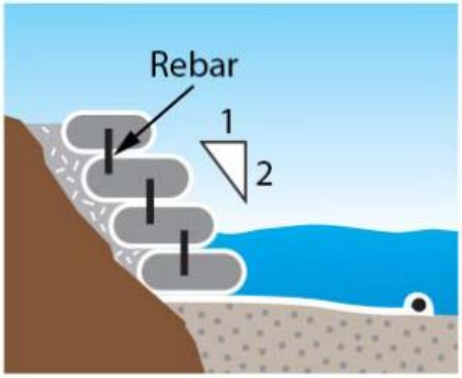

Figure A.11. 3 Fabric-formed Concrete System for Structural Repairs (http://www.fabriform1.com/, 2015)

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Figure A.11 – Rigid Linings, Fabric-formed Concrete Systems
Not to Scale
Emergency Streambank Protection Programmatic EA

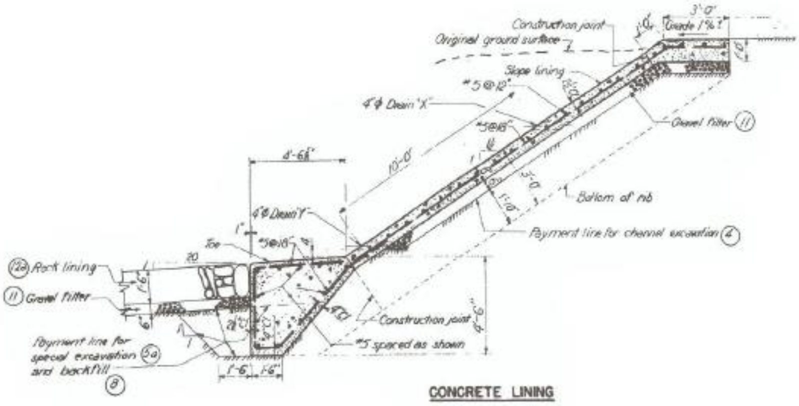

Figure A.12. 1 Concrete Lining (Bradford Flood Protection Project, Unit Three Tunungwant Creek, 1961)

Figure A.12. 2 Photo of existing concrete channel lining (Bradford Flood Protection Project, Unit Three Tunungwant Creek, 1961)

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Pittsburgh District

Figure A.12 – Rigid Linings, Concrete and Grouted Riprap Linings
Not to Scale
Emergency Streambank Protection Programmatic EA

G. STANDARD PROJECT CRITERIA

Most Section 14 projects have similar characteristics by nature and generally will not result in significant environmental impacts. The general Section 14 projects included within the scope of this PEA shall meet the criteria set forth below. Projects that do not meet these criteria will require project-specific NEPA analysis. Because these alternatives would require additional NEPA documentation, it is not considered a reasonable alternative that will be carried forward in this PEA. The following criteria will be applied to:

(a) Site specific analysis will be conducted to determine whether the project may affect threatened or endangered species under Section 7 of the Endangered Species Act (ESA). In the event a project may affect threatened or endangered species, appropriate mitigative measures will be applied to the project, resulting in successful Section 7 consultation. Accordingly, site preparation, construction, and operation of the project will either not adversely impact any federally threatened or endangered species, as identified under the ESA, or state-listed species, or endanger the critical habitat of such species; or, will successfully conclude ESA consultation; therefore, the project will proceed under this PEA. If consultation determines that threatened or endangered species may be impacted, the project will be re-evaluated as to whether it will continue on a specific-case basis requiring a tiered EA or assessed under the No-Action – B alternative.

(b) Discharges shall comply with Section 404.10(b)(1).

(c) Fill material will not exceed 1 cubic yard per running foot and a 500-foot maximum project length without District Engineer approval, to satisfy NWP 13 limitations.

(d) Removal of vegetation is limited to that necessary to achieve design slope. Denuded areas associated with project construction will be provided with a vegetative cover, including woody plant species, as soon as practicable.

(e) In-stream use of heavy equipment in connection with bank protection work is prohibited, except for the purpose of keying-in the toe of the bank protection material, construction of cofferdams, or where a bedrock or similar streambed exists.

(f) Discharged fill material will be maintained consistent with NWPs 3 and 13 to prevent erosion and other non-point sources of pollution.

(g) These general Section 14 projects consist of the type of activity that has the potential to cause effects on historic properties. Accordingly, site specific analysis will be conducted and each project will be coordinated with the State Historic Preservation Officer (SHPO) and federally recognized tribes with affinity to the project area, pursuant to the requirements of Section 106 of the National Historic Preservation Act and 36 CFR 800 (Protection of Historic and Cultural Properties) and 33 CFR 325 Appendix C. If consultation determines that historic properties may be impacted, the project will be re-evaluated as to whether it will continue on a specific-case basis requiring a tiered EA or assessed under the No-Action – B alternative.

(h) Notification of study initiation will be sent to the appropriate SHPO and tribal entities, as well as federal and state fish and wildlife and water quality agencies in the project area in the beginning of the planning process.

(i) All water supply system operators with intakes downstream within drift distance of sediment shall be notified at least 30 days before starting construction so that any necessary precautions for any changes in water quality may be taken.

(j) A Phase I Environmental Site Assessment will be completed for each project. If the Phase I Environmental Site Assessment indicates the possibility of HTRW issues in the project area, the project will be re-evaluated as to whether it will continue on a specific-case basis requiring a tiered EA or assessed under the No-Action – B alternative.

(k) If work is proposed within the limits of a Wild and Scenic River, the appropriate federal agency shall be contacted to receive an effects determination.

(l) Air emissions as a result of the project will be de minimis. Therefore, even in areas of non-attainment, a conformity analysis will not be required.

Any permit and/or verification authorizing activity under this Program is subject to revocation or modification by the District Engineer (DE) if, in the DE's opinion, the activity:

(1) creates or may create a hindrance to navigation;

(2) any increases flood heights;

(3) is detrimental to the environment; or,

(4) is damaging to the general public interest.

II. ALTERNATIVES CONSIDERED

NEPA regulations require Federal Agencies to consider the Proposed Action, the No-Action alternative, and other "reasonable" alternatives to the proposed action. For the purposes of this PEA, the alternatives that are analyzed are the Proposed Action and No-Action Alternatives A and B. This is because the only viable options are to either approve Section 14 projects that meet the general project criteria in Section 1.G. and result in no significant adverse environmental and cultural impacts (the proposed action), perform individual environmental assessments (No-Action Alternative – A), or to not approve projects (No-Action Alternative – B).

The No-Action Alternative – A would continue in the individual processing of Section 14 projects, with no provision for a PEA. Since individual approvals would be required, the No-Action Alternative would result in the continuation of a greater expenditure of both time and funds than if the proposed action was implemented.

The No-Action Alternative – B is not undertaking any streambank restoration project and permitting existing soil erosion to continue unabated with its consequences for the natural and socioeconomic environments. This represents the baseline condition.

If a Section 14 project doesn't meet all the criteria in Section 1.G., that project will be subject to project specific NEPA analysis, which may tier off this PEA. Because this alternative would require additional NEPA documentation, it is not considered a reasonable alternative that will be carried forward in this PEA.

III. PRESENT ENVIRONMENTAL SETTING

The Pittsburgh District contains three major drainage basins: the Allegheny, which drains the highland streams to the north and east of Pittsburgh; the Monongahela, which drains areas of West Virginia and Maryland, south and east of Pittsburgh; and the portion of the Ohio River that begins at the confluence of the Allegheny and Monongahela Rivers, continues through Pennsylvania, and subsequently forms the border between eastern (and southeastern) Ohio and northern West Virginia.

A. NATURAL ENVIRONMENT

1. Water Quality

Current problems facing the water quality in the District include increased runoff from impervious surfaces, which contributes to higher flow rates during storm events, additional sediment, and added contaminants in the water from runoff. Additionally, the higher rates of flow and disturbed banksides from development, farming, and industrialization have led to additional sedimentation from erosion and scouring of unstable banks. Abandoned mine drainage has also detrimentally impacted District water quality.

The District has two main types of groundwater aquifers. The first type is characterized by unconsolidated deposits of the Quaternary age. In these areas, typically glacial outwash and alluvium along major stream valleys comprised primarily of sand and gravel form productive local aquifers. The second type is characterized by semi-consolidated to consolidated rocks. In the District, most of the water-yielding beds are sandstones of Pennsylvanian and Mississippian age.

2. Wetlands

According to the U. S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual and the Regional Supplement to the 1987 Manual, typically all three parameters of vegetation, hydric soils, and hydrology must be met for the presence and development of wetlands. Within the District, these three parameters are typically found within floodplains, with more isolated occurrences of wetlands found in depressions and near seeps. However, due to the hilly topography and steep slopes found throughout the majority of the District, most wetlands are associated with floodplains.

3. Vegetation

Historically, forests consisting of species of oak, beech, hickory, and maple have dominated the

District. Oak-hickory associations are typical of upland forests in the region, while lowland forest communities include beech and maple associations. Many of these forests have been logged or cleared for farming, industry, mining, and development. Areas of Ohio have undergone extensive industrialization and development, most notably along the larger rivers. Forests in areas of West Virginia, Pennsylvania, Maryland, and New York have been cleared for farming as well as for some heavy and light industry and railroads along the larger rivers. Additionally, areas in Pennsylvania, Ohio, and West Virginia have been mined for coal.

Today, most of the existing forests are second-growth and are restricted to areas with limited human accessibility, rugged topographic relief, or federal, state, and private preserves and gamelands. Other remaining non-forest areas have been primarily farmed, mined or developed. Additionally, narrow bands of riparian vegetation persist along some of the riverbank's edge.

4. Fish and Wildlife

Common fish species include the gizzard shad, freshwater drum, emerald shiner, channel catfish, bluegill, white crappie, smallmouth bass, spotted bass, sauger, and walleye. Trout have also been stocked in many streams. The fish species prefer aquatic habitats where gravelly and rock substrate exists.

Common wildlife in the region includes the larger mammals such as the white-tailed deer, and gray and red foxes. Common bird species include a variety of songbirds and hawks. Suitable wildlife habitat is primarily restricted to the riparian woodlands, steep hillsides, and areas saved for conservation. In areas of disturbed habitat, a reduced number of species and species diversity are found and wildlife communities are dominated by species accustomed to humans and human activity. Mammals and birds such as gray squirrels, raccoons, opossums, Norway rats, eastern cottontails, white-tailed deer, English sparrows, starlings, and pigeons may use this habitat. Further information concerning fish and wildlife in a specific project site can be obtained by contacting the appropriate state fish and wildlife offices.

5. Threatened and Endangered Species

Suitable habitat for threatened and endangered species exists throughout the District. The occurrence of threatened and endangered species is typically associated with, but not limited to, undisturbed habitat. Greater probability for finding threatened or endangered species would exist in areas with large tracts of intact forest or exceptionally high water quality that tend to provide suitable habitat for threatened and endangered species. These areas would include: designated National Wild and Scenic Rivers and state and federal gamelands and forest preserves.

One animal group of particular concern with streambank restoration projects is the mollusk. Their sedentary nature causes them to be more susceptible to streambed and siltation disturbances associated with these projects. The United States Fish and Wildlife Service (USFWS) reports the occurrence of habitat of five federally-endangered species of mollusks, Dwarf wedgemussel *(Alasmidonta heterodon),* Rabbitsfoot *(Quadrula cylindrical cylindrical)*, the northern riffleshell *(Epiohiasma torulosa rangiana),* Rayed bean *(Villosa fabalis)*, Sheepnose *(plethobasus cyphyus),* and the clubshell *(Pleurohema clava)* in the project area watersheds, Typical habitat of the northern riffleshell includes a wide variety of streams, ranging from large to small, with runs containing bottoms of firmly packed sand and fine to coarse gravel. The clubshell occurs in small rivers and streams in clean swept sand and gravel and tends to bury itself in clean, loose sand to a depth of 2 to 4 inches. Waterways with the potential habitat include those within Crawford, Erie, Forest, Mercer, Venango, and Warren Counties, which are all part of the Allegheny Watershed in Pennsylvania. Within the Allegheny watershed, the USFWS notes the following waterways are known to contain habitat for federally-listed and proposed and/or state-listed mussel species:

- Allegheny River, between Kinzua Dam and the Borough of Templeton (i.e., Warren, Forest, Venango, Clarion, Armstrong, and Butler Counties)
- French Creek (Erie, Crawford, Mercer, and Venango Counties)
- LeBouf Creek (Erie County)
- Conneaut Outlet (Crawford County)
- Conneautee Creek (Crawford County)

Additional species of concern that are known to occur within the District include mammals such as the Indiana Bat (*Myotis sodalist*) and the Northern Long Eared Bat (*Myotis septentrionalis*). The Indiana bat is listed as endangered and is found across most of the eastern half of the U.S. They hibernate in caves in dense clusters throughout the winter and in the summer they are known to roost in colonies in cracks or crevices or under loose bark of trees. The Northern Long Eared Bat is listed as threatened with a range that includes much of the eastern and north central U.S. and parts of Canada and has similar winter and summer habitat requirements to the Indiana Bat.

Additional information on the most up to date endangered and threatened species lists by state can be found at the following locations:

- PA: http://www.fws.gov/endangered/map/pa-info.html
- OH: http://ecos.fws.gov/tess_public/reports/species-listed-by-state-report?state=OH
- WV: http://www.fws.gov/endangered/map/wv-info.html
- MD: http://www.fws.gov/endangered/map/md-info.html
- NY: http://www.fws.gov/endangered/map/ny-info.html

6. Floodplains

Due to the hilly topography throughout most of the District, the floodplains are characterized as narrow in width, and relatively high-rising in elevation. In areas where the topography becomes more flat and broad, the floodplains widen and the water during storm events does not reach the higher elevations.

Industry and private development have occurred within many of the floodplains prior to laws restricting development in these areas. This has caused some alteration to the original state of the floodplains. The increase in impervious surfaces has increased the amount of runoff during high water events, causing higher flood levels and scouring and erosion of streambanks.

7. Recreation

A variety of recreational activities are pursued within the District. These include fishing, swimming, canoeing/kayaking, boating, hunting, hiking, bicycling, and sightseeing.

8. Geology and Soils

The District is located in the Appalachian Plateaus Province, which is underlain by contiguous rocks that are nearly flat lying or are gently tilted and warped. Northern locations in the District have been previously glaciated, with the surfaces marked by glacial drift and valleys partly filled with glacial deposits. The northwestern portion of the District is located in the Central Lowland Province, characterized by flat lowland underlain by gently dipping sedimentary rocks.

Common soil associations in Maryland and West Virginia share the following characteristics: gently to steep sloping, moderately deep, and well-drained soils. Pennsylvania, Ohio, and portions of New York are commonly characterized by nearly level to steep, deep, and moderately deep soils that range from well drained to moderately well drained. Floodplain soils in the District are classified as generally well drained to somewhat poorly drained, deep and moderately deep, and are located on nearly level to steep topography approaching hilltops.

9. Wild and Scenic Rivers

Five federally-recognized Wild and Scenic River sections occur in the Pittsburgh District, four in Pennsylvania and one in Ohio.

Three stretches of the Allegheny River (with 86.6 miles classified as recreational) in Pennsylvania are federally-recognized as having wild and scenic value:

- From the Kinzua Dam downstream to the U.S. Route 62 bridge;
- From Buckaloons Recreation Area at Irvine downstream to the southern end of Acorn Island at Oil City; and
- From the sewage treatment plant at Franklin to the refinery at Emlenton

Additionally, the stretch of the Clarion River is federally-recognized (classified as scenic for 17.1 miles and recreational for an additional 34.6 miles) in Pennsylvania from the Allegheny National Forest/State Game Lands Number 44 boundary to an unnamed tributary at the backwaters of Piney Dam.

The Little Beaver Creek (classified as scenic for 33.0 miles) in Ohio is the other federally-recognized wild and scenic water in the District:

- The main stem from the confluence of the West Fork with the Middle Fork near Williamsport to the mouth
- The North Fork from its confluence with Brush Run to its confluence with the main stem at Fredericktown
- The Middle Fork from the vicinity of the County Road 901 (Elkston Road) bridge crossing to its confluence with the West Fork near Williamsport
- The West Fork from the vicinity of the County Road 914 (Y-Camp Road) bridge crossing to its confluence with the Middle Fork near Williamsport.

State-designated Wild and Scenic Rivers in the District are located in Ohio (Little Beaver Creek), Maryland (the Youghiogheny River), and Pennsylvania (Bear Run).

10. Air Quality

Air quality throughout the District is relatively good. Concentrated pockets of air pollution, or higher levels of the criteria pollutants, can be found within and near larger cities, along heavily traveled roadways and in areas of industry. The following counties within the District are located within NAAQS nonattainment areas:

- *Pennsylvania* – Allegheny, Armstrong, Beaver, Butler, Fayette, Indiana, Washington, Westmoreland
- *Ohio* – Belmont, Jefferson
- *West Virginia* – Brooke, Hancock, Marshall, Ohio

11. Climate

The climate of the District is temperate with seasonal variation in temperature. The area is located in a region of variable air mass activity, being subject to both polar and tropical continental and maritime air mass invasion.

The four seasons differ in intensity based on your location within the basin. January is generally the coldest month, with average high temps in the low-30s Fahrenheit and average low temperatures at 20 degrees Fahrenheit. July is usually the warmest month, with average highs in the low 80s degrees Fahrenheit and average lows in the mid-60s Fahrenheit. Summer temps in the 90s Fahrenheit are not uncommon in the southeast of the watershed and in the Pittsburgh area.

The future effects of anticipated climate change on water resources are of increasing concern. It is anticipated that the region will continue to warm throughout the 21st century, with temperature increases projected to occur relatively evenly throughout the year.

Some effects of climate change could include an increase in winter precipitation as rain, an increase in heavy precipitation events and an increase in winter runoff. Water quality within the region may also be negatively impacted due to flashier runoff and increasing water temperatures; consequently, this could exacerbate soil erosion, causing adverse effects to both the natural and social environments.

B. SOCIAL ENVIRONMENT

1. Land Use

Primary uses of land within the District include farming, urban, industrial, forest, and pockets of mining. Commonly, the industrial and urban areas have been concentrated along the major riverbanks of the Monongahela and Ohio Rivers with the rivers serving as a mode of transportation. The farmlands occur in the valleys and areas with relatively low sloping and less rocky topography, and the forested areas remain along ridge tops, steep slopes, and other areas difficult to access.

2. Noise

Major sources of noise in the District are associated with urban areas and other human sources such as vehicles, industry, air traffic, and in some instances, along the major waterways (boat and barge traffic).

3. Prime Farmland

Prime farmland soils are found throughout the District. Prime farmland is typically associated with soils that are well-drained to moderately well-drained, high yielding, and are currently, or have been, farmed. Section 14 projects occur along streambanks adjacent to prime farmland and will not impact this resource.

4. Aesthetics

Rolling hills, valleys, and broad plains all contribute to the aesthetics in the District. Aesthetic value varies from location and land use. Most of the sites associated with the Program would have an impaired aesthetic value due to the exposed soils, eroded slopes, toppled trees and other disturbances typically found along unstable streambanks.

5. Hazardous Materials

Industrial and urban areas within the District have been concentrated along the major riverbanks of the Monongahela and Ohio Rivers which means that it is possible to encounter hazardous materials throughout the District especially in areas of high industrial usage. As noted in Section II Standard Project Conditions, a Phase I Environmental Site Assessment will be completed for each project. This study will characterize any hazardous material and recommend type and extent of further studies.

6. Environmental Justice

Minority and low-income populations within the District are located in urban areas along the waterways in former industrial centers with depressed economies and in rural areas with limited economic development. Per the 2010 Census, significant urban populations include: Youngstown, OH (Mahoning County), 20.1; Pittsburgh, PA (Allegheny County), 18.5%; Erie, PA (Erie County), 11.8%; Canton, OH (Stark County), 11.3%; and Warren, OH (Trumbull County), 11.0%. The most significant minority population in a rural area is Forest County, PA, 23.1%. The largest concentrations of low-income populations at or beneath poverty statistical thresholds are located in Monongalia County, WV, 22.2%; Fayette County, PA, 20.7%; and Forest County, PA, 20.4. The table below summarizes the 2010 Census minority and low-income populations statistical averages within the District:

	MD	NY	OH	PA	WV
Minority	2.2%	7.3%	7.7%	6.1%	3.5%
Low-Income	15.1%	16.2%	17.0%	15.4%	17.9%

C. CULTURAL ENVIRONMENT

Cultural resources representing all periods of the regional cultural chronology are represented within the general boundaries of the District. Archaeological sites dating from the Paleoindian Period (10,000 - 8,000 BC) are generally small, dispersed camps of a hunting/foraging population with an economy based on migratory game exploitation. The Archaic Period (8,000-1,000 BC) is characterized by populations of specialized hunters and gatherers intensifying their use of specific resources, such as fish. Major changes in prehistoric lifeways occurred during the Woodland Period (1,000 BC - European contact), including the introduction of ceramics, the bow and arrow, and domesticated plants, as well as increased population and sedentism. It is also during the later portions of this time that the federally recognized tribal entities known today were starting to form. The arrival of European settlers and the westward expansion of American culture are represented in historic period archaeological sites, such as farmsteads, urban domestic sites, and industrial sites from the 17th through the 20th centuries.

IV. ENVIRONMENTAL IMPACTS

A. NATURAL ENVIRONMENT

1. Water Quality

Preferred Alternative. Streambank stabilization would have minor and temporary impacts on water quality. Temporary impacts would include increased turbidity due to the disturbance of the streambanks and river bottom. These disturbances could temporarily re-suspend any contaminants and pollutants that have settled in the riverbed, which would be conveyed downstream. A temporary increase in turbidity during construction would reduce light penetration and would have a minimal adverse effect on phototrophic organisms. Nektonic and/or planktonic populations could be adversely affected by a temporary increase in turbidity and by actual excavation. This effect would not be expected to be serious or to have a long-term impact. In any event, downstream drinking water suppliers within the drift zone would be notified at least 30 days prior to initiation of construction of the stabilization project. However, the long-term cumulative effect would be overall improvement of water quality as sediment loads from eroding streambanks are reduced. Impacts on water quality would be reduced with the use of sediment control measures such as silt fences, staged construction, and immediate stabilization.

Different methods of streambank stabilization would provide different long-term cumulative effects. Hard armoring is a relatively quick way to stabilize the streambank. However, hard armoring could increase water velocities, as the channeled banks would provide less resistance in slowing the stream down, which in turn could cause additional downstream erosion. Additionally, hard armoring has the potential secondary impact of warming the water temperature of the stream. However, previous sediment loads would be eliminated from the stabilized streambanks.

Stabilizing the banks with vegetation requires additional time, as the plants and various organic matter used would have to become firmly rooted or established along the streambank. Cumulative impacts of stabilization through vegetation would provide increased roughness alongside the banks to slow the stream and direct the flow velocity away from the banks. The roots and stems would also help increase sediment deposition from the stream.
No impacts are anticipated for groundwater resources.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs would be incurred from the project approval and NEPA documentation processes, allowing for continued erosion and worsening water quality in the interim.

No-Action Alternative - B. Failure to construct could result in the continuing conditions that permit gradual contamination of groundwater from pollutants or nutrients which will exacerbate over time.

2. Wetlands

Preferred Alternative. Direct impacts to wetlands may be experienced from streambank stabilization if the wetlands were located directly alongside the riverbank being stabilized. Soils and vegetation associated with the wetlands would be disturbed. However, wetlands associated with or nearby highly eroded streambanks tend to be lower value wetlands due to the high levels of sediment deposition produced from overtopping streams and, conversely, loss of soils and vegetation through erosion.

If appropriate, a wetland delineation, accompanied by a jurisdictional determination, should be conducted. If jurisdictional wetlands occur within the stabilization site, appropriate measures should be taken to avoid, reduce or mitigate impacts to the wetlands. Vegetative stabilization of streambanks using suitable native hydrophilic plants could be used to mitigate damages incurred to wetlands disturbed along the streambank during the restoration process.

Secondary impacts on downstream wetlands may result from the potential of increased sediment load in the stream due to construction activities during stabilization.

Cumulative impacts to wetlands located downstream or within the river floodplain not associated with the streambank could include the reduction of sedimentation as sediment loads into the wetlands would decrease as erosion problems are eliminated.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would permit the continuation of lower quality wetlands may continue to result from unchecked levels of sediment deposits caused by eroding streambanks.

No-Action Alternative - B. Failure to construct could result in the continuation of lower quality wetlands may continue to result from unchecked levels of sediment deposits caused by eroding streambanks which will exacerbate over time.

3. Vegetation

Preferred Alternative. Short-term impacts would consist of clearing areas for access roads and equipment staging. The main areas impacted would be restricted to areas alongside the streambank. Vegetation may need to be cleared alongside the streambank in order to stabilize it and create design slopes in areas that have been highly eroded. Depending on the selected method of stabilization, these areas may be revegetated. Access roads and staging areas would be designed to impact areas of lower priority (i.e. non-wetland, second growth, or open grass areas). No long term, cumulative impacts to terrestrial habitat are anticipated. Seasonal tree-cutting restrictions may apply for endangered bats as discussed in threatened and endangered species section below.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would permit the continuation of unchecked erosion, causing the continued loss of vegetation, thereby exacerbating soil loss along streambanks during the interim.

No-Action Alternative - B. Failure to construct could permit the continuation of unchecked erosion, causing the continued loss of vegetation, thereby exacerbating soil loss along streambanks which will exacerbate over time.

4. Fish and Wildlife

Preferred Alternative. Streambank stabilization would mainly impact aquatic organisms such as fish and invertebrates. Temporary impacts to fish and wildlife would be caused by increased turbidity from the excavation measures within the stream and along the streambank necessary for its stabilization. Work would be avoided during the primary fish spawning period. Filter feeding organisms would be among the most significantly impacted as they are highly sensitive to increased turbidity. Long term, cumulative, impacts to aquatic organisms would be anticipated to be positive as turbidity levels would decrease and overall water quality would improve. Additionally, depending on the method of protection used, vegetative stabilization and types of riprap could potentially increase habitat for aquatic organisms and wildlife that utilize the streambanks. In contrast, hard armoring would permanently eliminate vegetative streambank habitat potential. Terrestrial wildlife would be temporarily impacted in locations where access roads and staging areas need to be constructed. Additional impacts may be felt by wildlife that use the streambank for foraging. These species may have to travel to other portions of the stream during the stabilization process. Additionally, depending on the streambank stabilization design (i.e. hard armoring or walls); wildlife may have difficulty accessing the stream once the stabilization is completed.

Coordination with the USFWS and state wildlife agencies will be conducted on a project-by-project basis to meet the regulatory requirements of the Endangered Species Act, the Migratory Bird Treaty Act, and the Bald & Golden Eagle Protection Act. This coordination will be documented and referenced in the FONSI produced for each project.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would permit the continuing declination of habitat area for fish and wildlife. Worsening water quality and unchecked soil erosion, could potentially disturb ecosystem balances in the interim.

No-Action Alternative - B. Failure to construct could permit the continuing declination of habitat area for fish and wildlife. Worsening water quality and unchecked soil erosion, could potentially disturb ecosystem balances which would exacerbate over time.

5. Threatened and Endangered Species

Preferred Alternative. Commonly, disturbed habitat, or habitat of low value, reduces the potential for usage by threatened and endangered species. Since streambank stabilization typically occurs in areas of high disturbance, impacts to threatened and endangered species would be anticipated to be limited. However, coordination with appropriate state and federal agencies concerning threatened and endangered species will be conducted to determine specific impacts as is stated in the Standard Project Conditions.

Particular concern will be taken with threatened and endangered mollusk species. Primary factors in the reduction of these species have been attributed to impoundments, channelization, loss of riparian habitat, and the impacts from sediment (silt) loading into streams. Riprap placement using a clamshell, crane, or dragline, and project-associated excavation requiring in-stream work may have direct (streambed disturbance and loss of streambed habitat) and potentially indirect (increased turbidity and sedimentation) effects on these mussel species. For projects occurring in streams with potential habitat or known occurrences of these species, consultation with the USFWS and state wildlife agency will be conducted to ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species. If appropriate, a stream survey may be conducted with a state-certified biologist to determine the presence of threatened and endangered mollusk species in the project area. If these species are found, consultation with the USFWS and the appropriate state wildlife agency will be conducted to avoid or minimize impacts to these species.

The Indiana Bat (endangered) may necessitate a seasonal-tree cutting limitation to between November and March, or other conservation measures to ensure no impacts to summer habitat and roost trees.

The Northern Long-eared Bat (threatened) are currently protected by the provisions of the interim 4 (d) rule which restricts activities within .25 miles from known and occupied hibernacula and avoids removal of roost trees between June 1 – July 31.

Coordination will be conducted for each individual project to ensure no adverse effects to endangered bats and as discussed in the Standard Project Conditions section. This coordination will be incorporated into the FONSI produced for each project.

Cumulative stabilized streambank effects may eventually provide appropriate water quality levels necessary for certain threatened and endangered species, increasing the habitat potential.

In accordance with Executive Order 13112, precautions will be taken to avoid introduction of invasive species at project sites.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would permit the continuation of poor water quality that could adversely impact sensitive species (mollusks) during the interim; however, habitats in previously disturbed areas or existing low-value habitats will generally not impact threatened or endangered species.

No-Action Alternative - B. Failure to construct could permit the continuation of poor water quality that would adversely impact sensitive species; however, habitats in previously disturbed areas or existing low-value habitats will generally not impact threatened or endangered species.

6. Floodplains

Preferred Alternative. No direct impacts to the river floodplains located in the District are anticipated through streambank stabilization. Secondary impacts may include the overall decrease in erosion in the stabilized area, with potential increases in floodplain erosion further downstream, depending on whether the stabilization affects current and flow patterns. Future projects will be in compliance with Executive Order 11988.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would permit the continuation of unchecked erosion, thereby gradually destabilizing floodplains in the interim.

No-Action Alternative - B. Failure to construct could permit the continuation of unchecked erosion, thereby gradually destabilizing floodplains. Over time, local economies would be adversely impacted.

7. Recreation

Preferred Alternative. Some temporary impacts may occur to recreation. Direct temporary impacts may include the exclusion of public recreational use of the stream during and shortly after construction. Depending on the type of protection used, the banks may be off limits to recreational uses until stabilization (i.e. if vegetation) is achieved.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would permit the continuation of declining water quality and soil erosion, adversely impact certain recreational activities including boating and fishing in the interim.

No-Action Alternative - B. Failure to construct could permit the continuation of declining water quality and soil erosion, adversely impact certain recreational activities including boating and fishing. Over time, this would adversely impact local economies.

8. Geology and Soils

Preferred Alternative. No anticipated impacts are anticipated for the geology of the project areas. Soils will be directly affected. Preparation of the streambank (i.e. leveling of slopes and placement of riprap or hard armoring) will disrupt soils. Additionally, the use of heavy construction equipment may compact soils.

Cumulative impacts would include the stabilization of soils, which would diminish erosion.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would permit the continuation of soil erosion in the interim.

No-Action Alternative - B. Failure to construct could permit the continuation of soil erosion which would exacerbate over time.

9. Wild and Scenic Rivers

Preferred Alternative. No impacts would be anticipated on Wild and Scenic Rivers. Since wild and scenic rivers are recognized for their superior natural state, streambank stabilization would most likely not occur along designated reaches of wild and scenic rivers. However, if a stabilization project were required on a reach of a wild and scenic river or in an adjacent upstream reach, studies on river flow and current patterns would be conducted on stabilization designs to protect the wild and scenic river. Generally, stabilization is expected to improve conditions by reducing or eliminating an unstable source of excess sediment.

No-Action Alternative – A. No anticipated impacts to Wild & Scenic Rivers.

No-Action Alternative – B. No anticipated impacts to Wild & Scenic Rivers.

10. Air Quality

Preferred Alternative. No major impacts are anticipated that would affect air quality during streambank stabilization. Local levels of pollutants may increase associated with streambank stabilization resulting from construction vehicle emissions and particulate matter generated from construction activities and exposed soils. These impacts would be temporary. Even in non-attainment areas, projects that meet the general criteria will have de minimis emissions and would not require a conformity determination.

No-Action Alternative - A. No anticipated impacts to air quality.

No-Action Alternative - B. No anticipated impacts to air quality.

11. Climate

Preferred Alternative. No impacts are anticipated to climate due to the projects described in this report. Any emission of greenhouse gases would be temporary and minor due to project construction. Streambank stabilization may become increasingly important to prevent erosion from increased runoff events. Future climate change is not expected to change the functioning of projects as designed; these stabilized areas may increase in importance to sustaining ecosystems.

No-Action Alternative - A. No anticipated impacts to climate.

No-Action Alternative - B. No anticipated impacts to climate.

B. SOCIAL ENVIRONMENT

1. Land Use

Preferred Alternative. No adverse impacts on land use are anticipated to occur from the proposed action. Stabilization would protect current land uses.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would permit the continuation of unchecked erosion that adversely impacts existing land uses with potentially harmful effects to local communities and economies in the interim.

No-Action Alternative - B. Failure to construct would permit the continuation of unchecked erosion that adversely impacts existing land uses with potentially harmful effects to local communities and economies.

2. Noise

Preferred Alternative. Impacts on the noise environment will be experienced during streambank stabilization. Temporarily increased noise levels will be experienced during construction. The major noise source will be the operation of construction vehicles and other types of construction equipment. Increased noise levels may cause disruption to humans and wildlife living in the area. Increased noise levels would be confined to areas along the streambank and access routes to the streambanks. Restricting the operation of this equipment to daylight hours will minimize human disturbances.

No-Action Alternative - A. No impacts to noise.

No-Action Alternative - B. No impacts to noise.

3. Prime Farmland

Preferred Alternative. Under the Proposed Action, impacts may be experienced to Prime Farmland areas. However, these impacts would be temporary and minor, and restricted to those areas along the stream corridor and access routes.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would permit the continuation of potential erosion with adverse effects to agriculture and local economies due to loss of land use and restriction of commerce in the interim.

No-Action Alternative - B. Failure to construct could permit the continuation of potential erosion with adverse effects to agriculture and local economies due to loss of land use and restriction of commerce.

4. Aesthetics

Preferred Alternative. The aesthetics associated with streambank stabilization would be anticipated to improve. Temporary impacts to aesthetics would be caused from the construction equipment and associated bank-altering activities to achieve design slope. However, these impacts would be short term, as the aesthetics of the banks would improve after the bank is stabilized and no longer containing eroded slopes and bare soils.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would permit the continued degradation of aesthetics as unchecked erosion increases in the interim.

No-Action Alternative - B. Failure to construct could permit the continued degradation of aesthetics as unchecked erosion increases.

5. Hazardous Materials

Preferred Alternative. The projects described in this PEA will not generate hazardous materials. As described in the Standard Project Conditions section, a Limited Phase I Environmental Site Assessment will be completed for each project specific location to ensure HTRWs are not present in the project area. Therefore there should be no impacts due to hazardous materials being encountered.

No-Action Alternative - A. If the Phase I Environmental Site Assessment indicates the possibility of HTRW issues in the project area, the project will be re-evaluated as to whether it will continue on a specific-case basis and produce a stand-alone EA, or be discontinued.

No-Action Alternative - B. Any HTRWs onsite could have the potential of leaching into suface water, based upon soil erosion. This could have adverse impacts to water quality, habitats, and the human environment.

6. Environmental Justice

Preferred Alternative. Having a PEA in place will permit timely responses, thereby benefitting low-income and minority populations through limitation of adverse impacts to land use and subsequent harm to local economies and social services. Project activities would be in compliance with EO 12898 and low-income or minority populations would not be disproportionately impacted by adverse actions.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would allow the continued degradation of land use and harm to local economies and social services, adversely impacting low-income or minority populations in the interim.

No-Action Alternative - B. Failure to construct could allow the continued degradation of land use and harm to local economies and social services, adversely impacting low-income or minority populations.

C. Cultural Environment

Preferred Alternative. Cultural resource investigations will be conducted as discussed under the Standard Project Conditions section and if any sites eligible for the National Register are identified, mitigation agreed upon during consultation with the SHPO, appropriate Native American Tribes with cultural affinity, and other consulting parties will be performed before construction in accordance with the requirement of 36 CFR 800. This coordination will be documented and referenced in the FONSI produced for each project.

No-Action Alternative - A. In the absence of a PEA, lengthy delays and significant costs from project approval and NEPA documentation processes would allow the continued loss of or damage to significant cultural resources in the interim.

No-Action Alternative - B. Failure to construct would allow the continued loss of or damage to significant cultural resources.

D. Cumulative Impacts

CEQ/USACE regulations define cumulative impacts as: the impacts on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions; cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Since 1946, the District has intermittently performed streambank restoration projects throughout its boundaries and as of 2016 has four ongoing actions. Emergency streambank protection projects have historically been distributed throughout the District and are driven by a number of varying local factors, including: hydrology, soils quality, geology, weather events, and proximity of existing structures to water bodies. These factors will continue to drive potential future projects.

Preferred Alternative. In general, these past projects have had benefitted both the natural and socioeconomic environments. Bank stabilization projects have reversed the adverse effects of soil erosion, thereby improving water quality and regional ecosystems. Additionally, these projects have benefitted communities by reducing flood risk and enabling continued land usage. Consequently, municipalities that otherwise would have sustained potential losses of residents or businesses are able to maintain their tax bases, to continue providing public services, and to promote a high quality of life.

No-Action Alternatives A & B. In general, failure to address bank erosion would have potentially catastrophic impacts to both the natural and socioeconomic environments. Unchecked erosion would degrade water quality and create conditions for flooding, thereby harming ecosystems. Floods and erosion would impact land usage, causing a possible loss of residents or businesses, leading to tax base reductions with resulting losses in public services and declining quality of life.

The table, below, summarizes cumulative impacts to the various environmental resources.

	Preferred Alternative	No-Action Alternative - A	No-Action Alternative - B
Water Quality	*Present*: ongoing actions maintain and promote positive water quality, with positive effects for natural and socioeconomic environments. *Future*: long-term of these actions will promote safe watersheds.	*Past*: failure to timely address has gradually allowed poor water quality to spread from local areas to larger ones throughout the watersheds, harming ecosystems. *Present*: due to regional development, failure to timely address water quality would see a return of earlier issues on a larger scale. *Future*: adverse impacts would exacerbate a larger watershed scope.	*Past:* same as No-Action Alternative – A. *Present:* failure to address water quality issues could have long-term adverse impacts to both the natural and human environments. *Future:* same as No-Action Alternative - A
Wetlands	*Present*: ongoing actions promote healthy wetlands. *Future*: healthy wetlands will continue to sustain ecosystems throughout the watersheds	*Past*: failure to timely address damaged or created low-quality wetlands with minimal ecosystem benefits. Present: exacerbation of adverse impacts through a lack of timely response. *Future*: gradual worsening of wetland conditions throughout the watersheds and harmed ecosystems.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.
Vegetation	*Present*: native species are restored where lost, construction measures ensure survivability of vegetation and soil erosion is checked. *Future*: long-term survivability sustains local ecosystems.	*Past*: failure to timely address has allowed a loss of vegetation led to soil erosion, localized degradation of habitats and ecosystems. *Present*: exacerbation of adverse impacts through a lack of timely response. *Future*: expanded localized soil erosion, continued habitat loss, potential adverse impacts to man-made structures with potential social-economic consequences.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.

	Preferred Alternative	No-Action Alternative - A	No-Action Alternative - B
Fish & Wildlife	*Present*: ongoing actions sustain local habitats and ecosystems. *Future*: fish and wildlife will continue to be protected within the watersheds.	*Past*: failure to timely address has allowed a gradual loss of habitats and damage to ecosystem adversely impacted fish and wildlife, creating losses and causing relocation. *Present*: exacerbation of adverse impacts through a lack of timely response. *Future*: scale of adverse impacts to ecosystems gradually increases from local to more regional.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.
Threatened & Endangered Species	*Present*: ongoing actions sustain local habitats and ecosystems. *Future*: threatened & endangered species will continue to be protected within the watersheds.	*Past*: failure to timely address has allowed a gradual loss of habitats and damage to ecosystem adversely impacted threatened & endangered species, creating losses and causing relocation. *Present*: exacerbation of adverse impacts from a lack of timely response. *Future*: scale of adverse impacts to ecosystems gradually increases from local to more regional.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale for suitable habitats as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.
Floodplains	*Present*: ongoing actions reverse and limit future damages, thereby providing socio-economic benefits. *Future*: positive impacts of local benefit becomes more regional.	*Past*: failure to timely address has allowed unabated damage to floodplains restricted land use, thereby harming local tax bases and social services. *Present*: exacerbation of adverse impacts from a lack of timely response. *Future*: the adverse effects to communities begin to impact the wider region socioeconomically.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.

	Preferred Alternative	No-Action Alternative - A	No-Action Alternative - B
Recreation	*Present*: ongoing actions sustain outdoor activities, thereby providing local economic benefits and quality of life. *Future*: regional promotion of outdoor activities provides wider economic benefits.	*Past*: failure to timely address has allowed unabated damage to waterways and ecosystems and limited or halted recreational opportunities, creating economic harm for communities dependent upon this revenue stream. *Present*: exacerbation of adverse impacts through a lack of timely response. *Future*: loss of revenue related to recreation impacts the larger region.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.
Geology & Soils	*Present*: ongoing actions reverse and limit future damage from soil erosion. *Future*: erosion will be minimal.	*Past*: failure to timely address has exacerbated soil loss. *Present*: exacerbation of adverse impacts through a lack of timely response. *Future*: erosion will continue to spread, creating adverse impacts to the natural and socio-economic environments.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.
Wild & Scenic Rivers	No cumulative impacts to Wild & Scenic Rivers within the District's boundaries.	No cumulative impacts to Wild & Scenic Rivers within the District's boundaries.	No cumulative impacts to Wild & Scenic Rivers within the District's boundaries.
Air Quality	No cumulative impacts to air quality within the District's boundaries.	No cumulative impacts to air quality within the District's boundaries.	No cumulative impacts to air quality within the District's boundaries.
Climate	No cumulative impacts to climate within the District's boundaries.	No cumulative impacts to climate within the District's boundaries.	No cumulative impacts to climate within the District's boundaries.

	Preferred Alternative	No-Action Alternative - A	No-Action Alternative - B
Land Use	*Present*: ongoing actions reverse and limit future damages, thereby providing socio-economic benefits. *Future*: positive impacts of local benefit becomes more regional.	*Past*: failure to timely address has caused restricted land use, thereby harming local tax bases and social services. *Present*: exacerbation of adverse impacts through a lack of timely response. *Future*: adverse effects to communities begin to impact the wider region socioeconomically.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.
Noise	*Present*: short-term impacts to noise from construction activities. *Future*: no cumulative effects from noise.	No cumulative effects from noise.	No cumulative effects from noise.
Prime Farmland	Projects are located within urbanized areas; no cumulative effects to prime farmland.	No cumulative effects to prime farmland.	No cumulative effects to prime farmland.
Aesthetics	*Present*: ongoing actions sustain local aesthetics and thereby property values. *Future*: Aesthetic conditions remain unchanged.	*Past*: failure to timely address has allowed flood damage to create adverse effects to aesthetics and harm property values. *Present*: exacerbation of adverse impacts through a lack of timely response. *Future*: worsening local conditions.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.
Hazardous Materials	No cumulative impacts pertaining to hazardous materials.	No cumulative impacts pertaining to hazardous materials.	No cumulative impacts pertaining to hazardous materials.

	Preferred Alternative	No-Action Alternative - A	No-Action Alternative - B
Cultural Environment	*Present*: ongoing programs prevent the loss of potential historic properties due to soil erosion and potential harm to historic structures from land use impacts. *Future*: potential cultural resources remain preserved.	*Past*: failure to timely address has allowed potential loss of historic properties from unchecked soil erosion. *Present*: exacerbation of adverse impacts through a lack of timely response. *Future*: continued potential loss of cultural resources.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.
Environmental Justice	*Present:* ongoing actions protect low-income and minority populations. *Future*: low-income and minority populations remain protected.	*Past*: failure to timely address has hurt low-income and minority groups. *Present*: exacerbation of adverse impacts from a lack of timely response. *Future*: adverse effects to communities begin to impact the wider region socioeconomically.	*Past:* same as No-Action Alternative – A. *Present:* same as No-Action Alternative – A, but potentially on a larger scale as the issue is unaddressed rather than a delayed response. *Future:* same as No-Action Alternative – A.

E. Clean Water Act Compliance

The projects described in this PEA will be consistent with 33 CFR 325 and 33 CFR 337. Although the Corps does not permit itself for civil works actions, Section 14 streambank projects will be consistent with the requirements of the Corps' Nationwide Permit (NWP) 13. For projects that disturb more than 1 acre, construction contractors will obtain National Pollutant Discharge Elimination System permits in accordance with Section 402 of the Clean Water Act.

State	State Authorization (401 WQC)	Federal Authorization (404 permit compliance)*
Pennsylvania	PA DEP - Ch. 105 permit or individual 401 WQC*	NWP 13
Ohio	Ohio EPA - 401 WQC	NWP 13
West Virginia	WV DEP - 401 WQC	NWP 13
Maryland	Maryland Dept. Env. - MDSPGP-4 or individual 401 WQC	NWP 13
New York	NY DEC - 401 WQC	NWP 13

* *Or State Programmatic General Permit as applicable.*

V. COORDINATION

As stated in the Standard Conditions of the Public Notice and this PEA, notification of initiation of a study will be sent to all appropriate Federal and state agencies at the beginning of the planning process. This will allow sufficient time for Federal and state agency representatives to identify any potentially sensitive areas within a proposed project area.

This Draft PEA and draft FONSI is being circulated to Federal and state agencies, and to the public for review and comment prior to finalizing the PEA and FONSI. All substantive comments from this review will be incorporated into Appendix B.

APPENDIX A - MAILING LIST

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APPENDIX B – AGENCY & PUBLIC REVIEW COMMENTS

Will be completed following agency and public review of the Draft FONSI and Draft PEA.