

Draft Restoration Plan and Environmental Assessment for the AdvanSix Hazardous Substance Releases in Gravelly Run

City of Hopewell, Virginia



Prepared by:

**Natural Resource Trustees:
U.S. Fish and Wildlife Service
Virginia Department of Environmental Quality**

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Abbreviations and Acronyms

AdvanSix	AdvanSix Resins & Chemicals LLC
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Contaminants of Potential Concern
CWA	Clean Water Act (or Federal Water Pollution Control Act)
DKY	Discounted kg over Time
DOI	United States Department of the Interior
DP1	Discounted Productivity
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
kg	Kilogram
LF	Linear Feet
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NRDAR	Natural Resource Damage Assessment and Restoration
NWR	National Wildlife Refuge
REA	Resource Equivalency Analysis
REC	Restoration Evaluation Criteria
RP/EA	Restoration Plan and Environmental Assessment
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VADEQ	Virginia Department of Environmental Quality
WW	Wet Weight

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1.0 Introduction

The U.S. Department of the Interior (DOI), acting through the U.S. Fish and Wildlife Service (USFWS), and the Commonwealth of Virginia, acting through the Virginia Department of Environmental Quality (VDEQ), on behalf the Virginia Secretary of Natural Resources, collectively the Natural Resource Trustees (Trustees) initiated a natural resource damage assessment and restoration (NRDAR) process to determine and quantify injuries to natural resources and their services resulting from releases of hazardous substances at and from the AdvanSix Resins & Chemicals, LLC (AdvanSix) facility located in Hopewell, Virginia (VA), into the waters of Gravelly Run and impacting natural resources down to its confluence with the James River. The Trustees determined that the releases of hazardous substances from the facility resulted in the death of an estimated 3,475 fish in 2014 and 1,480 fish in 2017. As part of the NRDAR process, the Trustees are authorized to identify appropriate restoration actions to compensate for the injuries to natural resources and their services, and seek to recover compensation from the entity responsible for these injuries.

1.1 Purpose and Need for Restoration

This Draft Restoration Plan/Environmental Assessment (RP/EA) has been prepared by the Trustees to address the natural resources injured and ecological services lost due to releases of hazardous substances associated with the AdvanSix facility which occurred on or about November 25, 2014 and October 13, 2017. The purpose of this Draft RP/EA is to present the “Preferred Alternative” restoration project or projects that will accomplish the goal of restoring, rehabilitating, replacing and/or acquiring the equivalent of those natural resources, and the services those resources provide, that were injured by the release. The Trustees developed this Draft RP/EA in accordance with 43 C.F.R. § 11.93 to inform the public as to the types and scale of restoration to be undertaken towards compensating for injuries to natural resources. Consistent with the NRDAR regulations, this Draft RP/EA includes a reasonable number of restoration alternatives and identifies a Preferred Alternative. Public comments are being sought on this Draft RP/EA and will be considered and incorporated in the final RP/EA as appropriate.

1.2 Natural Resource Trustees and Authority

Pursuant to the authority of Section 107(f) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. § 9607(f) (CERCLA); Federal Water Pollution Control Act (commonly known as the Clean Water Act), as amended, 33 U.S.C. § 1321(f)(4) and (5), (CWA); Subpart G of the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. §§ 300.600, 300.605 (NCP); and other applicable Federal and State

laws, designated Federal and State authorities may act on behalf of the public as natural resource trustees to pursue natural resource damages for injury to, destruction of, or loss of natural resources and their services resulting from the release of hazardous substances to the environment.

The President has designated Federal resource trustees in the NCP, 40 C.F.R. § 300.600, and through Executive Order 12580, dated January 23, 1987, as amended by Executive Order 13016, dated August 28, 1996. Pursuant to the NCP, the Secretary of the DOI acts as a Trustee for natural resources managed or controlled by the DOI, and their supporting ecosystems. In this matter, the USFWS is acting on behalf of the Secretary of the DOI as Trustee for natural resources under its jurisdiction, including but not limited to migratory birds and endangered and threatened species.

In accordance with 42 U.S.C. § 9607(f)(2)(B) and the NCP, the Virginia Secretary of Natural Resources has been designated the natural resource Trustee by the Governor of Virginia. The Commonwealth of Virginia, acting through the Virginia Department of Environmental Quality (VDEQ) on behalf of the Virginia Secretary of Natural Resources acts on behalf of the public as Trustee for natural resources, including their supporting ecosystems, within the boundaries of their state, or belonging to, managed by, controlled by, or appertaining to Virginia. The State and Federal Trustees may have overlapping jurisdiction over the natural resources potentially affected in this matter. This shared trusteeship is reflected in the coordinated wildlife management practices of the USFWS and Virginia, and is consistent with the management policies of Virginia and the USFWS.

This Draft RP/EA was prepared jointly by the Trustees in accordance with Section 111(i) of CERCLA and its implementing regulations (43 C.F.R. § 11.93). In addition, federal trustees must comply with the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 et seq., and its regulations, 40 C.F.R. § 1500 et seq., when planning restoration projects. NEPA requires a federal agency to consider the potential environmental impacts of a planned federal action(s) to determine if the proposed action(s) may significantly affect the environment and to inform and involve the public in the decision-making process. In compliance with NEPA, this Draft RP/EA summarizes the current environmental setting where the proposed restoration actions may take place, describes the purpose and need for restoration actions, and identifies alternatives and their potential environmental consequences and provides an environmental analysis of the restoration actions. Other potentially applicable laws and regulations include the Endangered Species Act (16 U.S.C. § 1531, et seq.) (ESA) and the National Historic Preservation Act of 1966 (16 U.S.C. § 470 et seq.) (NHPA).

1.3 Public Participation

Public review of the Draft RP/EA is an integral component of both NEPA and the CERCLA/ NRDA process pursuant to 43 C.F.R. § 11.81(d)(2) and § 11.93. Through the public review process, the Trustees seek public comment on the restoration alternatives and the Trustees' Preferred Alternative to restore injured natural resources or replace resource services lost as a result of past releases.

The Draft RP/EA will be available for public comment for 30 days from the date of publication of the Notice of Availability in the Federal Register. Interested individuals, organizations, and agencies may submit comments by writing or emailing:

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An electronic version of the Draft RP/EA will be posted on the DOI NRDAR website (https://www.cerc.usgs.gov/orda_docs/DocHandler.ashx?task=get&ID=5856).

The Trustees will review and consider all public comments and input on the Draft RP/EA received during the public comment period prior to finalizing the RP/EA. The Final RP/EA will address public comments received and will document responses to those comments as an appendix to the Final RP/EA. As restoration progresses, the Trustees may amend the RP/EA if significant changes are anticipated to the type, scope, or impact of the projects. In the event of a significant modification to the RP/EA, the Trustees will provide the public with an opportunity to comment on that particular amendment.

The Trustees have maintained records documenting the information considered and actions taken during this NRDAR process. These records are available on the Virginia Field Office NRDAR website. Physical copies of the records are also available for review by interested members of the public at the USFWS Virginia Field Office, 6669 Short Lane, Gloucester, VA 23061. However, arrangements must be made in advance to review or obtain copies of these records by contacting the USFWS representative listed above. Access to and copying of these records is subject to all applicable laws and policies, including laws and policies relating to copying fees and the reproduction or use of any material that is copyrighted.

1.4 Overview of the AdvanSix Facility Releases

The Facility consists of 450 acres and is located approximately 1 mile southeast of the confluence of the James and Appomattox Rivers. The facility is bounded on the east by the James River and on the north by Poythress Run. Gravelly Run crosses the southern portion of the property. Both Poythress and Gravelly Runs are tributaries to the James River. Bailey Creek, located to the southeast of the facility, is another tributary to the James River. The surrounding area is industrial with some residential areas to the north, south, and west of the facility.

On or about November 25, 2014 and October 13, 2017, hazardous substances associated with the AdvanSix facility were released into Gravelly Run, resulting in subsequent fish kills. The first release, on or about November 25, 2014, consisted of approximately 5,500 pounds of

ammonium carbonate, of which, approximately 600 pounds discharged directly to an outfall on Gravelly Run. Gravelly Run was surveyed by the VDEQ and the USFWS from the facility to the confluence with the James River to determine the number of dead fish attributed to the ammonium carbonate release. A subset of the dead fish were collected for species identification. Response or remedial actions after the releases did not address injuries to natural resources and the services provided by those resources. This unpermitted release caused a fish kill in Gravelly Run from the release point for a distance of approximately 1.5 miles to the confluence with the James River. The release of ammonium carbonate adversely affected multiple fish trophic guilds inhabiting Gravelly Run (benthic feeders (*e.g.*, American eel (*Anguilla rostrata*)), insectivorous fish (*e.g.*, eastern mosquitofish (*Gambusia holbrooki*)), and top water predators (*e.g.*, largemouth bass (*Micropterus salmoides*)). In addition, the impact to the fish community may represent a loss in prey base services to raptors (*e.g.*, bald eagles (*Haliaeetus leucocephalus*) and osprey (*Pandion haliaetus*)) which may use Gravelly Run as a foraging area. The potential also exists for direct injury to sediment dwelling organisms from this release.

A subsequent unpermitted release of phenol from the facility on or about October 13, 2017 caused another fish kill. VDEQ responded following notification of the spill by AdvanSix. VDEQ counted 1,451 fish at the mouth of Gravelly Run. Based on the state of decomposition of some of the fish, VDEQ estimated the release had occurred within the previous 24 hours. USFWS conducted a site investigation on October 18, 2017 to provide confirmation that the fish kill was not ongoing. An additional 30 dead fish were observed in the water or along the shore, as well as several bones from about 10 additional fish that had been scavenged. The predominant species killed from this release was blue catfish (*Ictalurus furcatus*). Other species of fish killed from this release included: white perch (*Morone americana*), striped bass (*Morone saxatilis*), carp (*Cyprinus carpio*), and gizzard shad (*Dorosoma cepedianum*).

1.5 Summary of the Proposed Settlement Agreement

A proposed settlement agreement was documented in a draft Settlement Agreement, notice of which was published in the Federal Register for public review and comment simultaneously with the release of this Draft RP/EA. Under the proposed settlement, AdvanSix agrees to pay \$255,000 consisting of \$70,690 to compensate the Trustees for their actual past assessment costs, \$6,100 for administrative costs associated with restoration planning, implementation and monitoring, and \$178,210 to fund the Preferred Alternative identified in Section 3.0.

1.6 Organization of the AdvanSix RP/EA

The sections that follow describe the injury to natural resources and lost services as a result of the AdvanSix releases (Section 2); restoration alternatives and evaluation under Restoration Evaluation Criteria (Section 3); the affected environment and the probable consequences on the human environment that may result from the implementation of the alternatives (Section 4); the potential cumulative impacts from the proposed activities, including past, current, and foreseeable

future projects (Section 4); and a general monitoring framework for the Preferred Alternative (Section 5).

2.0 Injury to Natural Resources, Restoration Scaling, and Damages Determination

The goal of the injury assessment is to determine the nature and extent of injuries to natural resources and to quantify the resulting resource and service losses, providing a basis for evaluating the need for, type, and scale of restoration actions. The Trustees conducted inspections of the areas affected by the spill and reviewed data collected from spill response agencies to document natural resource injuries and recovery. The Trustees also evaluated several restoration projects. The scale (or size) of the restoration action should be sufficient to appropriately offset the natural resource losses. The process of determining the size of restoration is called restoration scaling. Restoration scaling requires a framework for quantifying the value of losses and for quantifying the benefits of restoration so the losses and benefits can be compared.

The hazardous substance releases from the AdvanSix facility resulted in ecological injuries to Gravelly Run. To support the injury determination, the Trustees may assess injury based on physical, chemical, or biological adverse changes in a resource resulting from exposure to toxic chemicals. Examples of these injuries include changes in an organism's reproductive success or death. For the AdvanSix NRDAR, fish were identified as the representative resource for the ecological injury due to the amount of data available showing evidence of injury (death) and the overlapping restoration needs of the impacted resources. For example, restoration projects designed to compensate for the injury to fish in this case, (*e.g.*, sunfish, darters, catfish, suckers, and shiners) are anticipated to provide benefits to multiple other aquatic species that may have been impacted (*e.g.*, invertebrates, waterfowl, raptors, reptiles and amphibians).

Staff from the VDEQ and USFWS responded to both incidents and conducted fish surveys (Figure 2-1). Gravelly Run was divided into 3 stream sections (A, B, and C) and fish counts were conducted in each section. Response personnel documented a total of 4,956 dead fish representing 12 species (Tables 2-1 and 2-2). Extrapolation of fish counts in inaccessible reaches was done by dividing the number of fish counted by the linear feet (LF) of each of the stream segments surveyed during the counting process, and multiplying the result by the number of LF of stream that was not covered during the counting process (*e.g.* inaccessible reach). Final results were rounded up.



Figure 2-1. Fish kill count segment locations (A,B, and C), 11/25/2014 and 10/13/2017, in Gravelly Run, Hopewell, VA. Stream reaches where fish counts were conducted are indicated in blue. Inaccessible stream reaches where fish counts were extrapolated are indicated in red.

Table 2-1. List of fish species known to have been killed from the hazardous substance release in Gravelly Run on November 17, 2014.

Fish Species	Fish Length (inches)	Sum of Actual and Extrapolated Fish Count
Blue Catfish (<i>Ictalurus furcatus</i>)	16	76
	18	463
	24	61
American Gizzard Shad (<i>Dorosoma cepedianum</i>)	12	38
Common Carp (<i>Cyprinus carpio</i>)	12	1
	16	1
	24	1
Smallmouth Bass (<i>Micropterus dolomieu</i>)	8	1
American Eel (<i>Anguilla rostrata</i>)	6	1
Largemouth Bass (<i>Micropterus salmoides</i>)	7	1
Striped Mullet (<i>Mugil cephalus</i>)	12	1
White Perch (<i>Morone americana</i>)	5	3
Eastern Mosquitofish* (<i>Gambusia holbrooki</i>)	2	1,412
Atlantic Silverside* (<i>Menidia menidia</i>)	4	1,412
TOTAL		3,475

*Total for eastern mosquitofish and Atlantic silverside were each 1000+, but are listed conservatively as 1,412 with the extrapolation.

Table 2-2. List of fish species known to have been killed from the hazardous substance release in Gravelly Run on October 13, 2017.

Fish Species	Fish Length (inches)	VDEQ Counts	USFWS Additional Counts	Sum of Actual and Extrapolated Fish Count
Blue Catfish	12	226	3	229
	18	687	8	695
	24	431	5	436
	30	98	1	99
	36	2	0	2
Common Carp	12	2	2	4

Striped Bass (<i>Morone saxatilis</i>)	8	2	0	2
White Perch (<i>Morone americana</i>)	6	5	0	5
American Gizzard Shad (<i>Dorosoma cepedianum</i>)	12	0	8	8
Sunfish (various species)	4	0	3	3
TOTAL*	1,451	30	1,480	

*Numbers do not sum to totals due to rounding from extrapolation.

Resource Equivalency Analysis (REA), an evaluation approach commonly used in NRDAR cases to quantify injuries and scale restoration, was used in conjunction with the fish injury data, to determine what natural resource services would have been present over time had injury from hazardous substances not occurred. A common biological unit of measure for REA is the number of individual animals killed, but the arithmetic of equivalency analysis can also accommodate quantities of biomass lost. In the case of a biomass-based REA, dead fish can be counted and mass can be measured or assigned based on other data and literature (e.g., data from fishbase.org).

To quantify the loss and facilitate scaling of restoration, the total weight in kilograms (kg) of the 4,955 fish killed were assigned a forgone lifespan, resulting in discounted kg over time (DKYs) using the standard 3% discount rate. The fish biomass DKYs were converted to kg wet weight (ww) prey productivity (e.g., fish food like smaller fish, algae, invertebrates) using trophic transfer. The result is 1,021,042 discounted prey productivity (DP1) years.

Because the debit was developed based on prey biomass lost, the crediting was calculated based on prey biomass restored. For purposes of settlement only, the Trustees used 9,782 kg per acre per year of appropriate prey biomass for marsh productivity and land development risk, resulting in a credit of 41,280 DP1 years credits per acre. The total debit divided by credit (scaling) resulted in approximately 25 acres of marsh needed to offset the fish kills.

3.0 Restoration Alternatives

Restoration of resources injured and services lost by the spills are the goal of the Gravelly Run NRDAR process. The purpose of the actions identified in this Draft RP/EA is to restore, rehabilitate, replace, or acquire the equivalent of natural resources that were injured or destroyed and resulting lost services due to the release of hazardous substances pursuant to the requirements of applicable federal and state laws and regulations.

3.1 Restoration Alternatives Evaluation Criteria

To ensure the appropriateness and acceptability of restoration options addressing ecological losses, the Trustees evaluated each option against restoration evaluation criteria. Below are the criteria used to evaluate potential restoration projects as part of the AdvanSix chemical releases. The criteria

reflect the “factors to consider when selecting the alternative to pursue” (Restoration Evaluation Criteria) as described in 43 C.F.R. § 11.82(d)(1-10):

- (1) Technical feasibility.
- (2) The relationship of the expected costs of the proposed actions to the expected benefits from the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources.
- (3) Cost-effectiveness.
- (4) The results of any actual or planned response actions.
- (5) Potential for additional injury resulting from the proposed actions, including long-term and indirect impacts, to the injured resources or other resources.
- (6) The natural recovery period determined in 43 CFR 11.73(a)(1) of this part.
- (7) Ability of the resources to recover with or without alternative actions.
- (8) Potential effects of the action on human health and safety.
- (9) Consistency with relevant Federal, State, and tribal policies.
- (10) Compliance with applicable Federal, State, and tribal laws.

Secondary criteria:

- Self-sustainability
- Integration with existing management programs/leverage potential
- Habitat connectivity (*e.g.*, result is larger individual habitat parcels rather than multiple, smaller, disconnected parcels)
- Proximity to lands with protected status

3.2 Alternatives Considered, But Not Further Evaluated

Alternatives considered and eliminated from further study included: 1) constructing a 3,600 LF walking path along the Appomattox River. The Hopewell Riverwalk section would protect the river shoreline and link the Hopewell City Park Trailhead to the public marina park for recreational use by residents and visitors; and 2) providing funding to assess restoration project opportunities to restore streams, wetlands, and greenway trails. The Trustees found that these alternatives did not have sufficient nexus (connection) to the injuries (lost fish and fish biomass), therefore no further evaluation was performed.

3.3 Proposed Restoration Alternatives and Evaluation

The following subsections discuss potential alternatives to restore, rehabilitate, replace, and/or acquire the equivalent of the injured resources affected by the AdvanSix chemical releases. Trustees evaluated the alternatives to determine if they provide sufficient type, quality, and quantity of ecological services to compensate for those lost due to contamination in the context of both site-specific and Restoration Evaluation Criteria (43 C.F.R. §11.82 (d)) (Table 3-1). The Trustees also evaluated whether significant effects may be associated with the proposed alternatives to restore the natural resources and services injured or lost due to the releases of

hazardous substances as required by NEPA (40 C.F.R. §1508.9(b)). Table 3-1 summarizes the results of the Trustees' evaluation and the preferred alternative as presented in Section 3.2.2.

3.3.1 Alternative 1 - No Action/Natural Recovery

As required under CERCLA and NEPA, the Trustees considered a No Action Alternative. Under natural recovery, the Trustees would take no direct action to compensate for interim losses, pending recovery, associated with the injured fishes and their lost services from the AdvanSix releases. The Trustees would allow natural processes to occur, which could result in the interim losses of natural resources not being restored. The principal advantages of this approach are the ease of implementation and the absence of monetary costs. If Trustees selected this Alternative, the public would not be compensated for the losses in natural resources and services caused by the AdvanSix releases. The Trustees found that the No Action Alternative would not satisfy the Restoration Evaluation Criteria under CERCLA. This Alternative would not compensate for injured resources or recreational use and technically feasible and cost effective restoration approaches are available to compensate for these losses. Therefore, the No Action Alternative is not a Preferred Alternative when evaluated against the NRDAR evaluation criteria.

3.3.2 Alternative 2 – Land Conservation (Preferred Alternative)

Alternative 2 involves the acquisition of approximately 25 acres of marsh and upland properties along Powell Creek, a tributary of the James River and ultimate transfer to the James River National Wildlife Refuge in Prince George County, Virginia for long-term stewardship and conservation in perpetuity. This action is a Preferred Alternative because it meets all of the criteria identified by the Trustees for a restoration project to address the injuries caused by the releases. This Alternative is expected to increase habitat quality, promote habitat connectivity, create new public use opportunities, and benefit public natural resources within the Powell Creek watershed. Acquisition and conservation of wetlands along Powell Creek will protect significant forest and wetland habitat with at risk, rare, and/or endangered aquatic species, adding greater access for the public to river-based recreation.

Habitat creation or preservation projects have been used in other NRDAR restoration actions to compensate for injuries of wildlife, fish and invertebrates (Rowe et al. 2010, McCay and Rowe 2003). Most freshwater fish depend on wetlands for spawning, and anadromous fish rely on them as nurseries for fry. Wetlands also provide essential ecosystem functions that technology has yet to rival such as flood mitigation (especially riverine wetlands), storm abatement, and nutrient and toxic material filtering. Wetlands are significant for global cycles of nitrogen, sulfur, methane, and carbon dioxide (Mitsch and Gosselink 1993).

Powell Creek watershed is categorized as Resource Protection Areas (RPAs) which are a component of the Chesapeake Bay Preservation Area. RPAs consist of groupings of sensitive environmental features, which include tidal wetlands, certain non-tidal wetlands, tidal shores, and buffer areas. As defined by the Code of Virginia at 9VAC25-830-80, RPAs consist of “*lands adjacent to water bodies with perennial flow that have an intrinsic water quality value due to the*

ecological and biological processes they perform or are sensitive to impacts which may result in significant degradation to the quality of state waters.” In their natural condition, these lands provide for the removal, reduction, or assimilation of sediments, nutrients and potentially harmful or toxic substances in runoff entering the bay and its tributaries, and minimize the adverse effects of human activities on State waters and aquatic resources. Recognizing the importance of the tributaries of the Chesapeake Bay to provide significant ecological benefits by providing water quality maintenance and pollution control as well as flood and shoreline erosion control, Prince George County enacted [Article XIV A](#) to implement the requirements of the Code of Virginia, § 10.1-2100 et seq., the Chesapeake Bay Preservation Act.

3.3.3 Alternative 3 – Stream Stabilization

This Alternative proposes to stabilize a stream segment of an unnamed tributary of Cattail Creek within the City of Hopewell. The stretch of stream is approximately 800 feet and is regularly impeded with woody debris and sediment scoured from the upstream channel. Visual observation has been impeded by heavy vegetation, but it is likely that this embankment is undergoing erosion and is in danger of being undermined, leading to possible failure of the adjacent sidewalk and roadway. Work would involve stabilization of the embankment with an armored retaining wall and installing stream channel stabilization to the extent allowed by the U.S. Army Corps of Engineers (USACE) and VDEQ. A sediment forebay and/or debris screen would be installed to minimize the obstruction of the culverts while also facilitating regular cleaning by City of Hopewell personnel. Completion of this project will provide reductions in sediment, nutrients, trash and debris being transported into Cattail Creek and the James River.

The restoration of the natural resources located in the areas described in this Alternative will result in unknown impacts which are suspected to be minimal and of a temporary nature biologically. Construction will produce a temporary increase in sediment and turbidity to the creek from the disturbance of soil and placement of fill. Haul trucks and construction equipment may produce dust. Access to this project site and the creek channel by construction equipment will most likely produce temporary disruptions in traffic flow and temporary impacts to private property. These impacts will require the use of erosion and sediment control measures detailed in an approved erosion and sediment control plan by the county and state water quality regulators. Long-term consequences of the actions will be increased native vegetation and reduced bank erosion leading to improved water quality, diversity of aquatic habitat, and restored riparian habitat. The Trustees determined that this restoration Alternative would result in negligible change in public use of the affected areas and would not individually or cumulatively have a significant permanent impact on the human environment. The Trustees found this Alternative to be technically feasible but costly with varying levels of success due to the uncertainty of permitting allowances from the federal and state agencies, so it was not a Preferred Alternative.

Table 3-1. Evaluation of Restoration Alternatives for the Gravelly Run hazardous substance release under Restoration Evaluation Criteria.

Restoration Alternatives 1-5		
Alternative	Project	Restoration Evaluation Criteria
1	No Action/Natural Recovery	<ol style="list-style-type: none"> 1. Technical Feasibility: Not applicable. 2. Cost/Benefit: Not applicable 3. Cost Effectiveness: Not applicable 4. Likelihood of Success: Interim losses due to chemical spill not restored. 5. Additional Injury: Additional interim loss would occur. 6. Recovery Period: Decades 7. Recovery Ability: Limited, would require decades. 8. Public Health and Safety: Not applicable. 9. Policy Consistency: Fail. Restoration is feasible under CERCLA. 10. Regulatory Compliance: Not applicable 11. Self-sustainability: Not applicable. 12. Integration with Existing Management Programs: None 13. Habitat Connectivity: Not applicable. 14. Proximity to Lands with Protected Status: Not applicable.
2	Land Protection	<ol style="list-style-type: none"> 1. Technical Feasibility: High 2. Cost/Benefit: High 3. Cost Effectiveness: High 4. Likelihood of Success: High 5. Additional Injury: No 6. Recovery Period: Short 7. Recovery Ability: High 8. Public Health and Safety: No Concerns 9. Policy Consistency: Compliant 10. Regulatory Compliance: Compliant 11. Self-sustainability: Yes 12. Integration with Existing Management Programs: Consistent with NWR goals and management 13. Habitat Connectivity: Yes 14. Proximity to Lands with Protected Status: Yes

3	Stream Stabilization	<ol style="list-style-type: none"> 1. Technical Feasibility: High 2. Cost/Benefit: Moderate 3. Cost Effectiveness: Moderate 4. Likelihood of Success: does not fully restore injury 5. Additional Injury: Temporary impacts due to sediment releases and instream work 6. Recovery Period: High 7. Recovery Ability: High 8. Public Health and Safety: Moderate concerns during construction 9. Policy Consistency: Compliant 10. Regulatory Compliance: Compliant 11. Self-sustainability: Would likely require upkeep over time 12. Integration with Existing Management Programs: Yes 13. Habitat Connectivity: Yes 14. Proximity to Lands with Protected Status: No
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3.4 Preferred Restoration Alternative

The Trustees propose Alternative 2 – Land Conservation as the Preferred Alternative. This Alternative meets all the Restoration Evaluation Criteria and best meets the CERCLA guidance to compensate for the loss of fish and their services.

4.0 Environmental Assessment Under NEPA

This section presents information about the affected area of the Preferred Alternative and the Trustees’ analysis of the environmental consequences of implementing the Preferred Alternative. The EA only applies to the No Action Alternative and preferred Alternative 2.

4.1 The Affected Environment

This sub-section presents a brief description of the physical, biological, and cultural environment for the affected area sites located in the Powell Creek watershed in Prince George County, Virginia. According to the U.S. Census Bureau, Prince George County has a total area of 265.12 square miles, of which approximately 17 square miles is water (2018). Prince George County’s altitude ranges from about sea level to 175 feet above sea level. The Powell Creek watershed, a tributary to the James River, encompasses < 40 square miles.

The affected area sites are made-up of two tracts totaling approximately 20 acres of wetlands. Additional acres totaling approximately 289 acres, within the two tracts include riparian protection areas and uplands. These sites are immediately adjacent to the James River National Wildlife Refuge (NWR). The James River NWR is 4,393 acres of forest and wetland habitats managed for the protection and conservation of native flora and fauna. Specifically the property was established in 1991 to protect the bald eagle (*Haliaeetus leucocephalus*) and other species of conservation

concern. Powell Creek forms 4 miles of the NWR's western boundary. The Powell Creek watershed would be affected by proposed acquisition as it would allow for instream habitat improvements, riparian improvements, and water quality benefits by transitioning upland uses. Additionally public benefits include wildlife observation opportunities and potential fishing access.

4.1.1 Physical Environment

The affected area is located in the James River Basin, the largest of Virginia's Chesapeake Bay watersheds. More specifically, the sites are located entirely within the Lower James River USGS hydrologic unit (HUC 02080206). The sites lie within the Virginia Coastal Plain Physiographic Province of the Atlantic Coastal Plain, as delineated by USGS. Physiographic provinces are broad-scale subdivisions based on terrain topography, rock type, and geologic structure and history. The Virginia Coastal Plain Physiographic Province consists of a series of terraces, or scarps, sloping toward the coast, with each terrace representing a former shoreline. It is the youngest physiographic province in the State and consists primarily of Holocene (11,700 years ago to present) and Pleistocene (2.6 million to 11,700 years ago) age sedimentary deposits of sand, clay, marl, and shell (Meng and Harsh 1988). Its principle characteristics are a generally low topographic relief, extensive marshes, and tidally influenced rivers and creeks (USFWS 2007).

Climate is humid and subtropical as determined by latitude, topography, prevailing westerly winds, and the influence of the Atlantic Ocean. Average annual temperature fluctuations typically range from a high of approximately 70 degrees Fahrenheit to a low of approximately 48 degrees Fahrenheit. The average monthly temperatures ranges from 37 degrees in January to 83 degrees in July. Precipitation averages 44 inches annually, with peak rainfall occurring in the summer. Local annual average relative humidity is 68%. Average annual snowfall is 7.9 inches (USFWS 2015).

The water resources of the affected environment sites are positioned at the confluence of tidal and non-tidal influences. The transition zone fluctuates between slightly brackish waters and fresh waters. Rain, wind, and full moon tides can cause changes as to where the intertidal zone occurs.

A segment of the estuarine area (0.4 square miles of Powell Creek subwatershed) is 303(d) listed as impaired due to the presence of noxious aquatic plants, organic enrichment, and oxygen depletion (Moore et al. 2006, VDEQ 2010). A 6.92 mile segment of Powell Creek from its headwaters downstream to its tidal limit is also listed as impaired due to bacteria (USEPA 2008, VDEQ 2012). Among the probable sources contributing to its impairment are agriculture, atmospheric deposition of nitrogen, clean sediments entering the waterway, industrial point source discharges, natural plant and wildlife nutrient cycling, loss of riparian habitat, municipal discharges and/or sewage, and stormwater. Reductions in point and non-point sources of pollution will be necessary to restore water quality conditions to those waters. Waste Load Allocations have been established for bacteria control for local residences that discharge to an upstream tributary, and potential future permits. Also, there have been recent years where the oxygen levels in Powell Creek have met limits.

4.1.2 Biological Resources

The northern extent of the Powell Creek watershed is biologically diverse and contains multiple habitat types and hundreds of different native plant and animal species. The area has had Virginia Native American presence thousands of years prior to the colonial human occupation which began 400 years ago. As a result of that extensive human use, the natural environment has been modified due to agricultural, logging and mining activities. Residential and commercial development associated with mill works, homes, and community infrastructure has also changed the landscape. Many of these changes were short-lived and sites have been allowed to return to a nature state. A few sites still show the heavy impacts of land manipulation. Some sites are actively being restored as human built environments are being transitioned for conservation purposes. The James River NWR is the largest landowner in the immediate vicinity and manages its property to promote natural habitats. Overall, the northern portion of the watershed is dominated in forest, wetlands, and fields. Forests largely fall into three distinct habitat types: pine-dominated (managed and unmanaged), moist hardwood, and floodplain. Freshwater/brackish marsh and shrub swamps bounded by varied waterways define the wetland habitats. Non-forested uplands are made-up of fallow fields, meadows, and actively farmed agricultural land.

This mixture of largely unspoiled habitats makes Powell Creek and adjacent tributaries and lands suitable for 50 fish species, over 200 bird species, 45 mammal species, 82 reptile/amphibian species and an estimated 1,000 species of invertebrates, including over 400 species of beetles (USFWS 2015). Riparian and riverine areas of Powell Creek support resident and migratory species such as raptors, waterfowl, waterbirds, neo-tropical songbirds, deer, small mammals, turtles, snakes, frogs and salamanders.

4.1.2.1 Rare, Threatened, Endangered, and Special Concern Species

Although minimal documented records exist, the affected area hosts suitable habitat for a variety of rare, threatened, endangered, and special concern flora and fauna species. Powell Creek and the adjacent James River NWR have been identified as supporting 118 bird species of priority species common to Bird Conservation Regions 27 and 30, and the Virginia Wildlife Action Plan (VDGIF 2015). Representative mammals include the tier 1 species Rafinesque's big-eared bat (*Corynorhinus rafinesquii*). Additionally, tier 3 reptile species such as the eastern box turtle (*Terrapene carolina*) and the spotted turtle (*Clemmys guttata*) are known to be present.

Atlantic sturgeon is among the oldest fish species living on earth dating back at least 70 million years (USFWS 2016). They are anadromous fish and spend most of their lives in saltwater and enter freshwater to spawn. The James River NWR is among the USFWS refuges where populations of this federally listed threatened species is known to occur.

Wetland and riparian banks within the two tracts proposed for land conservation may support habitat for plants such as the federally listed threatened sensitive joint vetch (*Aeschynomene virginica*), and lupine (*Lupinus perennis*), a larval host plant for the frosted elfin butterfly (*Callophrys irus*).

4.1.3 Archeological and Cultural Resources

No known archeological or cultural resources have been identified to be present within the affected area. The adjacent James River NWR and Flowerdew Hundred Plantation are known to contain significant cultural resources that have contributed to and have the potential to advance our understanding of Virginia prehistory and history. The heritage surviving at the NWR and plantation includes a material culture chronicling Native American culture, initial settlement of the James River by Europeans, Native American response to European settlement, Plantation society, military history, and post-Civil War rural agriculture. On the NWR there are 7 known archeological sites, and 53 potential historic locations. One site located across Flowerdew Hundred Road from the affected area was an old mill on Powell Creek which dates back to the 1700s. It was damaged during the Civil War, but reopened and operated until 1920 (USFWS 2015).

No known archeological sites and resources are within the affected area and will not be impacted by the Preferred Alternative.

4.1.4 Recreational Services

Local, state, and national parks, NWRs, and recreation areas existing near the affected area include: the Appomattox Regional Park, Richmond National Battlefield Park, Presquile NWR, Prince George County parks. The closest area that offers recreational opportunity is the adjacent James River NWR. With a wildlife refuge authorization permit (obtained in advance), the public can access a nature trail, canoe/kayak launch, and participate in wildlife observation, hunting, environmental education, interpretation and nature photography recreation.

4.1.5 Socioeconomic Trends

The U.S. Census Bureau lists the population of Prince George County as 38,082 in 2018 with a 6.6% increase since 2010. Density is 134.7 people per square mile. The largest ethnicity is 60.7% white, 23% of the population greater than 25 years of age have a Bachelor's degree or higher, and per capita income is \$27,970. The poverty rate is 10.7%. (www.census.gov/quickfacts/princegeorgecountyvirginia).

5.0 Environmental Consequences Under NEPA

The purpose of the environmental consequences analysis section is to evaluate the consequences of implementing the Preferred Alternative on the environment. This information will provide pertinent information to the decision-maker and the public. The analysis for each alternative will vary depending on the scope, magnitude, and environmental effects of the alternative.

NEPA requires that the potential impacts of the proposed restoration actions are evaluated, including evaluation of the No Action Alternative. This section of the Draft RP/EA includes

discussion of the potential impacts of both the No Action Alternative and the proposed Preferred Alternative identified in Section 3.0. The analyses presented here considered the range of potential environmental consequences that may be anticipated to occur as a result of implementation of activities within the scope of the Preferred Alternative.

The following definitions are used in this section to characterize the nature of the various impacts evaluated in this Draft RP/EA:

- Short-term or long-term impacts. These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period. Long-term impacts are those that are more likely to be persistent and chronic.
- Direct or indirect impacts. A direct impact is caused by a proposed action and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.
- Minor, moderate, or major impacts. These relative terms are used to characterize the magnitude of an impact. Minor impacts are generally those that might be perceptible but, in their context, are not amenable to measurement because of their relatively minor character. Moderate impacts are those that are more perceptible and, typically, more amenable to quantification or measurement. Major impacts are those that, in their context and due to their intensity (severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27) and, thus, warrant heightened attention and examination for potential means for mitigation to fulfill the requirements of NEPA.
- Adverse or beneficial impacts. An adverse impact is one having adverse, unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.
- Cumulative impacts. CEQ regulations implementing NEPA define cumulative impacts as the “impacts on the environment which result 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.” (40 CFR 1508.7) Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time within a geographic area.

5.1 Environmental Consequences of the No Action Alternative

NEPA requires the Trustees to consider a “no action” alternative. Under this alternative, the Trustees would take no direct action to restore injured natural resources or compensate for lost services pending natural recovery. Instead, the Trustees would rely on natural processes for recovery of the injured natural resources and their associated services. While natural recovery would occur over varying time scales for the injured resources services, the interim losses suffered would not be compensated under the “no action” alternative.

The principal advantages of this approach are the ease of implementation and low cost. This approach relies on the capacity of ecosystems to recover without human intervention. CERCLA, however, establishes Trustee authority to seek compensation for interim losses pending recovery of the natural resources, losses which cannot be addressed through a “no action” alternative. The “no action” alternative is rejected as it does not meet the purpose and need for restoration. Losses occurred and impacts from this release continue during the period of recovery. Technically feasible, cost-effective alternatives exist to compensate for these losses.

5.2 Environmental Consequences of the Preferred Alternative

A summary of environmental consequences of the Preferred Alternative is provided in Table 5-1. Adverse impacts associated with implementation of Alternative 2 – Land Conservation are anticipated to be minor, temporary, direct, and indirect whereas benefits are moderate to major, long term, direct, and indirect. Anticipated impacts on the wetlands and the riparian areas of interest would be minor and temporary. Impacts such as trampled vegetation, discarded trash, and disturbance to wildlife will be direct and temporary, but minor. However, minimization and avoidance measures, and best management practices such as staff clearly defining public access locations, establishing time of year access restrictions, and/or conducting volunteer debris clean-ups when vegetation is dormant will reduce adverse effects.

5.3 Cumulative Impacts

The Council on Environmental Quality’s (CEQ) regulations to implement NEPA require the assessment of cumulative impacts in the decision-making process for federal projects, plans, and programs. Cumulative impacts are defined as “the impact 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” (40 C.F.R. §1508.7). As stated in the CEQ handbook, “Considering Cumulative Effects” (CEQ 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful. The cumulative effects analysis of the Preferred Alternative in this Draft RP/EA is commensurate with nature and the degree of direct and indirect effects anticipated from implementation of the projects. For the purpose of this analysis, the cumulative impact spatial boundary includes the Powell Creek watershed since that is where projects described would occur. The Preferred Alternative being evaluated in this EA is anticipated to result in predominantly beneficial impacts to recreational uses, with potential minor benefits to riverine and riparian habitat.

Implementing the Preferred Alternative as proposed and analyzed in this Draft RP/EA would have no major adverse impacts on the Powell Creek habitat, on adjacent lands and waterways, or on the natural resources within each. When considered with other past, present, and reasonably foreseeable future actions within the Powell Creek watershed, the Preferred Alternative is not anticipated to have adverse cumulative impacts. The Preferred Alternative is not expected to result in significant cumulative impacts on the human environment since they alone would not significantly change the larger current hydrological patterns of discharge, recreational use, economic activity or land-use in the Powell Creek watershed.

The Trustees concluded that the actions associated with the Preferred Alternative would not lead to significant adverse impacts, and have issued a finding of no significant impact (FONSI).

Table 5-1. Summary of Environmental Consequences of the No Action and Preferred Alternative.

Environmental Consequences	Alternative 1: No Action	Preferred Alternative
		Alternative 2 – Powell Creek Land Conservation
Physical Resources		
Hydrology and Water Quality	Project area water, air, and geological/sediment conditions would not be affected since no restoration would occur. Any ecological benefits that may result from Alternative 2 would not occur, and the trajectory of any ecologically degraded areas would remain unchanged.	Long-term, indirect, minor, and beneficial impacts since conservation activities could enhance habitat quality and return to natural conditions. Increase human use could result in increased trash in waterways.
Air Resources		No impact to local or regional air quality is expected.
Sediment/ Geology		Conservation activities have potential to maintain or enhance natural conditions over time. Improved sediment transport and surface runoff following conservation activities could improve aquatic habitat. Impacts are expected to be long-term, indirect, minor, and beneficial.
Biological Resources		
Fish and Wildlife	Project area fish, wildlife, vegetation, and special species would not be affected since no restoration would occur. Any biological	Long-term minor benefits to fish and wildlife are anticipated since the acquired land will be removed from development or conversion pressure and management can be implemented to control invasive species or complete other activities beneficial to fish and wildlife.

Vegetation	improvements that may occur from Alternative 2 would not be realized	Long-term, indirect, and minor benefits to vegetation are expected because habitats would be conserved and potentially enhanced, including control of invasive species.
Special Status Species		Same consequences as listed for Fish and Wildlife
Environmental Consequences	Alternative 1: No Action	Preferred Alternative
		Alternative 2 – Powell Creek Land Conservation
Socio-economics		
Economic	Project area socio-economic variables would not be affected since no restoration would occur. Potential economic benefits as a result of the enhanced recreational opportunities would not be realized.	Permanent public open space areas may have the effect of increasing nearby residential land values, and increases in recreational activity on the acquired land may result in increased economic activity. Thus, the economic impacts are expected to be long-term, direct, indirect, minor, and beneficial.
Aesthetics and Noise		Minor long-term benefit to aesthetic and scenic qualities and values associated with acquired lands since they will be conserved. There may be a minor increase in traffic and/or recreational noise due to increased human use.
Recreation		New or improved access to river and riparian habitat is expected. Resource-based recreational activities, such as for bird watching, canoeing, kayaking, fishing, and other similar activities, may result from this alternative.
Transportation		Increased traffic in the vicinity of acquired area could be minor to moderate if recreational access is enhanced. Although uncertainty remains until NWR management identify specific actions, impacts are anticipated to be long-term, indirect, minor and adverse.
Cultural and Historical		The potential for impacts to historic and cultural resources is location-dependent. Activities will be subject to review under Section 106 of the National Historic Preservation Act of 1966.
Public Health and Safety	Public health and safety would not be impacted since no restoration activities would be undertaken.	Land acquisition and conservation poses no health and safety risk. Improvements to the acquired land may result in improved safety conditions.

Environmental Justice	Project area socio-economic variables would not be affected since no restoration would occur.	The project, in general, does not create an adverse effect on any minority or low-income populations. An increase in public use of the newly acquired land could result in downstream economic activity in the project area and thus be generally beneficial to local economies.
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6.0 Project Fulfillment and Monitoring

Should the lands proposed for conservation be acquired through this settlement, they would be fully enveloped into the James River NWR. Stewardship of those tracts would carry all the protections currently provided the NWR System. Those areas would be in full conservation status and supported by the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 in conformance with USFWS policy and legal mandates.

These areas of interest will be managed by using existing NWR management goals and objectives for this habitat type: Protect, enhance, restore the ecological integrity of non-forest ecosystems to support native wildlife and plant communities, including species of conservation concern, and to ensure those ecosystems are resilient to anticipation of climate change. The James River NWR also safeguards nationally significant habitats along the lower James River for bald eagles and vulnerable species of the Chesapeake Bay.

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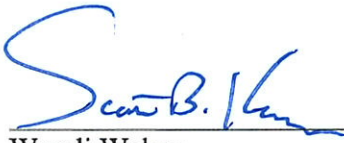
AdvanSix Hazardous Substance Releases
Natural Resource Damage Assessment and Restoration
Draft Restoration Plan/Environmental Assessment

In accordance with U.S. Department of the Interior (Department) policy regarding documentation for natural resource damage assessment and restoration projects (521 DM 3), the Authorized Official for the Department must demonstrate approval of draft and final Restoration Plans and their associated National Environmental Policy Act documentation, with concurrence from the Department's Office of the Solicitor.

The Authorized Official for the AdvanSix Hazardous Substance Releases is the Regional Director for the U.S. Fish and Wildlife Service's North Atlantic-Appalachian Region.

By the signatures below, the draft Restoration Plan/Environmental Assessment (RP/EA) is hereby approved. This approval does not extend to the final RP/EA. The draft RP/EA shall be released for public review and comment for a minimum of 30 days. After consideration of the public comments received, the RP/EA may be revised to address such comments.

Approved:

 NOV 15 2019

Date

Acting
Wendi Weber
Regional Director
North Atlantic-Appalachian Region
U.S. Fish and Wildlife Service

Concurred:

 12/18/2019

Date

Mark Barash
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AdvanSix Resins & Chemicals, LLC
Natural Resource Damage Assessment and Restoration

Draft Restoration Plan/Environmental Assessment

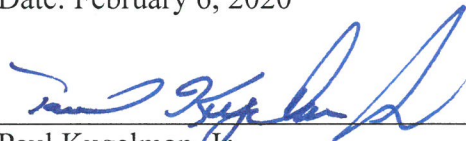
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Concur:

Date: February 6, 2020

A handwritten signature in blue ink, appearing to read "Paul Kugelman, Jr.", is written over a horizontal line.

Paul Kugelman, Jr.
Senior Assistant Attorney General
Chief, Environmental Section
Counsel for the Trustee of Virginia's Natural
Resources