FINAL

RESTORATION PLAN AND ENVIRONMENTAL ASSESSMENT

FOR THE

CORNELL-DUBILIER ELECTRONICS, INC. SUPERFUND SITE

SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

AUGUST 2021

Prepared by:

Cornell-Dubilier Electronics, Inc. Superfund Site Trustee Council

U.S. Fish and Wildlife Service on behalf of the U.S. Department of Interior

National Oceanic and Atmospheric Administration on behalf of the U.S. Department of Commerce

New Jersey Department of Environmental Protection on behalf of the State of New Jersey

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1 INTRODUCTION AND SUMMARY

1.1 Overview

The U.S. Department of Interior (DOI) acting through the U.S. Fish and Wildlife Service (Service), the U.S. Department of Commerce acting through the National Oceanic and Atmospheric Administration (NOAA), and the State of New Jersey acting through the New Jersey Department of Environmental Protection (NJDEP; collectively referred to as Trustees) initiated a natural resource damage assessment and restoration (NRDAR) process under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 U.S.C. §§ 9601 *et seq*.) for the Cornell-Dubilier Electronics, Inc. Superfund Site (Cornell-Dubilier Site or Site), located in South Plainfield, Middlesex County, New Jersey. As part of the NRDAR process, the Trustees developed and jointly filed natural resources damages claims with potentially responsible parties seeking monetary compensation for injuries to natural resources caused by the release of hazardous substances and pollutants at or from the Cornell-Dubilier Site, as summarized in Section 1.7. Recovered damages are intended to restore, replace, rehabilitate and/or acquire the equivalent of injured natural resources, including their supporting habitats, to compensate the public for injuries to natural resources. The Trustees developed this Final Restoration Plan and Environmental Assessment (Final RP/EA) in accordance with 43 C.F.R. § 11.93 to propose, evaluate, and select restoration alternatives and to inform the public of the restoration actions to be undertaken towards compensating the public for injuries to natural resources.

1.2 Purpose and Need for Restoration

The Trustees prepared this Final RP/EA to address natural resources injured or lost due to releases of hazardous substances at and from the Cornell-Dubilier Site. The purpose of the Final RP/EA is to present the "selected alternative" restoration project or projects that will accomplish the goal of compensating the public for injuries to natural resources.

Pursuant to Section 111(i) of CERCLA (42 U.S.C. § 9611(i)), and the CERCLA NRDAR regulations (43 C.F.R § 11.93), the Trustees developed a Draft RP/EA to identify and evaluate proposed restoration alternatives to restore, replace, rehabilitate and/or acquire the equivalent of injured natural resources, including their supporting habitats, to compensate the public for natural resource injuries caused by the release of hazardous substances at the Site. Consistent with

NRDAR regulations, the Draft RP/EA included a reasonable number of restoration alternatives and identified "preferred alternatives" for funding and implementation. Public comments were sought on the Draft RP/EA and are incorporated in this Final RP/EA as appropriate.

1.3 Natural Resource Trustees and Authorities

Pursuant to Section 107(f) of CERCLA, 42 U.S.C. § 9607(f); the Federal Water Pollution Control Act (Clean Water Act or CWA), 33 U.S.C. § 1321(f)(4) and (5); Subpart G of the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. §§ 300.600, 300.605; 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 resulting from the release of hazardous substances to the environment. The State Trustee (*i.e.*, NJDEP) also acts pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 *et seq.*; the Water Pollution Control Act, N.J.S.A. 58:10A-1 *et seq.*; and the authority vested in the Commissioner of the Department by N.J.S.A 13:1D-1 *et seq*.

This Final RP/EA was prepared jointly by the Trustees in accordance with Section 111(i) of CERCLA (42 U.S.C. § 9611(i)) and the NRDAR implementing regulations (43 C.F.R. § 11.93).

1.3.1 *CERCLA Compliance*

In compliance with CERCLA, this Final RP/EA evaluates a reasonable number of proposed restoration alternatives, including a No Action alternative (*i.e.*, natural recovery; 43 C.F.R. § 11.82). In this document, the Trustees select from among the possible alternatives the alternative(s) most appropriate to restore, rehabilitate, replace, or acquire the equivalent of those natural resources injured or lost due to the release of hazardous substances, in part by considering factors outlined in 43 C.F.R. § 11.82(d). Consistent with federal law, the Trustees also evaluated the proposed restoration alternatives for compliance with other applicable laws and regulations, as documented in Chapter 6.

1.3.2 *NEPA Compliance*

The Trustees must comply with the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §§ 4321 *et seq*., and its regulations, 40 C.F.R. §§ 1500 *et seq*., when planning restoration projects. NEPA is generally applicable to any project that involves federal funding, work performed by the

federal government, or permits issued by a federal agency. NEPA and its implementing regulations outline the responsibilities of federal agencies under NEPA, including preparing environmental documentation. In general, federal agencies contemplating implementation of a major federal action must produce an Environmental Impact Statement (EIS) if the action is expected to have significant impacts on the quality of the human environment. When it is uncertain whether a contemplated action is likely to have significant impacts, federal agencies prepare an Environmental Assessment (EA) to evaluate the need for an EIS. If the EA demonstrates that the Preferred Alternative(s) will not significantly impact the quality of the human environment, the agency issues a Finding of No Significant Impact (FONSI), which satisfies the requirements of NEPA, and no EIS is required. For a proposed restoration plan, if a FONSI determination is made, the Trustees may then issue a final restoration plan describing the selected restoration action(s).

In compliance with NEPA, this Final RP/EA summarizes the current environmental setting where the proposed restoration actions may take place, describes the purpose and need for restoration actions, identifies a reasonable range of alternatives, assesses the potential environmental consequences of those alternatives, including cumulative impacts, and summarizes public participation in the decision-making process. Actions undertaken by the Trustees to restore natural resources under CERCLA must also comply with other applicable laws and regulations, as documented in Chapter 6.

The Service is acting as the lead federal agency for NEPA compliance for the Draft and Final RP/EA, and NOAA is participating as a cooperating federal agency pursuant to NEPA (40 C.F.R. § 1508.5). NOAA is adopting the Final RP/EA, in accordance with 40 C.F.R. § 1506.3 and agency-specific NEPA procedures.

1.4 Site Background

The Cornell-Dubilier Site is a 26-acre industrial facility (Facility) and adjacent areas that were contaminated as a result of releases of hazardous substances at and from the Facility, located in South Plainfield, Middlesex County, New Jersey (Figure 1). Cornell-Dubilier Electronics, Inc. (CDE) manufactured electronic parts and components, including capacitors, from 1936 to 1962 at the Facility. CDE allegedly released and buried materials contaminated with polychlorinated biphenyls (PCBs) which contaminated Site soils; groundwater in the aquifer beneath the Site; soils

and groundwater of nearby residential and commercial properties; and the surface water, soils, and sediments of an unnamed tributary, the Bound Brook, and adjacent wetlands. The contaminant of greatest concern at the Site is PCBs, however, elevated concentrations of heavy metals, chlorinated volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), dichlorodiphenyltrichloroethane (DDT), dioxins, and furans have also been identified at levels of ecological concern.

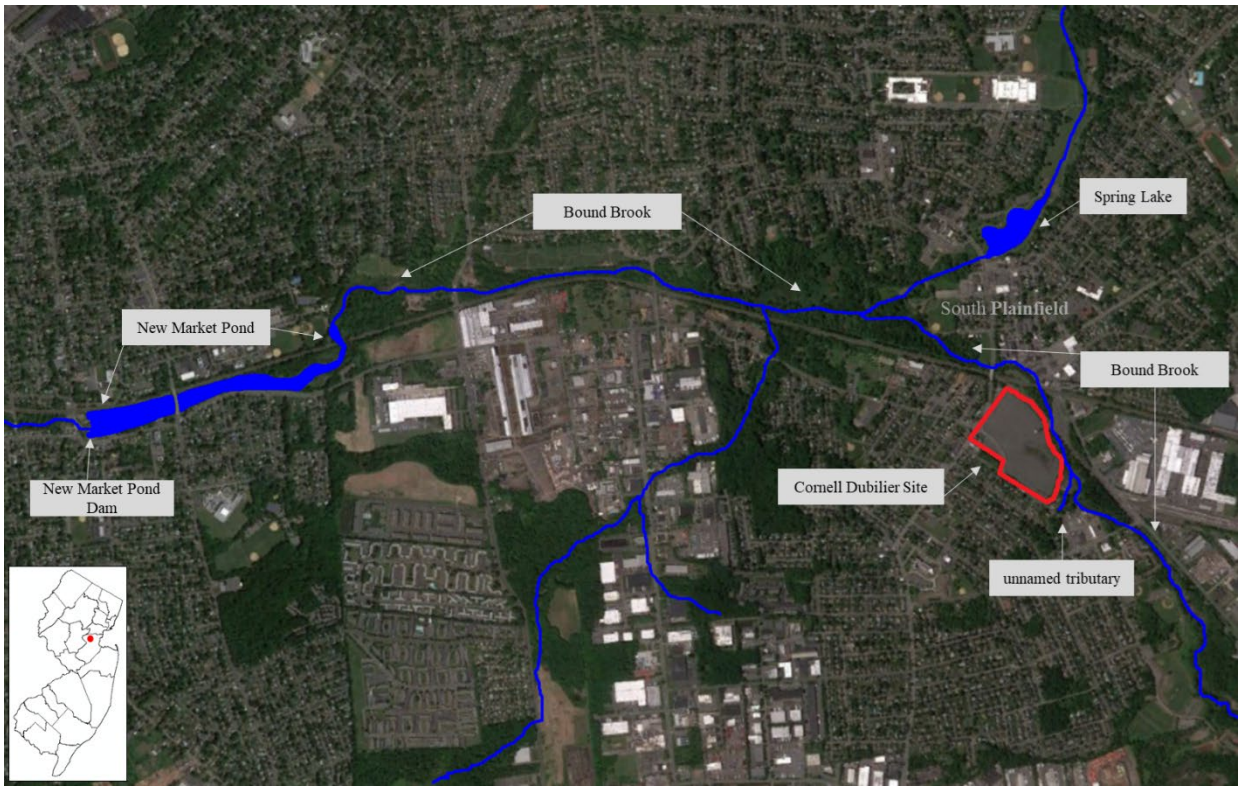

Figure 1. Map of Cornell-Dubilier Site and environs.

Of particular ecological concern is contamination that migrated to or was released into the surface water and sediments of the unnamed tributary, Bound Brook, and adjacent wetlands. The unnamed tributary flows approximately 0.5 mile along the southeast corner of the Facility to its confluence with Bound Brook. Bound Brook flows approximately 3.3 miles to the New Market Pond Dam, continues for 3 miles to the confluence with the Green Brook, and an additional 3 miles to the confluence with the Raritan River. Contaminated material was historically disposed of directly into the unnamed tributary, adjacent wetlands, and Bound Brook, and analytical results indicated

the presence of elevated PCB contamination extending downstream of the Site to the New Market Pond Dam in Piscataway, New Jersey.

The Facility was owned by the Dana Corporation (Dana) from about 1913 until 1956. Dana leased the Facility to CDE from 1936 until 1956, when Dana sold the property to CDE. CDE occupied the Facility from 1936 to 1962, manufacturing electronic components, primarily capacitors. In 1961, CDE sold the Facility to two companies that jointly held title, Lamitex, Inc. and C.R.D. Realty Corporation, but remained at the property as a tenant until 1962. Sometime prior to 1976, Lamitex, Inc. and C.R.D. Realty Corporation merged into the Marco Investing Corporation, which later merged into DSC Enterprises, Inc., now known as D.S.C. of Newark, Inc., the most recent property owner. The Facility was operated as a rental property for commercial and light industrial tenants after 1962 until the Facility was closed in the late 1990s.

1.5 Summary of Response (Remedial) Actions

The U.S. Environmental Protection Agency (EPA) added the Cornell-Dubilier Site to the National Priorities List (NPL) on July 28, 1998. The NPL is a list of hazardous waste sites in the United States that are eligible for long-term remedial action (*i.e.*, clean-up) under the Federal Superfund Program. The EPA divided the Site into four operable units (OUs) to address remedial actions, where Operable Unit 1 (OU1) addressed nearby residential and commercial properties; Operable Unit 2 (OU2) addressed Facility soils; Operable Unit 3 (OU3) addressed contaminated groundwater; and Operable Unit 4 (OU4) addressed contamination found in adjacent stream channels (*i.e.*, 8.3 miles of the Bound Brook and unnamed tributary, 1.6 miles of the Green Brook) and floodplain sediments.

The selected remedial action for OU1 was addressed first, and required the excavation, off-site transportation, and disposal of PCB-contaminated soils, property restoration, and cleaning of interior dust at residential and commercial properties in the vicinity of the former Facility. EPA began remediating OU1 in 2005, and work was substantially complete by 2014. The selected remedial action for OU2 included the demolition of Facility buildings; excavation of the most highly contaminated soil; on-site treatment of excavated soils using low temperature thermal desorption or off-site disposal if warranted; backfilling of excavated areas with clean fill or treated soil; and installation of a multi-layer cap or hardscape. Remediation of OU2 began in 2006, and

was substantially complete by 2012. The selected remedial action for OU3 included institutional controls and long-term monitoring of groundwater and vapor intrusion, and incorporated a waiver for groundwater treatment due to technical infeasibility. The remedial action associated with OU3 was initiated in 2012 and continues to be implemented. The selected remedial action for OU4 includes excavation and off-site disposal of capacitor debris located along the portion of Bound Brook that is adjacent to the former Facility property; the relocation of a waterline that transects the former Facility property; capping and treatment of groundwater along the boundary of the former Facility property and Bound Brook; and excavation and removal of contaminated sediment and floodplain soils in areas of the Bound Brook and its floodplains, inclusive of New Market Pond. The remedial design for OU4 is pending, and no remedial actions have been implemented to date.

The EPA's remedial process is distinct and separate from the Trustees' NRDAR process outlined in this document. The goal of EPA's remedial process (*i.e.*, clean-up) is to implement institutional and engineering controls at the Superfund Site (*e.g.*, deed restrictions, contaminant excavation and capping, groundwater treatment) to eliminate, reduce, or control risks to human health and the environment. The EPA's remedial process can also include restoration at the site to mitigate for impacts to sensitive areas resulting from implementation of the remedy (*e.g.*, restoration of riparian areas that were disturbed to provide equipment access). In contrast, the statutory mandate of the Trustees' NRDAR process is to restore, rehabilitate, replace, and/or acquire the equivalent of injured natural resources as those injured or destroyed by the release of a hazardous substance. Additional information on the EPA's clean-up activities can be found at: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0201112.

1.6 Summary of Natural Resource Injuries

For the purposes of developing natural resource damages claims for the Dana Corporation bankruptcy settlement, the Cornell-Dubilier Electronics, Inc. settlement, and the D.S.C of Newark settlement (discussed in Section 1.7), the Trustees quantified ecological injuries in Bound Brook, the unnamed tributary, and the wetlands located within the 100-year floodplain and within 25 feet of the brook and tributary. Evidence used to determine injury to natural resources from Site-related releases included concentrations of Site-related contaminants (*i.e.*, PCBs) in sediments in excess of guidelines developed for the protection of ecological receptors, and concentrations of Site-

related contaminants (*i.e.*, PCBs) in fish tissue in excess of values known to cause adverse effects to fish. The Trustees determined that Site-related contamination resulted in injury to at least 252 acres of forested wetland and 132 acres of emergent freshwater wetland, including open water areas of the Bound Brook corridor extending from the Site downstream to the New Market Pond Dam.

In addition to injuries to ecological resources, Site-related contamination resulted in injuries to recreational fishing. NJDEP issued a fish consumption ban in 1997 for all species in Bound Brook due to PCB contamination, and this fish consumption advisory currently remains in effect. Damages associated with the potential losses to recreational fishing associated with the fish consumption ban were estimated using information from studies of recreational fishing at other similar sites and information derived from NOAA's Marine Recreation Fishing Statistics Survey, since Site-specific information regarding recreational fishing was not available. The recreational fishing injury was calculated on a per-mile basis and applied to Bound Brook based on a calculation of the total number of miles affected. The value per mile accounted for past and future damages from 1997 to 2030, where 2030 represented the year that the Trustees assumed the Bound Brook corridor would be fully remediated and restored. The Trustees determined that between 1997 and 2030, at least 260 recreational fishing trips were lost per stream mile per year along 9.13 miles of Bound Brook and its tributaries.

1.7 Summary of Settlements

To date, there have been three NRDAR settlements associated with the Cornell-Dubilier Site.

Dana Corporation Bankruptcy Settlement: In June 2008, the Federal Trustees settled environmental claims against Chapter 11 debtors Dana Corporation and 40 affiliated companies (DANA) under CERCLA. The Federal Government claimed that DANA was liable at the CDE Site based on its prior ownership of the real property and buildings at the CDE Site from 1936 to 1956. According to the Federal Government's Proof of Claim, during that time, DANA leased the property and buildings to CDE. The Government alleged that PCB contamination from CDE's operations during DANA's ownership caused injury to natural resources at the Cornell-Dubilier Site, including injuries to migratory birds and fish. Under the DANA settlement for the Cornell-

Dubilier Site, the Departments of Commerce and Interior recovered DANA stock for natural resource damages, with a 2008-cashed value of $88,900.

Cornell-Dubilier Electronics, Inc. (ability to pay) Settlement: In October 2014, the Federal Trustees settled environmental claims against CDE under CERCLA, and the State additionally found CDE liable under the New Jersey Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 *et seq*.; the Industrial Site Recovery Act, N.J.S.A. 13:1K6, *et seq*.; and the common law of nuisance, negligence and strict liability. The U.S. Department of Justice (DOJ) entered a judgment against CDE for $75,040,000. However, the DOJ examined the company's financial and insurance information and determined that CDE had limited financial ability to pay for response costs and natural resource damages. Therefore, the DOJ ordered CDE to pay $75,040,000 using their best effort to maximize insurance proceeds from companies against which CDE has asserted a claim. To date, natural resource damages collections from CDE total $20,687,126.

D.S.C. of Newark Enterprises, Inc. Settlement: In February 2015, the Federal and State Trustees settled environmental claims against D.S.C. of Newark Enterprises, Inc. under CERCLA, and the State additionally found D.S.C. of Newark Enterprises, Inc. liable under the New Jersey Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 *et seq.,* and the Industrial Site Recovery Act, N.J.S.A 13:1K-6, *et seq.* The Federal Government and State of New Jersey asserted that D.S.C. of Newark Enterprises, Inc. was liable based on its current ownership of real property and buildings at the Site, having owned and operated the Site since 1976 as an industrial park, and having owned and operated the Site at a time at which hazardous substances were disposed of. The Trustees recovered $4,821,005 in natural resource damages in the D.S.C. of Newark Enterprises, Inc. settlement.

1.8 Administrative Record

The Trustees have maintained records documenting the information considered and actions taken by the Trustees during the NRDAR process. These records collectively comprise the Trustees' administrative record supporting this Final RP/EA. These electronic records are available at: https://www.diver.orr.noaa.gov/web/guest/diver-admin-record?diverWorkspaceSiteId=6229. For additional information, contact:

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Arrangements must be made in advance to review or obtain hard copies of these records by contacting the office listed above. Access to and copying of these records is subject to all applicable laws and policies including, but not limited to, copying fees and the reproduction or use of any material that is copyrighted.

1.9 Public Involvement

The Trustees have prepared this Final RP/EA to provide the public with information on the Cornell-Dubilier Site NRDAR settlements; the restoration objectives that guided the development of this plan; the restoration alternatives (*i.e.*, projects) that have been considered; and the process and rationale for the selection of restoration alternatives.

The public comment period on the Draft RP/EA began on February 9, 2021 and ended on March 10, 2021. Public review of the Draft RP/EA is an integral and important part of the restoration planning process and is consistent with all applicable state and federal laws and regulations, including the guidance for restoration planning found within 43 C.F.R. Part 11. Through the public review process, the Trustees sought public comment on the restoration alternatives and the Trustees' preferred restoration alternatives to restore injured natural resources.

The Trustees addressed public comments and documented responses to those comments as part of this Final RP/EA. A summary response to comments can be found in Appendix A.

CHAPTER 2 CERCLA RESTORATION PLANNING PROCESS

2.1 Restoration Objective

Restoration of resources injured or lost due to the release of hazardous substances is the goal of the Cornell-Dubilier Site NRDAR process. The purpose of the actions identified in this Final RP/EA is to restore, rehabilitate, replace, or acquire the equivalent of natural resources that were injured or destroyed, and recreational use that was lost as a result of releases of hazardous substances and pollutants, pursuant to the requirements of applicable federal and state laws and regulations.

2.2 Restoration Strategy

In accordance with NRDAR regulations, the Trustees identified and evaluated multiple restoration project alternatives to compensate for natural resource injuries, including a "No Action" alternative. The Trustees identified restoration alternatives through a variety of approaches, including: 1) reviewing information on potential projects from existing reports and datasets; 2) consulting individuals and/or local groups with knowledge of specific projects or restoration opportunities; and 3) soliciting input on potential ecological and recreational restoration opportunities from the public as part of a Restoration Scoping effort (https://pub-data.diver.orr.noaa.gov/admin-record/6229/CornellDubilier_RestorationScopingReport.pdf; NOAA 2019).

Project opportunities very near the Site boundaries are limited due to dense urban development in this area, persistent contamination in the surrounding Bound Brook watershed, and pending remedial actions at both the Site and other nearby contaminated areas that are managed by the EPA (*e.g.*, Woodbrook Road Dump Superfund Site). However, since injured resources included similar habitats, species assemblages, and recreational opportunities as found in the larger Raritan River watershed, the Trustees determined that natural resource injury restoration completed within the Raritan River watershed would be appropriate to compensate for natural resource injuries.

The Trustees consider the ecological and recreational restoration categories listed below as potentially appropriate for the purpose of restoring, rehabilitating, replacing, or acquiring the

equivalent of the natural resources and recreational opportunities that were injured or lost as a result of the release of hazardous substances at and from the Cornell-Dubilier Site.

Ecological Restoration Project Categories

- Tidal Wetland Restoration
- Freshwater Wetland Restoration
- Technical Fish Passage (*e.g.*, fish ladders, rock ramps, bypass channels)
- Dam Removal
- Submerged Aquatic Vegetation Restoration
- Oyster Restoration
- Riparian Restoration
- Floodplain Restoration
- Land Acquisition (parcels under imminent risk of development)
- Aquatic Connectivity (including culvert replacement)
- Freshwater Mussel Conservation and Enhancement
- Native Fish Conservation and Enhancement
- Instream Enhancement

Recreational Use Restoration Project Categories

- Boat Launches
- River Trails
- Land Trails
- Interpretive Signage
- Docks and Piers
- Americans with Disabilities Act Accessibility

2.3 Primary Evaluation Criteria

To ensure the appropriateness and acceptability of restoration options addressing ecological and recreational loss, the Trustees first evaluated each restoration alternative using "primary" evaluation criteria. Primary evaluation criteria incorporate the "factors to consider when selecting

the alternative to pursue" as described in the NRDAR regulations found at 43 C.F.R. § 11.82(d)(1-10).

Consistent with the NRDAR regulations, the following primary evaluation criteria were used to evaluate restoration project alternatives and identify projects preferred for implementation.

RELATIONSHIP TO INJURY

Criteria	Description
Nexus to Injury	Project restores natural resources similar to those injured.
Location	Project is located within the Raritan River watershed.
Scale of Benefits	Quality/quantity of benefits provided by project (increase in acres, species, etc.) per dollar spent.

LIKELIHOOD OF SUCCESS

Criteria	Description
Proven Technology	Can the project be accomplished with available technology? Is the technology well documented / studied? Are there biological, chemical, physical limitations and uncertainties that may require actions beyond technical capabilities?
Documented Success	Have similar projects succeeded in the past? Is success well documented / studied? Is success measurable?
Self-Sustaining	Are benefits expected to be long-lived? Will maintenance and/or supplemental (future) action be required?
Cost Effective	Are costs reasonable related to expected benefits? Are costs reasonable in comparison to alternative projects?

REGULATORY/POLICY CONSIDERATIONS

Criteria	Description
Compliant with Applicable Federal/State Law	Project complies with applicable federal, state, local laws and regulations. Based on current regulatory framework, policies, rules, and requirements is this potentially permittable work?
Site Ownership/Availability	Project site is available, ownership is clear, and owner is willing to consent to restoration action. Are there physical, legal, or technical limitations to site access? Is site access safe?
Consistent with Trustee Policy, Management Goals, Objectives	Project meets stated goals (objectives) of Trustee council.

2.4 Secondary Evaluation Criteria and Project Tiers

The NRDAR regulations allow the Trustees discretion to use additional (secondary) evaluation criteria, as appropriate. In developing this Final RP/EA, the Trustees gave primary evaluation

criteria (Section 2.3, above) initial consideration since these factors are paramount to ensuring that restoration actions will compensate the public for natural resource injuries. The Trustees additionally developed secondary evaluation criteria supplemental to the NRDAR primary (*i.e.*, regulatory) criteria for which to evaluate potential restoration projects for the Cornell-Dubilier Site.

The use of primary and secondary evaluation criteria allowed the Trustees to rank and categorize restoration alternatives into three tiers for the purpose of prioritizing projects for implementation. Tier I alternatives are projects that the Trustees view as providing the most appropriate restoration of natural resources injured, and can be funded using existing settlement funds to complete the project. Tier II alternatives are projects that would also result in appropriate restoration of the injured natural resources, but would only be funded if settlement monies remain after funding the higher priority Tier I projects. Tier III alternatives are projects that, as proposed, are not preferred to compensate the public for injuries to natural resources resulting from the release of hazardous substances at and from the Cornell-Dubilier Site.

The Trustees anticipate sufficient funding available for Tier I projects at the current estimated funding levels. The Trustees acknowledge, however, that uncertainties may arise as projects are implemented. For some projects, the Trustees may be able to modify the scale of the project, increasing or decreasing the scope of the project to accommodate financial limitations, or make the most cost effective use of funds relative to the environmental gains to be realized by a project. Thus, final funding levels will be based, in part, on the final cost of each selected project and Trustee judgments regarding what actions are most pertinent to compensate for natural resource injuries associated with the Cornell-Dubilier Site. The Trustees may choose to increase funding levels of one or more Tier I projects, if determined necessary to complete the project in a manner that best compensates the public for natural resource injuries. Conversely, if a project is not progressing in a timely manner that the Trustees deem suitable to compensate for natural resource injuries in a reasonable timeframe, the Trustees may withdraw funds from the project and reallocate the funds to another Tier I or Tier II project. The Trustees also reserve the right to consider future projects not currently identified or included in this Final RP/EA; such actions must be justified under the criteria stated in this document and will warrant additional documentation under CERCLA, NEPA, and other applicable law.

Consistent with the NRDAR regulations, the following secondary evaluation criteria were used to evaluate restoration project alternatives and identify the projects preferred for implementation.

SECONDARY EVALUATION CRITERIA

Criteria	Description
Consistent with Local, Regional, National Restoration Goals / Initiatives	Will the project be consistent with / contribute to existing local, regional, national initiatives?
Timeframe of Potential Benefits	What is the timeframe to expected benefits?
Integration with Existing Management Programs / Leverage Potential	Will the project integrate with existing programs and leverage external funds?
Aquatic / Terrestrial Connectivity	Will the project increase/enhance aquatic and/or terrestrial connectivity?
Proximity to Areas with Protected Status	Will the project provide access to / connectivity with protected areas? Will the project increase the size of protected areas?
Benefits to Species of Concern / Sensitive Habitats	Will the project benefit federal and/or state SOC or their identified habitats?
Potential for Public Outreach / Education / Recreation / Public Access	Will the project provide benefit to the public in the form of outreach, education, recreation, and/or public access?
Benefits More than One Natural Resource	Will the project benefit multiple types of natural resources?
Monitoring / Measurable Results	Will the project include monitoring? Will there be measurable results? Is monitoring cost-effective?
Climate Change	Will the project provide resilience to anticipated environmental changes due to climate change? Will the project withstand anticipated environmental changes due to climate change?

2.5 Restoration Alternative Identification and Screening

The Trustees compiled a list of potential restoration alternatives in the Raritan River watershed that were informed by the restoration strategy outlined in Section 2.2. The Trustees narrowed this list of potential restoration alternatives to reflect those potential alternatives that met some or all of the Trustees primary evaluation criteria (43 C.F.R. § 11.82(d), Section 2.3). Projects meeting some or all of the primary criteria requirements were further screened using the Trustees secondary evaluation criteria (Section 2.4). Tier I and Tier II projects ranked highest among primary and secondary criteria, and Tier III projects ranked lowest among criteria.

CERCLA requires the Trustees to evaluate a "No Action" restoration alternative. Under this alternative, the Trustees would take No Action to restore injured resources. In addition to the No Action alternative, the following alternatives were retained for detailed evaluation.

- Island Farm Weir Fish Passage
- Headgates Dam Removal
- Califon Dam Removal
- Blackwells Mills Dam Removal
- Nunn's Mill Dam Removal
- Pond Removal on Tributary to Rockaway Creek
- County Boat Launch and Fishing Platform at Lincoln Avenue Park
- Lost Valley Nature Park
- North Branch Raritan River Corridor Riparian Buffer Restoration
- East Brunswick Swamp Pink Restoration
- Stony Brook Green Infrastructure Demonstration Project
- Rockafellows Mills Dam Removal
- Klines Mill Dam Fish Passage
- Beisler Lake Dam Removal
- Mill Lane Dam Removal
- Lake Manalapan Riparian Restoration
- North Branch Raritan River, Lamington River, and Stony Brook Mussel Restoration
- Trash Trap Installation in the Lower Raritan River Watershed
- Rutgers Ecological Preserve Accessible Trail
- Bridge Over the Delaware and Raritan Canal Spillway
- Cherry Brook Preserve Constructed Wetland
- Raritan Bay Oyster Restoration
- South River Tidal Marsh Restoration
- Edison Landfill Capping and Wetland Restoration

CHAPTER 3 EVALUATION OF RESTORATION ALTERNATIVES

In this section, the Trustees evaluated the restoration alternatives using the primary and secondary evaluation criteria described in Sections 2.3 and 2.4. Each of the restoration alternatives identified by the Trustees in Section 2.5 are described in greater detail in the following sections. In compliance with the CERCLA NRDAR regulations and NEPA, the selection of restoration alternatives was finalized after public review and comment on the Draft RP/EA and are documented in this Final RP/EA. The overall objective of the restoration process is to make the public whole for injuries to natural resources resulting from the release of hazardous substances. In the sections below, the Trustees selected all Tier I and Tier II restoration alternatives as preferred alternatives to compensate the public for natural resource injuries. These preferred Tier I and Tier II projects best met all primary and secondary evaluation criteria. The No Action alternative and Tier III alternatives are non-preferred and have not been selected. Figure 2 shows the locations of restoration alternatives within the Raritan River watershed. Table 1 provides a tabular summary of the Trustees' criteria-based screening process and selected alternative restoration projects that will accomplish the goal of restoring, replacing, rehabilitating, and/or acquiring the equivalent of injured natural resources, including their supporting habitats, to compensate the public for injuries resulting from the release of hazardous substances at and from the Cornell-Dubilier Site. Table 3 provides preliminary cost estimates for Tier I and II selected alternatives.

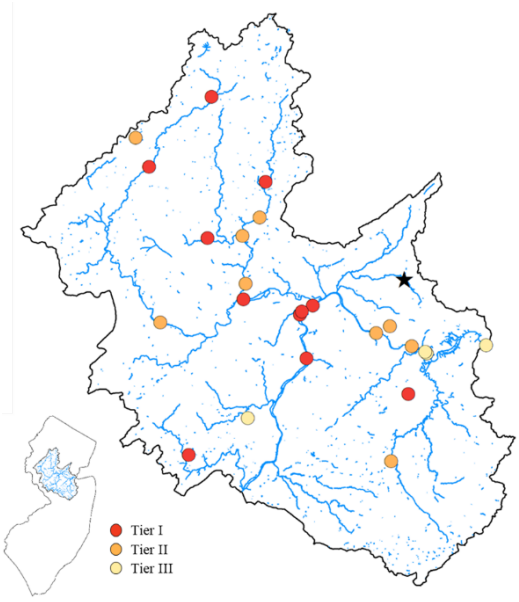

Figure 2. Location of Cornell-Dubilier Site (black star) and locations of restoration alternatives (circles). All restoration alternatives are located within the Raritan River watershed, New Jersey.

Table 1. Restoration alternatives tiered by primary and secondary criteria.

Restoration Alternative	Tier	Nexus to Injury	Location	Scale of Benefits	Proven Technology	Documented Success	Self-Sustaining	Cost Effective	Compliant with Applicable Federal / State Law	Site Ownership / Availability	Consistent with Trustee Policy, Management Goals, Objectives	Consistent with Local, Regional, National Restoration Goals / Initiatives	Timeframe of Potential Benefits	Integration with Existing Management Programs / Leverage Potential	Aquatic / Terrestrial Connectivity	Proximity to Areas with Protected Status	Benefits to Species of Concern / Sensitive Habitats	Potential for Public Outreach / Education / Recreation / Public Access	Benefits More than One Natural Resource	Monitoring / Measurable Results	Climate Change
Island Farm Weir Fish Passage	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	
Headgates Dam Removal	1	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Califon Dam Removal	1	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
Blackwells Mills Dam Removal	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Nunn's Mill Dam Removal	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Pond Removal on Tributary to Rockaway Creek	1	X	X		X	X	X	X	X	X	X	X	X	X	X		X		X	X	X
County Boat Launch and Fishing Platform at Lincoln Avenue Park	1	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X	
Lost Valley Nature Park	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X
North Branch Raritan River Corridor Riparian Buffer Restoration	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Brunswick Swamp Pink Restoration	1	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X
Stony Brook Green Infrastructure Demonstration Project	1	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rockafellows Mills Dam Removal	2	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X
Klines Mill Dam Fish Passage	2	X	X	X	X	X	X	X	X		X	X		X	X		X		X	X	
Beisler Lake Dam Removal	2	X	X		X	X	X	X	X	X	X	X	X	X	X				X	X	X
Mill Lane Dam Removal	2	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X
Lake Manalapan Riparian Restoration	2	X	X		X	X		X	X	X	X	X	X	X				X	X	X	
North Branch Raritan River, Lamington River, and Stony Brook Mussel Restoration	2	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	
Trash Trap Installation in the Lower Raritan River Watershed	2	X	X		X	X			X		X	X					X	X	X	X	
Rutgers Ecological Preserve Accessible Trail	2	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X		X	
Bridge over the Delaware and Raritan Canal Spillway	2	X	X		X	X			X		X	X				X		X		X	
Cherry Brook Preserve Constructed Wetland	3	X	X						X	X	X		X	X		X		X		X	
Raritan Bay Oyster Restoration	3		X	X	X	X			X		X	X	X	X			X	X	X	X	X
South River Tidal Marsh Restoration	3		X						X											X	
Edison Landfill Capping and Wetland Restoration	3		X						X											X	

Table 2. Preliminary cost estimates for Tier I and Tier II preferred alternatives.

Restoration Alternative	$0 - $100,000	$100,000 - $1,000,000	$1,000,000 -$3,500,00	$3,500,000 -$8,000,000
Tier I Alternatives				
Island Farm Weir Fish Passage				X
Headgates Dam Removal				X
Califon Dam Removal			X	
Blackwells Mills Dam Removal		X		
Nunn's Mill Dam Removal		X		
Pond Removal on Tributary to Rockaway Creek	X			
County Boat Launch and Fishing Platform at Lincoln Avenue Park		X		
Lost Valley Nature Park				X
North Branch Raritan River Corridor Riparian Buffer Restoration		X		
East Brunswick Swamp Pink Restoration	X			
Stony Brook Green Infrastructure Demonstration Project		X		
Tier II Alternatives				
Rockafellows Mills Dam Removal			X	
Klines Mill Dam Fish Passage			X	
Beisler Lake Dam Removal		X		
Mill Lane Dam Removal		X		
Lake Manalapan Riparian Restoration		X		
North Branch Raritan River, Lamington River, and Stony Brook Mussel Restoration		X		
Trash Trap Installation in the Lower Raritan River Watershed		X		
Rutgers Ecological Preserve Accessible Trail	X			
Bridge over the Delaware and Raritan Canal Spillway			X	

3.1 No Action

Under the No Action (*i.e.*, natural recovery) alternative, the Trustees would take No Action to restore, rehabilitate, replace, and/or acquire the equivalent of injured natural resources, including their supporting habitats and the services they provide. Natural resources at the Site were injured due to the release of hazardous substances, including PCBs. While consideration of the No Action (*i.e.*, natural recovery) alternative is required by CERCLA, given the long-term environmental persistence of PCBs and the other hazardous substances at the Site, natural recovery would not meet the requirements of the NRDAR process under CERCLA to restore injured natural resources and services. In short, the No Action alternative is not appropriate for the Cornell-Dubilier Site given that injured natural resources cannot be addressed through natural recovery.

3.2 Selected Tier I Alternative: Island Farm Weir Fish Passage

The Island Farm Weir (IFW) is located just downstream of the confluence of the Raritan and Millstone Rivers, in Franklin and Bridgewater Townships, Somerset County, New Jersey. The proposed restoration project includes the installation of a rock ramp fishway at the IFW to enhance fish passage. This Alternative meets the Trustees identified project categories of technical fish passage, aquatic connectivity, and native fish conservation and enhancement.

The IFW is currently the downstream-most barrier on the Raritan River, since the removal of the Calco Dam in 2011. The IFW is only a partial barrier to fish passage, since the current weir includes a concrete vertical slot fishway and supplemental flow chamber that supplies attraction water (Figure 3). However, an ongoing fish passage study conducted by the NJDEP Office of Natural Resource Restoration and Rutgers University indicates that overall fish passage at the IFW is relatively poor for all species, but particularly for anadromous species (NJDEP 2013, Jensen 2017). Such findings are not uncommon; Brown *et al*. 2012 reported that the mean passage efficiencies of conventional fishways (*i.e*., fish ladders) on three major Atlantic coast rivers was less than three percent for American shad (*Alosa sapidissima*).

The initial configuration of the IFW was completed by the New Jersey Water Supply Authority (NJWSA) in 1994. The IFW was built to supplement the State's public water supply system; extraction varies daily, but the IFW impoundment can supply upwards of 225 million gallons of water per day in summer months, and the facility is considered critical to New Jersey American Water's (NJAW) operations. As such, the IFW cannot be removed, and the headpond elevation of the impoundment cannot be altered. A reasonable alternative that will preserve NJAW's water withdrawal operations and provide enhanced fish passage involves retrofitting the weir with a rock arch rapids fishway.

Dam removal is the preferred solution for instream barriers, because dam removal provides immediate and permanent improvements to fish passage and benefits water quality and sediment transport. However, for sites such as the IFW where barriers cannot be removed, nature-like fishways (*e.g*., rock ramps, stream-like bypass channels) offer an alternative to previous conventional fishway designs (*e.g*., fish ladders, fish lifts). Historically, conventional fishways were built from conventional materials such as metals and concrete, and often did not reflect

natural stream conditions (*e.g*., contain right angles, high walls, chutes). Conventional fishways are generally unsuccessful for fish passage on Atlantic Coast rivers (Brown *et al*. 2012). In contrast, nature-like fishways simulate natural stream materials and environmental conditions, and provide suitable passage conditions and habitat for a wide variety of fish species and sizes (Katopodis *et al*. 2001). Emerging research indicates that nature-like fishways have greater passage success than conventional fishways (Franklin *et al*. 2012). However, very few studies have been conducted on rock ramps in larger rivers, and recent studies have found that fish passage success varies widely among species, sizes, and years (Landsman *et al*. 2018; Raabe *et al*. 2019). As such, rock-ramp fishways should be carefully designed for a particular location and for particular target species, rather than assuming that all species will pass successfully.

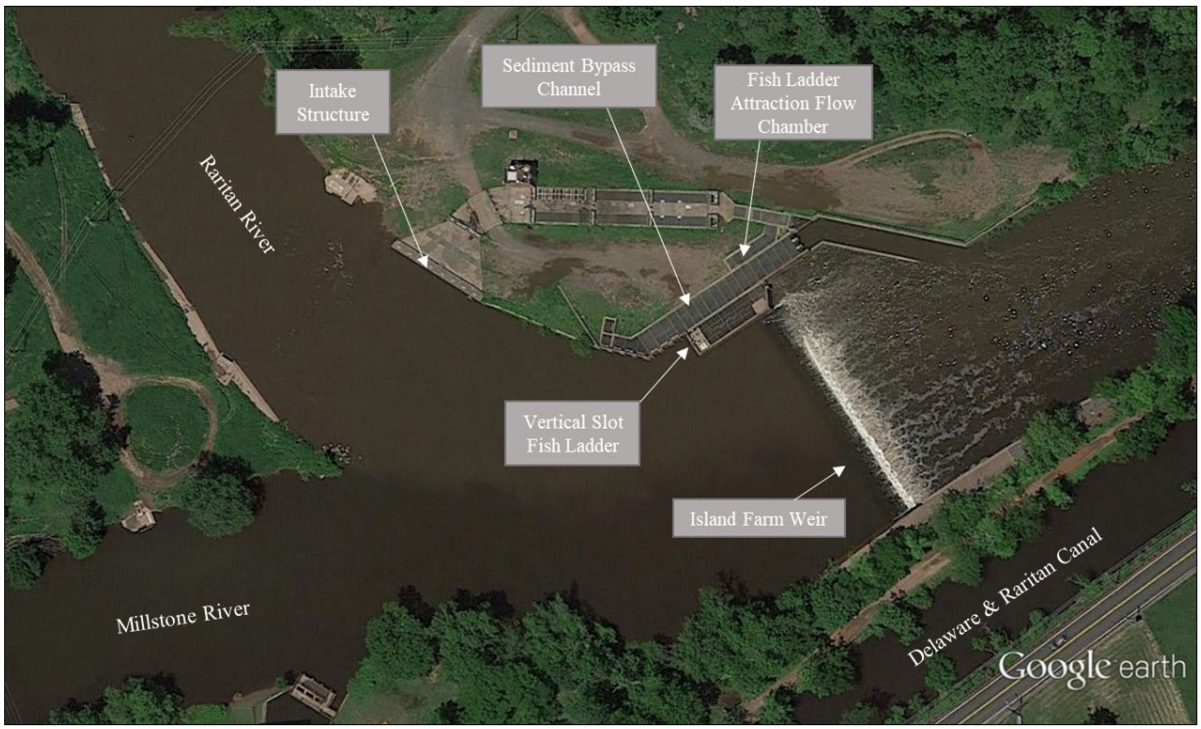

Figure 3. Island Farm Weir aerial view showing layout of major structures.

The original IFW and vertical slot fishway were built in 1994. The original weir was approximately 200-feet-long, 8-feet-high, and 24-feet-wide, including a 15-foot-long section extending from the weir crest to the downstream apron. Following a series of boater fatalities in 1996, the downstream weir geometry was redesigned as a stepped spillway in 1997. The revision consisted of installing a series of steps of varying heights (1 to 2 feet), and extending the downstream apron by an

additional 10 feet. The existing vertical slot fishway remains in the same configuration as constructed in 1994. The fishway is located in a 20-feet-wide bay, with a labyrinth configuration and pool dimensions of 8 feet by 12 feet. An adjacent chamber (approximately 8-feet-wide) provides supplemental attraction flow. Downstream fish passage is provided by a single 4-feet-long by 1.2-feet-deep weir notch that directly abuts the fishway. Additional infrastructure associated with NJAW's water withdrawal operation is present on the north bank, including water intakes and a sediment bypass channel (Figure 4).

Rock ramps are a sloped watercourse that link two pools of different elevations (*i.e*., headwater and tailwater of dam). Design plans for a rock ramp (*i.e.*, nature-like fishway) at the IFW are being prepared as part of a partial NRDAR settlement agreement for the American Cyanamid Company Superfund Site (Bridgewater Township, New Jersey). The proposed design includes a rock arch rapids fishway that spans the full length of the weir, although a portion of flow will be diverted for the sediment bypass channel and the water intake system. The design includes at least 8 rock (boulder) arches, spaced and positioned appropriately to provide adequately sized zones of passage, resting pools, water depths, and velocities to facilitate passage of 'target' anadromous species (*i.e*., American shad, blueback herring, alewife), and possibly other 'non-target' resident and diadromous species. The design will not impact water withdrawal operations nor the headpond elevation of the impoundment. The 2016 Federal Interagency Nature-like Fishway Passage Design Guidelines for Atlantic Coast Diadromous Fishes and the Service's 2019 Region 5 Fish Passage Engineering Design Criteria guided the fish passage design elements (Turek *et al*. 2016; USFWS 2019).

The IFW is owned by the NJWSA and downstream properties on the northern bank are owned by Wyeth Holdings, LLC. The Wyeth properties house the now defunct American Cyanamid facility, a partially remediated EPA Superfund Site. The southern edge of the IFW meets the Delaware and Raritan (D&R) Canal State Park and towpath, owned and managed by the State of New Jersey Division of Parks and Forestry. Visitors can view and access the IFW from the D&R Canal State Park towpath.

Restoration of fish passage at the IFW will benefit diadromous species such as American shad (*Alosa sapidissima*), alewife (*Alosa pseudoharengus*), and blueback herring (*Alosa aestivalis*). The proposed nature-like fishway is specifically designed to pass the clupeid species mentioned above,

but may also benefit American eel (*Anguilla rostrata*), hickory shad (*Alosa mediocris*), sea lamprey (*Petromyzon marinus*), and striped bass (*Morone saxatillis*).

Figure 4. Island Farm Weir spillway and associated infrastructure shown from downstream facing north bank.

Long-term fish passage monitoring at the IFW is critical to demonstrate the efficacy of the rock ramp in comparison to the existing conventional vertical slot fishway, and to track the recovery of several anadromous populations. Telemetry is the most useful tool for assessing fishways, especially for determining fish passage efficiency and fish passage duration (Lucas and Baras 2001; Bunt *et al.* 2012; Raabe *et al*. 2019). The Trustees recommend the use of boat electrofishing to capture and tag adult fishes downstream of the IFW as part of a robust monitoring program. The Trustees recommend the use of stationary (*e.g*., acoustic) telemetry stations placed strategically at multiple stations upstream and downstream of the IFW. The Trustees additionally recommend developing methods to quantify juvenile anadromous populations in the Raritan River, and utilizing novel techniques to sample and quantify both adults and juvenile populations, as feasible (*e.g*., sonar imaging, eDNA).

The installation of a rock-ramp at the IFW may be accomplished by leveraging additional funds through other federal and state sources. Alternative 3.2 is a Tier I selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances. Restoration of fish passage at the IFW will reestablish fish movement in the mainstem Raritan River, expand critical spawning habitat for diadromous fishes, and enhance recreational boating and fishing opportunities.

3.3 Selected Tier I Alternative: Headgates Dam Removal

The Headgates Dam is located on the mainstem Raritan River in Bridgewater and Hillsborough Township, Somerset County, New Jersey. The proposed restoration project involves the removal of the Headgates Dam; appropriate relocation or reconfiguration of the Bridgewater North Branch Trunk sewer line located approximately 90 feet upstream; appropriate adjustment or modification of the Raritan Water Power Canal located approximately 0.15 mile upstream; appropriate restoration and stabilization of the adjacent stream reaches and impoundment area; revegetation of exposed and newly formed banks; and scour protection measures, as warranted (Figure 5). This Alternative meets the Trustees identified project categories of dam removal, riparian restoration, aquatic connectivity, freshwater mussel conservation and enhancement, native fish conservation and enhancement, instream enhancement, and river trail recreation.

The Headgates Dam is a 235-feet-wide, approximately 7.5-feet-tall, concrete, run-of-river, gravity dam that provides no water storage or flood attenuation function (Figure 6). The original timber crib dam was built in 1842; its original purpose was to deliver flow into the Raritan Water Power Canal. Various repairs, modifications, and upgrades took place prior to 1959, when the spillway failed and was reconstructed that same year. The current training walls were reconstructed sometime between 1964 and 1965, and the retaining walls were replaced on both the north and south banks in the 1960s.

An intake culvert that siphons flow from the Raritan River into the Raritan Water Power Canal is located approximately 0.15 mile upstream of Headgates Dam. The culvert has a reinforced concrete pipe inlet structure that is approximately 120-feet-long and 24 inches in diameter. The Raritan Water Power Canal is a 3-mile-long canal built in the early 1840s to supply water power for nearby mills. By the mid-1900s, the mills had closed, and the canal was used to provide

drinking water to neighboring towns. In the 1970s, the canal and adjacent parcels were purchased by Somerset County and transformed into a recreational park. The canal is now part of the Raritan Water Power Canal Historic District, and cannot be removed or modified. However, it may be necessary to adjust the canal intake structure to ensure a consistent water supply after dam removal if hydrologic and hydraulic modeling indicates that the dam supplies water to the canal.

Figure 5. Headgates Dam aerial view showing layout of major structures.

A submerged active sewer line (Bridgewater North Branch Trunk Sewer) is located approximately 90 feet upstream of the Headgates Dam, and crosses the river perpendicular to its flow. The sewer pipe is composed of a 54-inch reinforced concrete pipe fully encased in a minimum of 6 inches of concrete, and serves as the main sewer line for both Bridgewater and Branchburg Townships. Manholes are located on both sides of the river. The sewer line will be exposed after dam removal, putting the section at risk of degradation and failure. The exposed line would also likely become a barrier for fish passage. Therefore, the sewer line will either be relocated under the riverbed or rerouted, as determined in the design phase.

Dam removal will consist of demolishing, removing, and disposing of approximately 3,000 cubic yards of dam material. Approximately 400 cubic yards of sediment that have accumulated

immediately upstream of the dam would be resuspended and transported downstream following dam removal. This sediment will redistribute to downstream reaches, but is unlikely to have a measurable impact on benthic habitat quality. The removal design may include minor grading of the riverbed and banks, revegetation of exposed areas, and scour protection measures, as warranted.

Figure 6. Headgates Dam shown from downstream facing west bank.

The Headgates Dam is currently the only complete fish passage barrier on the mainstem Raritan River. The downstream Island Farm Weir, in its current configuration, houses a fish ladder that that has provided fish passage to tens of thousands of fish since installation in 1994. The installation of a rock ramp at Island Farm Weir is a Tier I project in this Final RP/EA, which will dramatically increase fish passage success at the Island Farm Weir structure. After fish passage issues are addressed at the Island Farm Weir, the removal of the Headgates Dam would restore fish passage for approximately 13.5 miles to the next two upstream dams (*i.e.*, Mill Lane Dam on the North Branch Raritan, and Rockafellows Mills Dam on the South Branch Raritan), and would provide fish passage for an additional 27.8 miles downstream to the Raritan Bay.

Somerset County owns the Headgates Dam, and adjacent upstream and downstream land parcels are owned by the NJDEP, Somerset County, private landowners, and the Dukes Farms Foundation. Somerset County's Duke Island Park is located along the northern side of the dam. Duke Island Park is a 343-acre county-managed park that flanks the Raritan Power Canal and provides a variety of recreational opportunities and special events, including but not limited to: picnicking, playgrounds, athletic fields, ice skating and cross country skiing, biking, running, and fishing. A 127-acre protected parcel owned by Somerset County and the NJDEP is located along the southern side of the dam. Duke Farms, a 2,740-acre protected property is located approximately 1 mile downstream on the southern side of the Raritan River. Approximately 1,000 acres of Duke Farms is open to the public for recreational and educational opportunities.

Restoration of fish passage at the Headgates Dam will benefit diadromous species such as: American eel (*Anguilla rostrata*), American shad (*Alosa sapidissima*), alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), hickory shad (*Alosa mediocris*), sea lamprey (*Petromyzon marinus*), and striped bass (*Morone saxatillis*). Habitat improvements may improve conditions for several species identified by the State of New Jersey as having Greatest Conservation Need, including: American brook lamprey (*Lethenteron appendix*), bluespotted sunfish (*Enneacanthus gloriosus*), bridle shiner (*Notropis bifrenatus*), comely shiner (*Notropis amoenus*), cutlips minnow (*Exoglossum maxillingua*), eastern mudminnow (*Umbra pygmaea*), fallfish (*Semotilus corporalis*), margined madtom (*Noturus insignis*), redbreast sunfish (*Lepomis auritus*), satinfin shiner (*Cyprinella analostana*), shield darter (*Percina peltata*), swallowtail shiner (*Notropis procne*), white catfish (*Ameiurus catus*), and yellow bullhead (*Ameiurus natalis*). Habitat and fish passage improvements may also improve conditions for several mussel species, including: eastern elliptio (*Elliptio complanata*), eastern pondmussel (*Ligumia nasuta*), and eastern floater (*Pyganodon cataracta*).

Removal of the Headgates Dam will enhance the safety and experience of recreational paddling on the mainstem Raritan River. The 6.6-mile reach extending between the Old York Road (Somerville, New Jersey) and Duke Park launches brings boaters by the scenic areas of the Duke Island Park and Duke Farms, but is currently interrupted by a dangerous, but necessary portage at the Headgates Dam. The dam is also a safety hazard for boaters unaware of the upwelling and drowning hazards associated with small low-head dams.

The removal of the Headgates Dam may be accomplished by leveraging additional funds through other federal and state sources. Alternative 3.3 is a Tier I selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances. Removing the Headgates Dam restores river habitat, improves water quality, reestablishes fish and mussel movement, and enhances fishing and recreational boating opportunities.

3.4 Selected Tier I Alternative: Califon Dam Removal

The Califon Dam (also known as Coles Mill Dam) is located on the South Branch Raritan River, in Califon, Hunterdon County, New Jersey. The proposed restoration project involves the removal of the Califon Dam; appropriate restoration, stabilization, and revegetation of adjacent stream reaches and the impoundment area; appropriate characterization, dredging, removal, and storage/disposal of upstream sediments, as warranted; and scour protection measures at the Highway 512 Bridge and other areas, as warranted. This Alternative meets the Trustees identified project categories of dam removal, riparian restoration, aquatic connectivity, freshwater mussel conservation and enhancement, native fish conservation and enhancement, instream enhancement, and river trail recreation.

The Califon Dam is an approximately 210-feet-long concrete and rock-fill run-of-river gravity dam that creates an approximate 7-acre impoundment on the South Branch Raritan River (Figure 7). The dam and former mill were originally constructed sometime between 1830 and 1840 by Aaron Sutton, and sometime prior to 1850, Benjamin Cole purchased the property and operated the facility as a flour mill. At this time, the dam became known as Cole's Mill Dam. The mill operation became defunct by the end of the 1800s, and the dam is now obsolete. In January of 2018, approximately 30 feet of the dam was damaged by ice, resulting in a breach. The breach caused the water level in the impoundment to drop 8 to10 inches over a 24-hour period. Due to this incident, the NJDEP Bureau of Dam Safety notified the current dam owner in writing that the dam must be repaired or removed. The breach and associated debris accumulation has accentuated a bifurcated flow pattern just downstream of the dam that threatens to erode and undermine a small local road (Raritan River Road).

Figure 7. Califon Dam shown facing north. Photo depicts approximate 30-foot breach.

The dam is currently in private ownership, and the impoundment is flanked by parcels of both private and public ownership. The Borough's Califon Island Park, and the County's South Branch River Reservation are located approximately 0.25 mile upstream of the dam along the upper impoundment, and the Ken Lockwood Gorge Wildlife Management Area (WMA) is located approximately 0.85 miles downstream. The Ken Lockwood Gorge WMA is a 533-acre state-owned and managed protected parcel that flanks the South Branch Raritan River along a 2.5-mile stretch, and is valued as a trout fishing destination. The Columbia Trail, a 15.1-mile rails-to-trails conversion, runs along the South Branch Raritan and passes by the Califon Dam at approximately 0.1 mile to the southeast.

Removal of the Califon Dam would restore fish passage for approximately 11 miles to Nunn's Dam, the next dam upstream. The removal of the Nunn's Mill Dam is also a Tier I restoration project in this Final RP/EA. Removal of the Califon Dam would additionally provide resident fish passage for five miles downstream, through Ken Lockwood Gorge to the Lake Solitude Dam. Summertime fish kills are not uncommon at the Ken Lockwood Gorge due to water quality issues,

particularly increased water temperature. Removal of the Califon Dam would help to conserve coldwater habitat in the South Branch Raritan and improve recreational fishing in the Ken Lockwood Gorge.

Dam removal will improve fish passage for resident and diadromous species such as American eel (*Anguilla rostrata*), and will reduce stream temperatures for coldwater species such as brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), and rainbow trout (*Oncorhynchus mykiss*). Water quality and habitat improvements will improve conditions for all species, including several species identified by the State of New Jersey as having Greatest Conservation Need, including: American brook lamprey *(Lethenteron appendix*), bluespotted sunfish (*Enneacanthus gloriosus*), cutlips minnow (*Exoglossum maxillingua*), eastern mudminnow (*Umbra pygmaea*), fallfish (*Semotilus corporalis*), margined madtom (*Noturus insignis*), redbreast sunfish (*Lepomis auritus*), satinfin shiner (*Cyprinella analostana*), shield darter (*Percina peltata*), swallowtail shiner (*Notropis procne*), and yellow bullhead (*Amerius natalis*). Water quality and habitat improvements will also benefit several mussel species, including: alewife floater (*Anodonta implicata*), eastern elliptio *(Elliptio complanata*), and eastern floater (*Anodonta cataracta*).

Sediments that have accumulated upstream of the Califon Dam would need to be characterized and quantified as part of the dam removal feasibility process, and construction actions may require dredging, removal, or storage/disposal of sediments. The dam removal design may include minor grading of the riverbed and banks, revegetation of exposed areas, and scour protection measures, as warranted.

The most recent New Jersey Integrated Water Quality Assessment Report for EPA 303d requirements[1] indicate that South Branch Raritan waters upstream of the Califon Dam attain the following designated uses: aquatic life general; and aquatic life-trout (NJDEP 2019). However, waters upstream of Califon do not attain the following designated uses: public water supply (due to arsenic); and recreation (due to *Escherichia coli*). Data is insufficient to determine if waters

[1] Section 303(d) of the Clean Water Act, 33 U.S.C. § 1313(d), requires states to identify and develop a list of impaired waters (waters that do not meet water quality standards) and develop Total Maximum Daily Loads (TMDLs) for every pollutant / waterbody combination on the list. This process ensures that polluted waters are monitored and assessed until applicable water quality standards are met. *See* https://www.epa.gov/tmdl/overview-identifying-and-restoring-impaired-waters-under-section-303d-cwa.

upstream of Califon meet their designated use for fish consumption. In contrast, South Branch Raritan waters downstream of the Califon Dam do not attain any designated uses, including: aquatic life general (due to pH); aquatic life-trout (due to temperature); fish consumption (due to mercury in fish tissue); public water supply (due to arsenic); and recreation (due to *Escherichia coli*).

The removal of the Califon Dam and restoration of its associated impoundment will likely improve water quality conditions in the impoundment reach and downstream of Califon, namely by reducing pH, temperature, and *Escherichia coli* levels. The impoundment created by the Califon Dam is very shallow with predominant sand and clay substrates. Shallow, slow moving, unshaded waters are highly susceptible to thermal impacts at all times of year, but particularly during summer months. In addition, shallow and slow waters tend to host intense aquatic plant growth. Excessive photosynthesis in slackwater impoundments can cause pH to rise to high, basic levels that are intolerable to some fish and macroinvertebrate species. Small, shallow impoundments are also attractive to numerous wildlife species such as Canada goose (*Branta canadensis*), which can contribute to increased *Escherichia coli* levels.

The removal of the Califon Dam may be accomplished with technical assistance and leveraging additional funds from the Raritan Headwaters Association and other state and federal sources. Alternative 3.4 is a Tier I selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances. Removing the Califon Dam restores river habitat, improves water quality, reestablishes fish and mussel movement, and enhances recreational fishing and boating opportunities.

3.5 Selected Tier I Alternative: Blackwells Mills Dam Removal

The Blackwells Mills Dam is located on the Millstone River in Franklin Township, Somerset County, New Jersey. The proposed restoration project involves the removal of the Blackwells Mills Dam; appropriate restoration and stabilization of the adjacent stream reaches; native plantings to stabilize banks; installation, relocation and/or recalibration of U.S. Geological Survey (USGS) stream gaging equipment; and scour protection measures at the Blackwells Mills Road bridge and other areas, as warranted. This Alternative meets the Trustees identified project

categories of dam removal, riparian restoration, floodplain restoration, aquatic connectivity, freshwater mussel conservation and enhancement, native fish conservation and enhancement, instream enhancement, and river trail recreation.

The Blackwells Mills Dam is an approximately 90-feet-long and 3-feet-high, concrete, run-of-river, gravity dam (Figure 8). The current dam structure was built in 1933, and it is unknown whether the current structure incorporated the remnants of the original dam at this location, built in 1747. A remnant millrace and associated spillway is located approximately 280 feet upstream.

Figure 8. Blackwells Mills Dam shown from upstream facing west.

The current 1933 Blackwells Mills Dam was likely constructed by the USGS, when it was reconfigured as the control weir for the USGS gage 01402000 Millstone River at Blackwells Mills, New Jersey. This USGS gage measures stage and discharge, and has been in continuous use at its current location since 1921, with water quality measurements taken in 1962-1969, 1973, 1976-1980, and 1991 to present (USGS 2019). The gage's stage measurements are currently used to

inform local water supply operations, therefore dam removal must preserve this capability along this stretch of the Millstone River. A 2018 report found that the USGS gage only provides accurate readings at low flows, primarily due to the fact that there is bifurcated flow between the main channel and the former millrace entrance located just upstream (Princeton Hydro 2018). The remnant millrace is prone to debris jams and the abutments of the dam itself may create accuracy issues at higher flows as well (Princeton Hydro 2018). As such, project proponents have proposed to relocate the USGS gage at Blackwells Mills Dam to an alternate location, or update existing equipment and recalibrate the gage at its current position or relocate to a new position. Such actions would preserve the capability of stage measurements in this stretch of the Millstone River, while also facilitating dam removal. Depending on the new configuration of the USGS gage, this restoration project may include closing the millrace channel to prevent flows less than bankfull from entering. Stakeholder discussions regarding how to deal with the gage appropriately are ongoing; further feasibility investigations may be warranted to determine the best approach to balancing the dual needs of dam removal and stream gaging.

The Blackwells Mills Dam is currently the downstream-most barrier on the Millstone River since the removal of the Weston Mills Dam in 2017. Multiple formal reports by the USGS, the Service, and Princeton Hydro, LLC, have determined that the Blackwells Mills Dam is a barrier to anadromous fish passage. Dam removal is the most parsimonious solution to achieve fish passage and eliminate ageing infrastructure that poses a public safety hazard.

The NJDEP owns the Blackwells Mills Dam and adjacent land parcels. Parcels located to the east of the Blackwells Mills Dam are managed by the NJDEP Division of Parks and Forestry as part of the Delaware and Raritan Canal (D&R Canal) State Park and towpath. The D&R Canal was built in the 1830s and connects the Delaware River to the Raritan River. Most of the canal system was declared a state park in 1974, and is currently used for boating, fishing, biking, hiking, running, and wildlife viewing.

The most recent New Jersey Integrated Water Quality Assessment Report for EPA 303d requirements indicate that Millstone River waters above and below the Blackwells Mills Dam do not attain the following designated uses: aquatic life general (due to total phosphorus); fish consumption (due to mercury in fish tissue); and public water supply (due to arsenic; NJDEP 2019). Both upstream and downstream waters do attain the use of recreation. Total Maximum

Daily Load (TMDL) regulations are in place for total suspended solids. The removal of the Blackwells Mills Dam will likely improve water quality conditions in the impounded reach and downstream, namely by restoring natural sediment transport and contributing to the reduction of total suspended solids.

Removal of the Blackwells Mills Dam would restore fish passage for approximately 9.7 miles to the Kingston Mill Dam, the next dam upstream. Dam removal would also provide fish passage for 6.25 miles downstream, to the Island Farm Weir. Restoration of fish passage at the Island Farm Weir is a Tier I project in this Final RP/EA. Once fish passage issues at the Island Farm Weir are addressed, the removal of the Blackwells Mills Dam would restore a total of approximately 35.7 miles of fish passage connectivity along the Millstone River and Raritan River mainstem extending to the Raritan Bay.

Restoration of fish passage at Blackwells Mills will benefit diadromous species such as American eel (*Anguilla rostrata*), sea lamprey (*Petromyzon marinus*), blueback herring (*Alosa aestivalis*), and American shad (*Alosa sapidissima*). After the removal of the lowermost dam on the Millstone River in the fall of 2017 (Weston Mill Dam), juvenile American shad were documented as far upstream as the base of the Blackwells Mill Dam by the fall of 2018, confirming that shad are migrating and spawning in the Millstone River for the first time in approximately 278 years. A 2017 report determined that the Blackwells Mills Dam is a hydrological barrier to upstream fish passage for American shad for approximately seventy percent of the migration season during the period of record (Haro *et al*. 2017). Dam removal is the best method to further improve fish passage in the Millstone River.

Water quality and habitat improvements will improve conditions for several species identified by the State of New Jersey as having Greatest Conservation Need, including: bluespotted sunfish (*Enneacanthus gloriosus*), comely shiner (*Notropis amoenus*), and satinfin shiner (*Cyprinella analostana*). Habitat and water quality improvements may also benefit several mussel species, including: alewife floater (*Anodonta implicata*), eastern elliptio (*Elliptio complanata*), eastern floater (*Pyganodon cataracta*), eastern lampmussel (*Lampsilis radiata*), and triangle floater (*Alasmidonta undulata*).

Removal of the Blackwells Mills Dam will enhance recreational paddling on the Millstone River. Boaters will be able to paddle the reach extending from the Kingston Mill Dam near Kingston, New Jersey to the County Boat Launch in Manville, New Jersey. Restoration of the County Boat Launch is a Tier I project in this Final RP/EA. The reach between Kingston and Manville is currently interrupted by a necessary portage at the Blackwells Mills Dam. The dam is a safety hazard for boaters unaware of the upwelling hazards associated with small low-head dams.

The removal of the Blackwells Mills Dam will be accomplished through funding and technical assistance from The Watershed Institute based in Pennington, New Jersey, and may be accomplished by leveraging additional funds through private, state, and/or federal sources. Alternative 3.5 is a Tier I selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances. Removing the Blackwells Mills Dam restores river habitat, improves water quality, reestablishes fish and mussel movement, and enhances recreational fishing and boating opportunities.

3.6 Selected Tier I Alternative: Nunn's Mill Dam Removal

The Nunn's Mill Dam is located on the South Branch Raritan River in Washington Township, Morris County, New Jersey. The proposed restoration project involves the removal of the Nunn's Mill Dam; appropriate characterization, dredging, removal, and storage/disposal of upstream sediments, as warranted; appropriate restoration, stabilization, and revegetation of adjacent stream reaches and the impoundment area; and scour protection measures at the Four Bridges Road bridge and other areas, as warranted. This Alternative meets the Trustees identified project categories of freshwater wetland restoration, dam removal, riparian restoration, floodplain restoration, aquatic connectivity, freshwater mussel conservation and enhancement, native fish conservation and enhancement, instream enhancement, and river trail recreation.

Nunn's Mill Dam is approximately 150-feet-long and the spillway is approximately 6-feet-tall (Figure 9). Approximately 40 feet of the dam's width is a concrete gravity dam spillway, and the remaining 110 feet is an earthen embankment. The earthen embankment consists of two concrete walls with a rock rubble interior fill. There is a 7.5-feet-wide double gate sluice on the north end of the dam and a 5-feet-wide single gate sluice on the south end. The single sluice gate drains two

48-inch diameter reinforced concrete pipes that run beneath Four Bridges Road. The dam retains an approximate 2.5-acre impoundment. The dam owner reported that sediment has recently collected at a rapid rate just upstream of the dam.

Figure 9. Nunn's Mill Dam shown from downstream facing northeast.

The dam was constructed at least 100 years ago to provide power for a small mill located on the north bank of the river. It is unknown whether the current dam structure incorporates the remnants of any type of historic structure. After an inspection in August of 2019, the NJDEP Division of Dam Safety and Flood Engineering determined that Nunn's Mill Dam was damaged and not maintaining a normal pool. As a result, the NJDEP directed the dam owner to conduct an official engineering inspection, including recommendations for permanent decommissioning or repair, to bring the dam into compliance with the New Jersey Safe Dam Act (N.J.S.A. 58-4.1 *et seq*.).

The dam is currently in private ownership, and the impoundment is flanked by parcels of both private and public ownership. The State of New Jersey, including the State's Green Acres Program,

owns several large parcels of land on the western side of the impoundment and upstream reaches of the South Branch Raritan. The Columbia Trail, a 15.1-mile rails-to-trail conversion, runs along the South Branch Raritan and passes by the dam and impoundment on their eastern side.

Sediments that have accumulated upstream of the Nunn's Mill Dam would need to be characterized and quantified as part of the dam removal feasibility process, and the removal may require dredging, removal, and storage/disposal of sediments. The dam removal design may include minor grading of the riverbed and banks, revegetation of exposed areas, and scour protection measures, as warranted.

Removal of the Nunn's Mill Dam would restore fish passage for approximately 1 mile to the next upstream dam, and would provide fish passage for approximately 11 miles downstream to the Califon Dam. The removal of the Califon Dam is a Tier I project in this Final RP/EA. Once fish passage is restored at the Califon Dam, an additional five miles would be gained to the Lake Solitude Dam.

Dam removal will improve fish passage for resident and diadromous species such as American eel (*Anguilla rostrata*), and will reduce stream temperatures for coldwater species such as brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), and rainbow trout (*Oncorhynchus mykiss*). Water quality and habitat improvements will improve conditions for all species, including several species identified by the State of New Jersey as having Greatest Conservation Need, including: American brook lamprey *(Lethenteron appendix*), bluespotted sunfish (*Enneacanthus gloriosus*), cutlips minnow (*Exoglossum maxillingua*), eastern mudminnow (*Umbra pygmaea*), fallfish (*Semotilus corporalis*), margined madtom (*Noturus insignis*), redbreast sunfish (*Lepomis auritus*), satinfin shiner (*Cyprinella analostana*), shield darter (*Percina peltata*), swallowtail shiner (*Notropis procne*), and yellow bullhead (*Amerius natalis*). Water quality and habitat improvements will also benefit several mussel species, including: alewife floater (*Anodonta implicata*), eastern elliptio *(Elliptio complanata*), and eastern floater (*Anodonta cataracta*).

Recreational trout fishing is popular along the upper South Branch Raritan River. Cold water is released from Budd Lake (located 6 miles upstream) during most of the year, which allows for stocked rainbow and brown trout to holdover well. The section of the river in proximity to the

Nunn's Mill Dam ranges from 20 to 40 feet in width, has ample public fishing access, and has appropriate habitat heterogeneity to support trout.

The most recent New Jersey Integrated Water Quality Assessment Report for EPA 303d requirements indicate that South Branch Raritan waters do not attain the following uses: aquatic life general (due to biological - cause unknown); aquatic life – trout (due to temperature); fish consumption (due to mercury in fish tissue); public water supply (due to arsenic); and recreation (due to *Escherichia coli*; NJDEP 2019). TMDL regulations are in place for total phosphorus and total suspended solids.

The removal of Nunn's Mill Dam will likely improve water quality conditions in the impounded reach and downstream, namely by reducing temperature, total phosphorus, total suspended solids, and *Escherichia coli* levels. The impoundment created by Nunn's Mill Dam is shallow with predominant sand and clay substrates. Shallow, slow moving, unshaded waters are highly susceptible to thermal impacts at all times of year, but particularly during summer months. In addition, shallow and slow waters tend to host intense plant growth that can negatively affect dissolved oxygen and pH. Small, shallow impoundments attract numerous wildlife species such as Canada goose (*Branta canadensis*), which can contribute to high *Escherichia coli* levels. The removal and revegetation of the impoundment will also help trap nutrients and sediments that may runoff and increase total phosphorus and total suspended solid loads.

The removal of the Nunn's Mill Dam may be accomplished by leveraging additional funds through other state and/or federal sources. Alternative 3.6 is a Tier I selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances. Removing Nunn's Mill Dam restores river habitat, improves water quality, reestablishes fish and mussel movement, and enhances recreational fishing and boating opportunities.

3.7 Selected Tier I Alternative: Pond Removal on Tributary to Rockaway Creek

This project will remove a small inline farm pond on a private property. The pond is located on an unnamed tributary to Rockaway Creek, in Readington Township, Hunterdon County, New Jersey. The proposed restoration project includes: the removal of a small pond weir structure; the restoration of the stream corridor within and adjacent to the small pond; the removal of exotic

invasive plant species; the revegetation and stabilization of stream banks; and the creation/restoration of floodplain topography to restore floodplain hydrology and improve connectivity between the stream and its floodplain. This Alternative meets the Trustees identified project categories of freshwater wetland restoration, dam removal, aquatic connectivity, and instream enhancement.

Figure 10. Inline farm pond on an unnamed tributary to Rockaway Creek.

The farm pond is situated on an unnamed tributary located approximately 0.7 mile upstream of Rockaway Creek; Rockaway Creek flows for 2.5 miles to the Lamington River, and the Lamington River flows another 2.5 miles to the confluence with the North Branch Raritan River. The farm pond weir is approximately 12 to 15 feet long, and retains an approximate 0.25-acre impoundment (Figure 10). The pond is located on private property, and the landowner wishes to remove the pond and restore the stream and floodplain to their natural state. The surrounding watershed of the unnamed tributary is comprised mostly of forest and fallow agricultural fields, although a private golf course is located near the headwaters.

The Rockaway Creek watershed exhibits healthy biological communities, and recent improvements have been attained in water quality (NJDEP 2019). However, the section of Rockaway Creek that the unnamed tributary flows to does not attain the following uses: aquatic life general (due to pH and total phosphorus); aquatic life – trout (due to temperature); public water supply (due to arsenic); and recreation (due to *Escherichia coli*). Data is insufficient to determine the use of fish consumption. TMDL regulations are in place for total phosphorus and total suspended solids.

The farm pond removal will likely contribute to the improvement of water quality conditions in Rockaway Creek, by helping to reduce pH and total suspended solids. The shallow, sediment-laden pond hosts excessive plant growth. Excessive photosynthesis in slackwater ponds can cause pH to rise to high, basic levels that are intolerable to fish and macroinvertebrate species. The removal and revegetation of the impoundment will help reduce pH and the removal design is tailored to help to trap nutrients and sediments that may runoff and increase total suspended solid loads.

The farm pond removal will be accomplished with the assistance of the Natural Resources Conservation Service (NRCS). NRCS has prepared engineering design plans, will assist the landowner with construction contracting, will provide technical assistance and project management assistance, and will provide partial funds for the project. Alternative 3.7 is a Tier I selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances. Removing the Rockaway Creek tributary farm pond is cost-effective, increases floodplain habitat, and improves water quality.

3.8 Selected Tier I Alternative: County Boat Launch and Fishing Platform at Lincoln Avenue Park

The County Boat Launch is located on the lower Millstone River in Lincoln Avenue Park, Manville, Somerset County, New Jersey. The proposed recreational restoration project includes: the restoration of an existing dirt and gravel boat launch at the Lincoln Avenue Park; the installation of an accessible fishing platform, as feasible, in the vicinity of the boat launch; the installation of appropriate safety and informational signage associated with the boat launch and

platform; and the creation or expansion of unpaved parking, as warranted. This Alternative meets the Trustees identified project categories of boat launch recreation, river trail recreation, docks and piers, and ADA accessibility.

Figure 11. County Boat Launch in Lincoln Avenue Park, Manville, New Jersey.

The existing boat launch is located in the southwest corner of Lincoln Avenue Park, on the western edge of the Millstone River, approximately 1.5 miles upstream of the confluence with the Raritan River (Figure 11). The boat launch is located immediately downstream of the Royce Brook tributary, and approximately 450 feet downstream of the former Weston Mill Dam, which was removed in 2017. The existing boat launch is composed of hard-packed gravel to approximately the water line, then is gravel and riprap into the river. New riprap and gravel were added to the in-river portion of the launch in 2017, as part of the equipment access route for the Weston Mill Dam removal. The new slope of the in-water portion of the ramp precludes easy trailer launching at low water levels.

The existing parking area is an extension of the gravel and dirt drive that provides vehicle access to the Lincoln Avenue Park. No signage is visible to instruct visitors as to the types of boats permitted to be launched, where visitors should park their vehicles, or the hours of operation. There is currently no river or fishing access to visitors with disabilities.

This recreational restoration project involves enhancing public access to the Millstone and Raritan Rivers, in part, by upgrading the existing boat launch at Lincoln Avenue Park. Boat launch upgrades may include regrading the launch to a greater slope and resurfacing the launch with appropriately sized gravel and riprap, or regrading the launch to an appropriate slope and replacing the existing gravel/rip-rap with pre-cast concrete slabs. The launch should be able to handle both non-motorized and small motorized boats. Boaters that launch at the County Boat Launch can currently travel to the mainstem Raritan River as well as travel 4.7 miles upstream the Millstone River to the Blackwells Mills Dam.

Fishing access will be enhanced by installing an accessible fishing platform, as feasible. Figure 12 provides an example of the type of fishing platform that could be installed at or near the County Boat Launch. The fishing platform should provide access, given the provisions of the Americans with Disabilities Act of 1990 (ADA; 42 U.S.C. §§ 12101 *et seq*.), and should incorporate appropriate signage. The fishing platform should be designed in a manner as to not exacerbate erosion of the Millstone River and Royce Brook banks.

Figure 12. Example of accessible fishing platform along a small river in Virginia. Photo credit: Hawksbill Greenway Foundation.

This restoration project may additionally include the creation or expansion of the existing parking area associated with the boat launch. Parking materials will consist of gravel or parking pavers. Appropriate signage will be installed to provide instruction on the safe use of the launch, and other general information about the park, as warranted.

The proposed restoration project may be accomplished through leveraging additional funding and/or technical assistance from the Borough of Manville, the Manville Green Team, the Somerset County Planning Division, and other private, state, and federal partners. Alternative 3.8 is a Tier I selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the recreational injuries caused by the release of hazardous substances. Repairing the County Boat Launch and installing an accessible fishing platform, as feasible, will enhance recreational fishing and boating opportunities on both the Millstone and Raritan Rivers.

3.9 Selected Tier I Alternative: Lost Valley Nature Park

The Lost Valley is an area of Manville, Somerset County, New Jersey that is situated along the western side of the Millstone River, just upstream of the confluence with the mainstem Raritan River. The Borough of Manville, Somerset County, The Nature Conservancy, and other partners have proposed to transform the Lost Valley Area into a multi-use Nature Park. The proposed restoration project includes a mix of recreational and ecological improvements, that may include but are not limited to: the removal of existing impervious surfaces; trail and path development; planting pollinator garden areas; installing rain gardens; expansion and revegetation of wetland areas; tree plantings; upland meadow plantings; improvements to a gravel driving path; installation of a new gravel parking area; and installation of educational and wayfinding signage. This Alternative meets the Trustees identified project categories of freshwater wetland restoration, riparian restoration, floodplain restoration, land trail recreation, interpretive signage, and ADA accessibility.

The 65-acre Lost Valley Nature Park will include portions of the Lost Valley neighborhood and Lincoln Avenue Park. The Lost Valley neighborhood was comprised of roughly 500 homes and businesses, but after unprecedented flooding following Hurricane Floyd in 1999, the State's Blue Acres buyout program has reduced the community to only 377 homes and 4 remaining commercial

properties. The Lost Valley Nature Park will be situated along the southeastern portion of the Lost Valley neighborhood, and will completely incorporate the Lincoln Avenue Park. Somerset County owns and maintains the Lincoln Avenue Park, and the Manville Borough owns the reclaimed portion of the Lost Valley neighborhood.

The Nature Park will be located within the 100-year floodplain of the lower Millstone River, approximately 1 mile upstream of the confluence with the Raritan River. Royce Brook flows along the southwestern edge of the park, and portions of the proposed park are wetlands. The existing Lincoln Avenue Park has ball fields, a playground, and a boat ramp, but the site is underutilized by visitors.

The Nature Conservancy produced a recommendations report (TNC 2017) and the Borough of Manville produced a draft Master Plan report for the site in 2017 (Mott MacDonald 2017). The draft Master Plan for the Lost Valley Nature Park includes a conceptual design, as well as information regarding the existing natural and anthropogenic characteristics of the park. The Master Plan conceptual design is depicted in Figure 13.

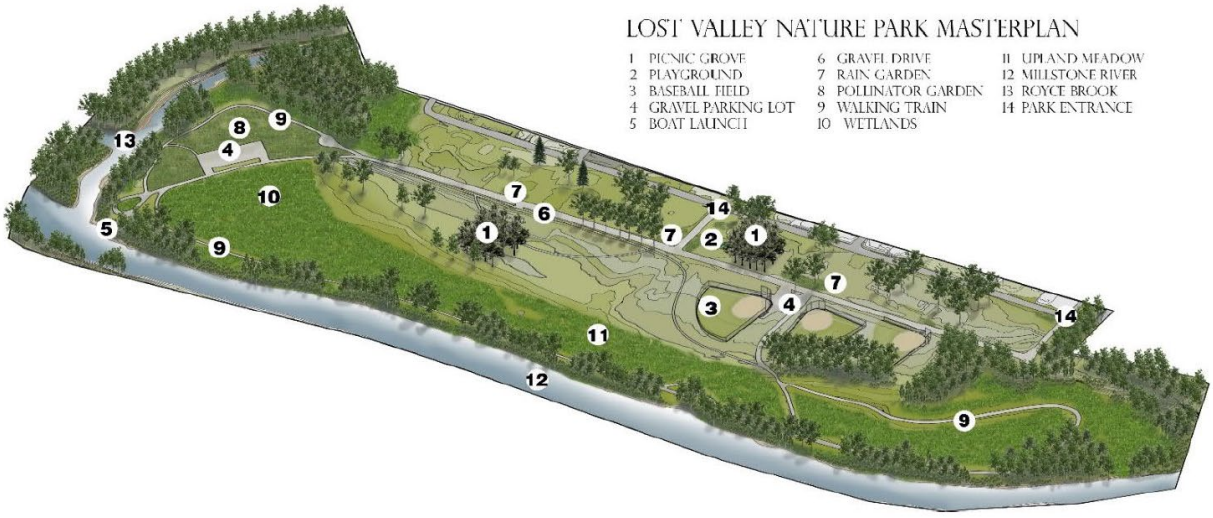

Figure 13. Conceptual design for the Lost Valley Nature Park, Mott MacDonald 2017.

The Lost Valley Nature Park has the potential to transform an area considered a community impediment into a community asset. Draft and final designs will be produced as part of this project. The available conceptual design indicates that the park may include: floodplain habitat, forested riparian buffer zones, pollinator gardens, rain gardens, tree plantings, picnic areas, impervious

surface removal, vegetated wetlands, upland meadow, and lawn. The conceptual design indicates that the park may provide human recreational areas, including active recreation (*e.g*., basketball court, baseball field, playground) and passive recreation (e.g., trails, roads, lawn). The Trustees will work with project partners to create a design that meets the goals and objectives of both the local community and the Trustee Council.

The proposed Lost Valley Nature Park restoration project may be accomplished through partnerships, additional funding, and technical assistance from the Borough of Manville, Somerset County, The Nature Conservancy, Manville's Green Team, and other state and federal sources. Alternative 3.9 is a Tier I selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the ecological and recreational injuries caused by the release of hazardous substances. Creation of the Lost Valley Nature Park will increase and enhance public recreation and environmental education opportunities; will remove impervious surfaces and enhance water retention and storage capacity; and will improve pollinator habitat and habitat for small mammals and birds.

3.10 Selected Tier I Alternative: North Branch Raritan River Corridor Riparian Buffer Restoration

The headwaters of the North Branch Raritan River are located in Mendham Borough, Morris County, New Jersey and the river flows generally southward through Somerset County, joining the South Branch Raritan River in Bridgewater and Branchburg Townships to form the mainstem Raritan River. The North Branch Raritan River watershed has a drainage area of approximately 187 square miles. The proposed restoration project includes the establishment and restoration of riparian buffers on publicly-owned open space properties along the North Branch Raritan River corridor (Figure 14). This Alternative meets the Trustees identified project categories of riparian restoration, floodplain restoration, land freshwater mussel conservation and enhancement, native fish conservation and enhancement, and instream enhancement.

The Raritan Headwaters Association (RHA) will identify, prioritize, and implement riparian buffer restoration in the North Branch Raritan River watershed. The RHA is a non-profit conservation organization based in Bedminster, Somerset County, New Jersey. RHA operates under the guidance of a Board of Trustees, and has 20 staff members, an AmeriCorps Watershed

ambassador, nature educators, interns, and over 180 volunteers. RHA's mission is to protect clean water in the rivers, streams, and homes of the North and South Branch Raritan watersheds, a region covering 38 municipalities in Hunterdon, Somerset, and Morris counties.

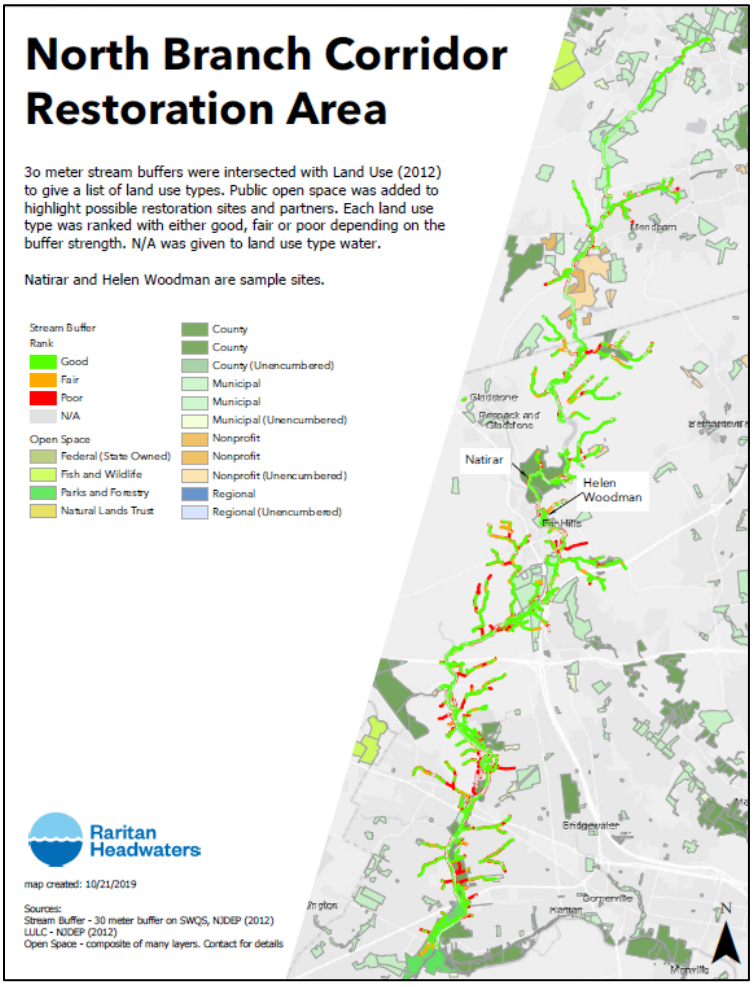

Figure 14. Map of potential areas for riparian buffer restoration in the North Branch Raritan watershed.

The RHA analyzed land cover and water quality data collected from the North Branch Raritan River and tributaries, including the Lamington/Black River, Chambers Brook, Mine Brook, Peapack Brook, and Rockaway Creek, and found that there has been a decline in water quality over time. The primary causes of impairment include non-point source pollution, impervious cover associated with increased development, and the decline of forested stream riparian buffers. RHA encourages green infrastructure and reducing nonpoint source pollution through their programming, and the State requires a 50-foot, 150-foot, or 300-foot riparian buffer depending on

how the State classifies the adjacent stream or waterbody. However, RHA recently conducted a GIS analysis of riparian buffers on the North Branch Raritan River and its tributaries, and found that long segments of riparian areas had inadequate or no riparian buffer, even when located on publicly-owned parcels.

The proposed project will establish or restore riparian buffers to at least their State-required length at select municipal, county, and state properties along the North Branch Raritan River and its tributaries. The RHA has a minimum goal of establishing 10,000 native trees and shrubs in partnership with municipalities and other public landowners. As part of the project, RHA will monitor water quality parameters including benthic macroinvertebrate and fish communities before and after restoration as part of their robust stream monitoring program. This will provide data on the effectiveness of stream buffer plantings on restoring water quality.

Streams of this region provide drinking water to 1.5 million people in New Jersey; therefore, water quality improvements are of utmost importance to the health of citizens, the local economy, and the natural ecology of the area. Healthy riparian buffers contain trees and other vegetation that help protect water quality. Riparian buffers intercept non-point source pollutants carried by rainwater runoff and help to trap excess nutrients and other chemical pollutants that degrade waterbodies. Riparian buffers help to stabilize stream banks and minimize erosion and sedimentation. Riparian buffers help to flatten the hydrograph by infiltrating and slowing down runoff from rain events prior to entering the stream; this capability helps to decrease the frequency and intensity (*i.e.*, flashiness) of flood events. Riparian buffers provide shade over waterbodies, which helps to reduce stream temperatures and reduce large fluctuations in stream temperatures over time. Streams and their riparian buffers also play an important role in water storage and groundwater recharge. During high water events, riparian buffers can help to store subsurface water, allowing it to slowly percolate to the stream over time and also percolate vertically to groundwater reserves. As a result, riparian buffers help to maintain stream flow in the late summer when rain is minimal and help to maintain groundwater resources. Riparian buffers contribute towards aquatic habitat heterogeneity by providing large wood and other organic inputs that help provide a diversity of habitats (and food sources) for a variety of different species.

Improvements to water quality and aquatic/riparian habitat would benefit a number of sensitive wildlife species, including several species identified by the State of New Jersey as having Greatest

Conservation Need, including: longtail salamander (*Eurycea longicauda*), wood turtle (*Glyptemys insculpta*), American brook lamprey (*Lethenteron appendix*), comely shiner (*Notropis amoenus*), fallfish (*Semotilus corporalis*), margined madtom (*Noturus insignis*), redbreast sunfish (*Lepomis auritus*), satinfin shiner (*Cyprinella analostana*), shield darter (*Percina peltata*), spotfin shiner (*Cyprinella spiloptera*), swallowtail shiner (*Notropis procne*), and yellow bullhead (*Amerius natalis*). Water quality and habitat improvements may also benefit several mussel species, including: brook floater (*Alasmidonta varicosa*), triangle floater (*Alasmidonta undulata*), alewife floater (*Anodonta implicata*), eastern elliptio (*Elliptio complanata*), and eastern floater (*Pyganodon cataracta*).

The North Branch Raritan River riparian restoration project may be accomplished by leveraging additional funds and technical assistance from RHA, and other state, federal, or local sources. Alternative 3.10 is a Tier I selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances. Creating and restoring riparian buffers along the North Branch Raritan River and its tributaries will benefit water quality and aquatic habitat for sensitive aquatic taxa, will benefit species that use stream edge as habitat, and will also provide a high potential for public outreach and education.

3.11 Selected Tier I Alternative: East Brunswick Swamp Pink Restoration

The proposed restoration project involves the protection of an extant swamp pink (*Helonias bullata*) population and the restoration and protection of adjacent Atlantic white cedar (*Chamaecyparis thyoides*) habitat in East Brunswick, New Jersey. This Alternative meets the Trustees identified project categories of freshwater wetland restoration and floodplain restoration.

Swamp pink is a perennial herb in the lily family, characterized by smooth evergreen oblong-spatulate leaves that lay flat on the ground in a basal rosette, and a stocky, hollow flower stem (one to three feet) that is topped by a cluster of unique pink flowers in the spring. Swamp pink is only found in wetlands along streams and seepage areas in freshwater swamps. It often grows on hummocks formed by trees, shrubs, and sphagnum moss. The hummocks keep the roots moist but not submerged in the standing water and hydric soil characteristic of the plant's habitat. In New

Jersey, the plant is often found in Atlantic white cedar or red maple (*Acer rubrum*) dominated swamps.

Swamp pink was listed as threatened under the Endangered Species Act of 1973 (ESA; 16 U.S.C. §§ 1531 *et seq*.) in 1988. The species once inhabited wetland areas from New York to Georgia, but now only ranges from New Jersey to Virginia and a few isolated areas in the Southern Appalachian Mountains. The East Brunswick swamp pink population, located in East Brunswick, New Jersey, represents the northernmost occurrence of the species within its extant range. The protection of this remnant population is important for maintaining the distribution and genetic diversity of the species.

Figure 15. Swamp Pink plant from the East Brunswick, New Jersey population.

The East Brunswick swamp pink population is currently comprised of less than 20 individual plants (Figure 15). The population is negatively impacted by deer browse; only a small number of swamp pink plants flower each spring and their flowers are preferentially consumed by deer. In

addition, the adjacent Atlantic white cedar stand is aging, and at risk of windfall. As a result, canopy gaps and other changes that may alter the specialized wetland habitat required by swamp pink. Recently germinated Atlantic white cedar seedlings are present in the understory, but their growth is suppressed by the high level of deer browse at the site. Because of inadequate canopy cover, the invasive plant Japanese stilt grass (*Microstegium vimineum*) is encroaching on the project site, causing further risk. Appropriate restoration at the site involves the protection of swamp pink using deer exclusion fencing, and the enhancement and protection of its adjacent Atlantic white cedar habitat.

The proposed restoration project is comprised of three general phases: 1) conduct a current swamp pink survey (last survey conducted in 2018) to determine the appropriate footprint for deer exclusion fencing, and conduct a survey of the adjacent white cedar stand to determine appropriate habitat enhancement actions; 2) install 6- to 8-foot-high deer exclusion fence around the swamp pink area, install anti-herbivory cages around individual plants, and implement appropriate habitat suitability actions (*e.g.*, thin the adjacent white cedar stand to promote new growth; plant white cedar saplings an house with browse tubes, and/or provide additional fencing around the white cedar stand; remove invasive species within fenced area); and 3) monitor swamp pink plants and the Atlantic white cedar stand for a minimum 5-year period, and monitor and repair the fencing, as warranted.

The protection of the East Brunswick swamp pink population may be accomplished by leveraging additional funds and technical assistance through other federal sources. Alternative 3.11 is a Tier I selected alternative because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances. Protection of the East Brunswick swamp pink population benefits a federally endangered species and protects critical wetland habitat in New Jersey.

3.12 Selected Tier I Alternative: Stony Brook Green Infrastructure Demonstration Project

The Watershed Reserve is a property owned and operated by The Watershed Institute, and is located in Pennington, Mercer County, New Jersey. The proposed recreational and ecological restoration project involves the removal of impervious driving surfaces and the 14,000 square feet

impervious parking area located on The Watershed Reserve property; the installation of multiple demonstration porous paving alternatives; the installation of bioswales to capture and treat stormwater along the entry drive; the removal of invasive species along the entry drive and adjacent tributary stream; and native plantings along the entry drive and adjacent tributary stream. This project will serve as a green infrastructure demonstration project to educate Watershed Reserve visitors on alternative green infrastructure practices and will also serve as a research site for local academic groups. This Alternative meets the Trustees identified project categories of riparian restoration, floodplain restoration, instream enhancement, interpretive signage, and ADA accessibility.

The Watershed Reserve is owned and managed by The Watershed Institute (a nonprofit formerly known as the Stony Brook Millstone Watershed Institute). The Watershed Reserve spans nearly 1,000 acres of forest, wetlands, meadows, and farmland; houses a 15,256 square foot LEED-Platinum certified educational center (*i.e.*, The Watershed Center); and attracts tens of thousands of visitors each year who attend more than 300 programs including summer camps, educational classes, school field trips, conferences, and environmental festivals. The Watershed Reserve hosts over 10 miles of hiking trails for general recreation (*e.g.*, hiking, wildlife viewing, educational center).

The current parking lots, entry drive, and exit roads used to access The Watershed Reserve are comprised of asphalt and gravel and do not infiltrate stormwater. Runoff and sediments, especially from the gravel parking lot, drain directly into an unnamed tributary to Stony Brook and also drain indirectly into the tributary through various storm sewer drains. Invasive plants that perform poorly at stormwater infiltration and retention dominate riparian areas along the entry drive and the parking lot. Cumulatively, there is concern that the existing road and parking infrastructure at the Watershed Reserve is promoting the degradation of water quality in the Stony Brook.

The proposed recreational and ecological restoration project will play a significant role in educating tens of thousands of people that visit The Watershed Reserve each year about stormwater runoff and the role that runoff plays in degrading our local waterways. Though signage, brochures, presentations, and educational programs, this project will demonstrate and explain the principals of stormwater mitigation and green infrastructure. Watershed Center staff will incorporate monitoring of water quality changes associated with project installation, and will work with local

academic groups to monitor other aspects of the efficacy of the multiple types of impervious surfaces installed onsite.

Approximately 0.73 mile of tributary stream leading to the Stony Brook will be immediately enhanced with the implementation of this green infrastructure project, and water quality uplift will have a lasting impact for miles downstream. At least 3 acres of wetland, 9 acres of riparian buffer, and 12 acres of upland habitat will be improved through the riparian planting program, and 11 acres of upland will be protected through the implementation of green infrastructure that will reduce the negative effects of stormwater runoff and erosion.

Aquatic species that may benefit from the reduction of stormwater runoff in Stony Brook include diadromous species such as American eel (*Anguilla rostrata*), and several coldwater species (brook trout – *Salvelinus fontinalis*, rainbow trout – *Oncorhynchus mykiss*). The project may also benefit species identified by the State of New Jersey as having Greatest Conservation Need, including: comely shiner (*Notropis amoenus*), margined madtom (*Noturus insignis*), redbreast sunfish (*Lepomis auritus*), satinfin shiner (*Cyprinella analostana*), and swallowtail shiner (*Notropis procne*). Water quality improvements may additionally benefit several mussel species, including: alewife floater (*Anodonta implicata*), brook floater (*Alasmidonta varicosa*), creeper *(Strophitus undulatus*), eastern elliptio (*Elliptio complanata*), eastern floater (*Pyganodon cataracta*), eastern pondmussel (*Ligumia nasuta*), green floater (*Lasmigona subviridis*), and triangle floater (*Alasmidonta undulata*).

The installation of green infrastructure at The Watershed Reserve may be accomplished with funding and technical assistance from The Watershed Institute, and may leverage additional funds through private and/or federal sources. Alternative 3.12 is a Tier I selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the recreational and ecological injuries caused by the release of hazardous substances. Creating a green infrastructure demonstration project at The Watershed Reserve will provide a high potential for public outreach and education, and will also provide ecological benefits by improving water quality and benefitting species of concern.

3.13 Selected Tier II Alternative: Rockafellows Mills Dam Removal

The Rockafellows Mills Dam is located on the South Branch Raritan River, in Readington and Raritan Townships, Hunterdon County, New Jersey. The proposed restoration project involves the removal of the Rockafellows Mills Dam; appropriate stabilization, restoration and vegetation of the adjacent stream reaches and impoundment area; appropriate characterization, dredging, removal, and storage/disposal of upstream sediments, as warranted; and scour protection measures for the Black River & Western Railroad Flemington through truss bridge, the Rockafellows Mill Road bridge, and other areas, as warranted. This Alternative meets the Trustees identified project categories of dam removal, riparian restoration, aquatic connectivity, freshwater mussel conservation and enhancement, native fish conservation and enhancement, instream enhancement, and river trail recreation.

The Rockafellows Mills Dam is the downstream-most barrier on the South Branch Raritan River. The dam is an approximately 290-feet-long, 14-feet-high (maximum height) concrete and rock-fill run-of-river gravity dam that creates an approximate 12.5-acre impoundment on the South Branch Raritan River (Figure 16). The concrete overflow spillway is connected to an undershot water wheel structure at the southern end of the dam, but the low-level outlet valves that supply water to the wheel, as well as the wheel, are no longer operable.

The original construction date for Rockafellows Mills Dam is unknown. The dam was rebuilt in 1919 to supply power for a small mill located along the southern edge of the dam. In 1930 and 1978, dam failures were recorded. The cause and extent of the failure in 1930 and/or resulting damage is unknown. The 1978 failure consisted of a 30-foot breach at the southern end of the main spillway (USACE 1981). All damage has been since been repaired. The dam and most of the land flanking the impoundment is currently in private ownership. The state-owned South Branch WMA is situated along the northern bank of the river just downstream of the dam.

Removal of the Rockafellows Mills Dam would restore fish passage for approximately 9.4 miles upstream to the Hamden Pump Dam, which is mostly permeable to migratory fish, and an additional 3 miles upstream to the next impermeable dam, the Clinton Mills Dam. Dam removal would also provide fish passage for approximately 12 miles downstream to the Headgates Dam located on the mainstem Raritan River. The Headgates Dam removal is a Tier I project in this Final

RP/EA. The Headgates Dam is the last remaining complete barrier on the mainstem Raritan; as such, the removal of both the Headgates and Rockafellows Mills Dam could allow for approximately 55 miles of fish passage connectivity along the South Branch and mainstem Raritan Rivers extending to the Raritan Bay.

Figure 16. Rockafellows Mills Dam shown from downstream facing southwest.

Sediments that have accumulated upstream of the Rockafellows Mills Dam would need to be characterized and quantified as part of the dam removal feasibility process, and the removal may require dredging, removal, and storage/disposal of sediments. The dam removal design may include minor grading of the riverbed and banks, revegetation of exposed areas, and scour protection measures, as warranted.

The most recent New Jersey Integrated Water Quality Assessment Report for EPA 303d requirements indicate that South Branch Raritan waters in the vicinity of the Rockafellows Mills Dam do not attain any of the following uses: aquatic life general (due to total phosphorus); aquatic life – trout (due to temperature); fish consumption (due to mercury in fish tissue); public water

supply (due to arsenic); and recreation (due to *Escherichia coli*; NJDEP 2019). TMDL regulations are in place for total phosphorus and total suspended solids.

The removal of the Rockafellows Mills Dam and restoration of its associated impoundment will likely improve water quality conditions in the impounded reach and downstream of the dam, namely by reducing temperature, total phosphorus, and total suspended solids. Shallow, slow moving, unshaded waters are highly susceptible to thermal impacts, particularly during summer months. Altered flow regimes also modify nutrient and chemical cycling, and sediment transport. The impoundment created by the Rockafellows Mills Dam is very shallow with predominant sand and clay substrates, very little physical and hydrological habitat heterogeneity, and very little cover. The reintroduction of the river's natural flow regime will provide more suitable habitat conditions for aquatic biota.

Dam removal will improve fish passage for resident and diadromous species such as American eel (*Anguilla rostrata*), blueback herring (*Alosa aestivalis*), sea lamprey (*Petromyzon marinus*), and striped bass (*Morone saxatillis*) after fish passage issues are addressed at the Island Farm Weir and Headgates Dam. Water quality and habitat improvements will improve conditions for all species, including several species identified by the State of New Jersey as having Greatest Conservation Need, including: American brook lamprey *(Lethenteron appendix*), bluespotted sunfish (*Enneacanthus gloriosus*), cutlips minnow (*Exoglossum maxillingua*), eastern mudminnow (*Umbra pygmaea*), fallfish (*Semotilus corporalis*), margined madtom (*Noturus insignis*), redbreast sunfish (*Lepomis auritus*), satinfin shiner (*Cyprinella analostana*), shield darter (*Percina peltata*), swallowtail shiner (*Notropis procne*), and yellow bullhead (*Amerius natalis*). Water quality and habitat improvements will also benefit several mussel species, including: brook floater (*Alasmidonta varicosa*), eastern elliptio (*Elliptio complanata*), eastern floater (*Anodonta cataracta*), and triangle floater (*Alasmidonta undulata*).

Removal of the Rockafellows Mills Dam will enhance recreational paddling on the South Branch River. The reach extending from Clinton, New Jersey to the confluence with the mainstem Raritan River is currently interrupted by a necessary portage at the Rockafellows Mills Dam, which is not recommended due to the fact that the dam is located on private property. The dam is also a safety hazard for boaters unaware of the upwelling hazards associated with small low-head dams.

The removal of the Rockafellows Mills Dam may be accomplished with technical assistance and leveraging additional funds from the Raritan Headwaters Association and other state and federal sources. Alternative 3.13 is a Tier II selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances, but project access and permissions are uncertain at this time. Removing the Rockafellows Mills Dam restores river habitat, improves water quality, reestablishes fish and mussel movement, and enhances recreational fishing and boating opportunities.

3.14 Selected Tier II Alternative: Klines Mill Dam Fish Passage

The Klines Mill Dam is located on the North Branch Raritan River in Bedminster Township, Somerset County, New Jersey. The proposed restoration project involves the restoration of fish passage at the Klines Mill Dam through dam removal, partial dam removal, or the installation of a nature like fishway. The project may also include appropriate restoration, stabilization, and revegetation of the adjacent stream and millrace reaches; and scour protection measures at the Klines Mill Road and bridge, as warranted. This Alternative meets the Trustees identified project categories of dam removal or technical fish passage, riparian restoration, floodplain restoration, aquatic connectivity, freshwater mussel conservation and enhancement, native fish conservation and enhancement, instream enhancement, and river trail recreation.

The Kline's Mill Dam is an approximately 145-feet-long, v-shaped, concrete, run-of-river gravity dam (Figure 17). The northern arm of the v-shaped dam is approximately 90-feet-long, and contains a small notch toward its southern end that is approximately 15 feet in length and 1 foot in depth; this arm passes the river's thalweg. The southern arm of the v-shaped dam is approximately 55-feet-long and contains a small, vertical-rising sluice gate that opens to a historic millrace. The millrace runs approximately 780 feet to a fork where a portion of flow can be diverted back to the North Branch Raritan, and remaining water runs in a smaller, more constricted millrace for an additional 800 feet past the historic McDonalds-Klines Mill before rejoining the North Branch Raritan.

The Klines Mill Dam is associated with the historic McDonalds-Klines Mill, originally constructed as an up-and-down sawmill built in 1744 by William McDonald. The mill was converted to a grist

mill and willed to the wife of Jacob Kline in 1836, and the property remained in the Kline family until 1899. While the dam and mill are now obsolete, the mill building has been refurbished in modern times and retains functional sawmill machinery inside. The McDonalds-Klines Mill as well as the Klines Mill Road located 0.2 mile downstream are listed on the National and New Jersey Registers of Historic Places. The dam is currently privately owned; land to the south is privately held (preserved farmland), and land to the north is owned by Bedminster Township.

Figure 17. Klines Mill Dam shown from downstream facing southeast.

Restoration of fish passage at the Klines Mill Dam will benefit diadromous species such as American eel (*Anguilla rostrata*) and sea lamprey (*Petromyzon marinus*), and after fish passage is addressed at the Island Farm Weir and Headgates Dam will additionally benefit American shad (*Alosa sapidissima*) and blueback herring (*Alosa aestivalis*). Water quality and habitat improvements will improve conditions for all species, including several species identified by the State of New Jersey as having Greatest Conservation Need, including: American brook lamprey (*Lethenteron appendix*), comely shiner (*Notropis amoenus*), fallfish (*Semotilus corporalis*), margined madtom (*Noturus insignis*), redbreast sunfish (*Lepomis auritus*), satinfin shiner (*Cyprinella analostana*), shield darter (*Percina peltata*), spotfin shiner (*Cyprinella spiloptera*), swallowtail shiner (*Notropis procne*), and yellow bullhead (*Amerius natalis*). Restoration of fish passage at the Kline Mill Dam may also benefit several mussel species, including: triangle floater

(*Alasmidonta undulata*), alewife floater (*Anodonta implicata*), eastern elliptio (*Elliptio complanata*), and eastern floater (*Pyganodon cataracta*).

Removal of the Klines Mill Dam would restore fish passage for approximately 5.6 miles to the next upstream dam (Ravine Lake Dam), and would provide fish passage for approximately 8.1 miles downstream to the Mill Lane Dam. Once fish passage is addressed at the Mill Lane Dam and remaining mainstem Raritan River Dams, the removal of the Klines Mill Dam would provide approximately 43.6 miles of fish passage connectivity along the North Branch and mainstem Raritan Rivers extending to the Raritan Bay.

Restoration of fish passage at the Klines Mill Dam may be accomplished by leveraging additional funds through other state and federal sources. Alternative 3.14 is a Tier II selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances, but project access and permissions are uncertain at this time. Removing the Klines Mills Dam restores river habitat, improves water quality, and reestablishes fish and mussel movement.

3.15 Selected Tier II Alternative: Beisler Lake Dam Removal

Beisler Lake is located in Lebanon Township, Hunterdon County, New Jersey. This restoration project includes the partial removal of the earthen dam at Beisler Lake; stream channel restoration and stabilization in the former impounded area and downstream; revegetation of the former impounded area and other disturbed areas; and the creation of vernal pools in and around the former impoundment footprint. This Alternative meets the Trustees identified project categories of dam removal, riparian restoration, floodplain restoration, aquatic connectivity, native fish conservation and enhancement, and instream enhancement.

Beisler Lake is created by the impoundment of Spruce Run Creek, and is situated approximately 9.4 miles upstream of the Spruce Run Reservoir. Spruce Run Reservoir meets the South Branch Raritan River just downstream of the reservoir's dam. The Beisler Lake Dam is a 630-feet-long and 17.1-feet-high earthen dam that retains a 6.8-acre impoundment (Figure 18). In 2015, the NJDEP requested that the dam owner perform a dam failure analysis. The analysis resulted in the recommendation to designate the earthen dam as a Class I – High Hazard Potential, indicating that its failure would likely cause the loss of life or extensive property damage. Due to the Class I

designation, the property owner was required to either reconstruct the dam to meet minimum hazard requirements or remove the dam. After determining the reconstruction option to be cost-prohibitive, the dam owner chose to remove the dam, reclaim the former impoundment, and restore the section of Spruce Run Creek that flows through the impoundment.

Figure 18. Beisler Lake in fall of 2019. The impoundment was permanently drained through the outflow structure embedded in the earthen dam in 2017, and the impoundment was partially revegetated in 2018.

To date, the dam owner has taken several actions towards removing the Beisler Lake Dam. In fall of 2017, there was a permanent drawdown of the lake and a complete fish removal and relocation effort. The drawdown was facilitated by permanently opening an existing outflow structure and conveyance pipe that is embedded in the earthen dam. Immediately following the drawdown, the lakebed was hydroseeded with native rye grass to minimize sediment transport. In summer of 2018, a total station survey was conducted to assist in the development of dam removal and

impoundment restoration design plans. In fall of 2018, approximately 750 native trees and shrubs were planted in the former impounded area.

Conceptual project designs include dam removal, stream reconstruction, and native plant reclamation. The dam removal design calls for the removal of the existing spillway structure, and excavation of a breach through the dam. The embankment breach will be excavated to a slope of at least 5:1, taking into consideration ease of access as well as constriction during high water events. Excavated soils will be relocated to adjacent areas within the former impoundment. The streambed will be graded to match the existing upstream bed elevation through the breach, and rock cross vanes will be installed for gradient control. The designed channel dimensions through the dam will allow for minimal retention of floodwaters within the impoundment. The breach will be stabilized with riprap, non-woven geotextiles, and erosion control matting.

Once dam removal is complete, the reach of Spruce Run Creek that flows through the impoundment will be stabilized by the revegetation of stream banks and modifications to the channel dimensions to reflect those upstream and downstream of the Beisler Lake impoundment. Meanders and pools will be excavated to create fish and macroinvertebrate habitat. Riffles will be created with excavated gravels and imported gravels, as needed. The flow line will be relocated within the upstream reach of the impoundment to the creek's assumed historic streambed. A channel block may be installed to direct the stream's flow into its historic channel. Vernal pools will be established at appropriate locations within and adjacent to the former impoundment footprint.

The Beisler Lake Dam was built in 1973 to support a local summer camp, and is currently in private ownership. There are no significant historic resources in the general area. Beisler Lake is situated at the headwaters of Spruce Run Creek, although five, small (two to three acre), off-channel impoundments are located within 0.5 to 0.75 mile upstream. Most of the upstream ponds are located within a Hunterdon County open space preserved land parcel. There are no impoundments for 9.4 miles downstream to the Spruce Run Reservoir.

Beisler Lake was built for swimming and boating recreation by a local summer camp. The restored impoundment area will be used for environmental education and alternate recreational purposes (*e.g.*, nature-hikes, wildlife viewing). The section of Spruce Run Creek running from Beisler Lake

to the Spruce Run Reservoir is a popular trout-fishing destination, and the removal of the Beisler Lake Dam and the revegetation of the former impoundment will help keep downstream waters sufficiently cool to support trout.

The most recent New Jersey Integrated Water Quality Assessment Report for EPA 303d requirements indicate that Spruce Run Creek waters in the vicinity of Beisler Lake do not attain the following uses: aquatic life – trout (due to temperature); and recreation (due to *Escherichia coli*), but do attain the uses of aquatic life general and public water supply (NJDEP 2019). There is insufficient data to determine the use of fish consumption. Spruce Run Creek in the vicinity of Beisler Lake is listed on the Raritan Water Region Restoration Priority Watershed List (NJDEP 2019), indicating high potential in achieving water quality improvements to restore designated uses. The removal of the Beisler Lake Dam and the revegetation of the former impoundment will help to reduce stream temperature, and will help reduce *Escherichia coli* by dissuading use by Canada goose and by infiltrating and capturing other *Escherichia coli* sources before entering the creek.

Restoration of fish passage and other water quality and habitat improvements at Beisler Lake will improve conditions for all fish species, including several cold water recreational game species (brook trout - *Salvelinus fontinalis*, brown trout - *Salmo trutta*, and rainbow trout - *Oncorhynchus mykiss*), and diadromous species such as American eel (*Anguilla rostrata*). Water quality and habitat improvements may also benefit several mussel species, including: brook floater (*Alasmidonta varicosa*), eastern elliptio (*Elliptio complanata*), eastern floater (*Pyganodon cataracta*), and triangle floater (*Alasmidonta undulata*).

The Beisler Lake Dam removal may be accomplished by leveraging additional funds and technical assistance from other non-profit, state, and/or federal sources. Alternative 3.15 is a Tier II selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances, but the project may not yield ecological benefits of the magnitude of other Tier I projects. Removing the Beisler Lake Dam restores headwater aquatic habitat, improves water quality, and enhances recreational opportunities at the adjacent summer camp.

3.16 Selected Tier II Alternative: Mill Lane Dam Removal

The Mill Lane Dam is located on the North Branch Raritan River in Branchburg and Bridgewater, Somerset County, New Jersey. The proposed restoration project involves the removal of the Mill Lane Dam; relocation and/or recalibration of an adjacent USGS stream gage; appropriate restoration and stabilization of the adjacent stream reaches and impoundment area; revegetation of exposed and newly formed banks; and scour protection measures at the U.S. Route 202 bridge and other areas, as warranted. This Alternative meets the Trustees identified project categories of dam removal, riparian restoration, aquatic connectivity, freshwater mussel conservation and enhancement, native fish conservation and enhancement, instream enhancement, and river trail restoration.

The Mill Lane Dam is an approximately 180-feet-long, less than 5-feet-high, concrete, run-of-river gravity dam (Figure 19). The dam is owned by NJDEP, and is flanked by land owned by the NJDEP to the west and by Somerset County Park Commission on the east. Land downstream is owned by the NJDEP and is part of the Chipman Tract, a 109-acre undeveloped preserved parcel. The dam can likely be accessed through an existing entrance along the eastern side of U.S. Route 202; this access point would accommodate heavy demolition equipment and avoid disruption of the former mill site located on the west bank.

The Mill Lane Dam acts as the control weir for USGS gage 01400000 North Branch Raritan River near Raritan, New Jersey. This USGS gage measures stage and discharge, and has been at use in its current location since 1923. The USGS reports that records are generally good except for estimated discharges, which are fair due to variable-stage backwater from the confluence with the South Branch Raritan River. However, the riverbank at the northeastern edge of the weir is eroding and this bypass conveys an unquantified volume of flow around the weir. The bypass is approximately 10- to 15-feet-wide, up to 3-feet-deep, and likely reduces the accuracy of the USGS gage at this location. In addition to the bypass, the 8.5-foot by 10.5-foot concrete buttress that formerly anchored the weir to the northeast bank has dislodged from its foundation and pitched to the northeast, opening a 14-inch crack through the weir structure. In 2018, another breach caused by concrete spalling was observed on the southwestern end of the structure. The degraded condition of the Mill Lane Dam makes it ideal to consider relocating the USGS gage to an alternate location or updating existing equipment and recalibrating the gage at its current position.

Removal of the Mill Lane Dam would restore fish passage for approximately 8.1 miles to Klines Mill Dam, the next upstream dam, as well as provide access to both the Lamington/Black River (8.1 miles) and the Rockaway Creek (7 miles). Restoration of fish passage Klines Mill Dam is a Tier II project in this Final RP/EA. Removal of the Mill Lane Dam would also provide fish passage for 1.9 miles downstream, to the Headgates Dam on the mainstem Raritan River. Fish passage projects at the two remaining Raritan River mainstem dams, the Headgates Dam and the Island Farm Weir, are Tier I projects in this Final RP/EA. Once fish passage issues at these remaining mainstem dams are addressed, the removal of the Mill Lane Dam would restore approximately 38 miles of fish passage connectivity along the North Branch Raritan and mainstem Raritan Rivers extending to the Raritan Bay.

Figure 19. Mill Lane Dam shown facing northeast. Water has eroded the stream bank along the northeastern edge of the dam, and visibly flows around the weir.

The most recent New Jersey Integrated Water Quality Assessment Report for EPA 303d requirements indicate that North Branch Raritan waters in the vicinity of the Mill Lane Dam do not attain the following uses: aquatic life general (due to pH and turbidity); public water supply

(due to arsenic); and recreation (due to *Escherichia coli*); and there is insufficient data to determine if waters in the vicinity of the Mill Lane Dam meet their designated use for fish consumption (NJDEP 2019). TMDL regulations are in place for total phosphorus and total suspended solids. The removal of the Mill Lane Dam will likely improve water quality conditions in the impounded reach and downstream, namely by restoring natural sediment transport and contributing to the reduction of turbidity and total suspended solids.

Restoration of fish passage at the Mill Lane Dam will benefit diadromous species such as American eel (*Anguilla rostrata*) and sea lamprey (*Petromyzon marinus*), and will additionally benefit American shad (*Alosa sapidissima*) and blueback herring (*Alosa aestivalis*) after fish passage is addressed at the remaining mainstem Raritan River dams. Water quality and habitat improvements will improve conditions for all species, including several species identified by the State of New Jersey as having Greatest Conservation Need, including: American brook lamprey (*Lethenteron appendix*), comely shiner (*Notropis amoenus*), fallfish (*Semotilus corporalis*), margined madtom (*Noturus insignis*), redbreast sunfish (*Lepomis auritus*), satinfin shiner (*Cyprinella analostana*), shield darter (*Percina peltata*), spotfin shiner (*Cyprinella spiloptera*), swallowtail shiner (*Notropis procne*), and yellow bullhead (*Amerius natalis*). Restoration of fish passage at the Mill Lane Dam may also benefit several mussel species, including: triangle floater (*Alasmidonta undulata*), alewife floater (*Anodonta implicata*), eastern elliptio (*Elliptio complanata*), and eastern floater (*Pyganodon cataracta*).

Removal of the Mill Lane Dam will enhance recreational paddling on the South Branch Raritan River. The commonly paddled reach extending from the Lamington River confluence to the mainstem Raritan River is currently interrupted by a necessary portage at the Mill Lane Dam. The dam is a safety hazard for boaters unaware of the upwelling hazards associated with small low-head dams.

The removal of the Mill Lane Dam may be accomplished by leveraging additional funds through other state and federal sources. Alternative 3.16 is a Tier II selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances, but project permissions are uncertain at this time. Removing the Mill Lane Dam restores river habitat, improves water quality, reestablishes fish and mussel movement, and enhances fishing and recreational boating opportunities.

3.17 Selected Tier II Alternative: Lake Manalapan Riparian Restoration

Lake Manalapan is located in Monroe Township, Middlesex County, New Jersey. The 30-acre lake is situated within Thompson Park, a 616-acre county park that is a popular spot for fishing, boating, and general recreation. The proposed restoration project would create 600 feet of riparian buffer along the western shoreline of Lake Manalapan to stabilize banks and reduce erosion, reduce sediment and nutrient loading from runoff, and deter Canada geese. This Alternative meets the Trustees identified project categories of riparian restoration and floodplain restoration.

Specific project components would include: re-grading and installing erosion control blankets, coir logs, and native vegetation; creation of a vegetated buffer to dissipate and resist wind-driven wave action along the shoreline and deter Canada geese (approximately 600-feet-long and 20-feet-wide); and planting of aquatic vegetation to reduce wind-driven wave energy associated with the long fetch of Lake Manalapan. The primary objective of these design measures is to improve water quality in Lake Manalapan and downstream by reducing total suspended solids originating from the continued erosion and degradation of Lake Manalapan's shoreline.

Lake Manalapan is an impoundment of Manalapan Brook, a tributary to the South River and situated 14.5 miles upstream of the Raritan River mainstem. The western shoreline is currently bare, and the current landscaping regime dictates mowing up to the shoreline banks. Shoreline erosion is exacerbated by upland runoff, foot traffic, and wave action from recreational users and by Canada geese who congregate in the area and eat shoreline vegetation. Excess sediment increases turbidity and total suspended solids, and can carry pollutants that further degrade water quality.

The most recent New Jersey Integrated Water Quality Assessment Report for EPA 303d requirements indicates that Manalapan Branch waters at Lake Manalapan attain the designated use of public water supply (NJDEP 2019), but do not attain the following designated uses: aquatic life general (due to total phosphorus); fish consumption (due to chlordane, DDT, PCBs in fish tissue); and recreation (due to *Escherichia coli*). Waters downstream of Lake Manalapan attain the use of aquatic life general, but do not attain the following uses: fish consumption (due to mercury in fish tissue); public water supply (due to arsenic); and recreation (due to *Escherichia coli*). In general, biological communities in the Manalapan Brook are healthy and fully supporting (NJDEP 2019),

and the Manalapan Brook watershed is one of seven Raritan sub-watersheds that has a nine-element watershed-based plan (WBP). WBPs can be an effective alternative to a formal TMDL to characterize pollutant sources, the reductions needed to attain EPA 303d surface water quality standards, and the means to achieve those reductions (*e.g.*, EPA 319(h) grants).

Figure 20. Riparian Restoration on Lake Manalapan's southern shoreline; this project is very similar to the proposed project.

In 2016, the Freehold Soil Conservation District received a 319(h) grant to install a 600-feet-long and 20-feet-wide riparian buffer along the southern shoreline of Lake Manalapan (Figure 20). The project was completed by the District in partnership with Princeton Hydro, Middlesex County, and the Rutgers Cooperative Extension of Middlesex County. The buffer incorporated native plants and biodegradable erosion control materials to stabilize the soil and reduce erosion. The project was part of an ongoing effort within the Manalapan Brook watershed to implement restoration projects that benefit water quality (as outlined in the WBP). Additional past projects include the installation of floating wetland islands at Lake Manalapan and naturalized detention ponds to

reduce stormwater runoff. The proposed restoration project will add to these ongoing conservation efforts.

A total of 0.52 acre of wetland and riparian habitat would be enhanced from the proposed riparian restoration. Plant species that will benefit include wetland plants that typically populate the littoral zone of lakes, floodplains, and emergent wetland habitats, including but not limited to: pickerel weed (*Pontederia cordata*), broadleaf arrowhead (*Sagittaria latifolia*), northern blue flag (*Iris versicolor*), green bulrush (*Scirpus atrovirens*), softstem bulrush *(Schoenoplectus tabernaemontani*), crimsoneyed rosemallow (*Hibiscus moscheutos*), river birch (*Betula nigra*), silky dogwood (*Cornus amomum*), and red chokeberry (*Aronia arbutifolia*). The restoration of the riparian area would improve habitat for many native birds, mammals, reptiles, and amphibians. Along with stabilizing the shoreline and providing benefits to local biota, the restoration will also provide recreational aesthetic benefits to Thompson Park.

Thompson Park staff will engage community volunteers to help plant native species once the buffer surface is prepared. Volunteer engagement will help to educate the local population and help to reduce overall project costs. Additional potential project partners include the Rutgers Cooperative Extension of Middlesex County and the Middlesex County Office of Parks and Recreation, Princeton Hydro, and the Middlesex County Office of Planning. Princeton Hydro has completed the initial engineering design plans.

The Lake Manalapan riparian restoration project may be accomplished by leveraging additional funds and technical assistance from other state, federal, or local partners. Alternative 3.17 is a Tier II selected alternative for this restoration plan because it meets the Trustees' identified restoration criteria and objectives to address the injuries caused by the release of hazardous substances, but the project may not yield ecological benefits of the magnitude of other Tier I projects. Installing a riparian buffer at Lake Manalapan will improve water quality, restore habitat, and serve as a community demonstration project for stormwater runoff and erosion prevention practices.

3.18 Selected Tier II Alternative: North Branch Raritan River, Lamington River, and Stony Brook Mussel Restoration

The North Branch Raritan River, the Lamington River, and the Stony Brook are home to several state-listed mussel species, including the brook floater (*Alasmidonta varicosa*), green floater

(*Lasmigona subviridis*), triangle floater (*Alasmidonta undulata*), and eastern lampmussel (*Lampsilis radiata*). The green floater is an at-risk species that is currently under candidate review for listing under the Federal ESA, and in New Jersey is only known to potentially occur in two river systems, including the Stony Brook. The brook floater was recently determined to not warrant listing under the ESA, although the species is only found in four to five known locations in New Jersey, including locations in the North Branch Raritan River and the Lamington River.

The proposed project involves: expanding current mussel surveys within the North Branch Raritan River, the Lamington River, and the Stony Brook; determining environmental correlates to mussel decline in those waterways; and determining and potentially implementing appropriate restoration actions that may benefit imperiled mussel species. The identification of survey areas may include a review of historic and current distribution information, identification of locations that have never been surveyed or are under-surveyed, and the use of eDNA as a survey location screening tool. Determination of environmental correlates may involve habitat surveys, habitat modeling, and GIS modeling. Determination and implementation of appropriate restoration actions may include: genetic and genomic studies; relocation of non-reproducing mussels to areas with suitable stable habitat; and propagation and stocking of mussels as a long-term conservation strategy. Special focus will be given to the brook floater and green floater, since they are both state-listed endangered and have both been considered for federal listing. This Alternative meets the Trustees identified project categories of freshwater mussel conservation and enhancement.

The brook floater is a small freshwater mussel that ranges from the Savannah River Basin in South Carolina, to the St. Lawrence River Basin in Canada, and west to the Ohio River Basin in West Virginia (Figure 21). In New Jersey, low numbers of brook floater have been historically reported in Stony Brook, Lamington River, North Branch of the Raritan River, Musconetcong River, and the upper Delaware River. The brook floater requires clean flowing water over stable cobble, sand, and gravel substrates of small streams and rivers, little to no siltation, high dissolved oxygen, appropriate spawning temperatures, and adequate food availability. Reported host fishes include, but are not limited to, the slimy sculpin (*Cottus cognatus*), longnose dace (*Rhinichthys cataractae*), blacknose dace (*Rhinichthys atratulus*), golden shiner (*Notemigonus crysoleucas*), pumpkinseed (*Lepomis gibbosus*), yellow perch (*Perca flavescens*), and margined madtom (*Noturus insignis*).

The brook floater was listed as state endangered in 2002. Low population numbers of brook floater reported in occupied habitats indicate that little new reproduction is occurring. However, brook floater populations are under-surveyed in New Jersey. In 2010, the Service received a petition to list the brook floater as threatened or endangered under the ESA. As of 2019, the Service determined that the species did not warrant listing under the ESA.

Figure 21. Green floater and brook floater shells. Photo credit: Allan Barlow.

The green floater is a small, rare mussel with an ovate trapezoid bivalve shell (Figure 21). The green floater ranges from the Cape Fear River Basin in North Carolina to the St. Lawrence River Basin in New York. The species is often found in small streams with pools, eddies, and sand-gravel substrates. The host fish are unknown, and there is some evidence that host fish are not obligatory for the green floater to complete its life cycle.

The green floater was listed as state endangered in 2002. There is currently only one known live record of the green floater in the Raritan River watershed, located in the Stony Brook. However, green floater populations are likely under-surveyed in New Jersey. The Service is currently reviewing the status of green floater under the ESA.

Freshwater mussels are an important component of freshwater systems. Adult mussels filter-feed and consume phytoplankton, diatoms, and other microorganisms, as well as detritus and bacteria. The fact that mussels filter-feed makes them highly beneficial to water quality. Some mussels can filter up to 15 gallons of water per day. Mussels are also food sources for fish, aquatic birds,

mammals, and humans. Mussels are commonly used as indicators of water quality; for example, a sudden increase in mortality of mussels is a reliable indicator of contamination.

Although mussels are critical to freshwater systems, their populations are too often in decline due to habitat loss and degradation; water flow alterations; loss of host fish; contamination; and disease. Frequent and increasingly intense flood events are a major threat to mussel populations in New Jersey and the Mid-Atlantic region. In addition, mussels are frequently under-surveyed, since it requires a high level of expertise and resources to locate and identify mussels. The purpose of this restoration project is, in part, to expand mussels surveys to increase our knowledge of where mussels are found, what species are abundant (or rare), and what anthropogenic correlates are related to their decline. Expansion of mussel surveys may lead to more robust efforts to protect New Jersey mussel populations and identify areas where practitioners can target appropriate restoration efforts that will benefit mussels, including but not limited to relocation of existing populations to suitable habitat as well as propagation and stocking.

Implementing mussel surveys, determining environmental correlates, and determining and implementing restoration actions in the North Branch Raritan River, the Lamington River, and the Stony Brook may be accomplished by leveraging additional funds and technical assistance from other state and/or federal sources. Alternative 3.18 is a Tier II selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances, but project access and permissions are uncertain at this time. Implementing mussel surveys will benefit species of concern and sensitive habitats, and has a high potential for public outreach.

3.19 Selected Tier II Alternative: Trash Trap Installation in the Lower Raritan River Watershed

This restoration project involves the installation and maintenance of a trash trap device at an easily accessible trash 'hotspot' location on a tributary to the Raritan River between Cuckels Brook at State Route 287 and the mouth of the Raritan River at Perth Amboy. The project area may include portions of South Bound Brook Borough, Highland Park Borough, Sayreville Borough, Perth Amboy, and South Amboy. This Alternative meets the Trustees identified project categories of

freshwater mussel conservation and enhancement, native fish conservation and enhancement, and instream enhancement.

Trash that is improperly disposed of can enter freshwater and coastal systems, and can eventually make its way to the ocean. Aquatic trash decreases water quality and degrades habitat, in addition to causing aesthetic blight, ecological effects, economic impacts, and possible human health risks. Of particular concern is that plastics tend to break down to tiny pieces called microplastics (five millimeters or smaller). Microplastics both absorb and give off harmful pollutants and can be harmful to wildlife and humans via direct ingestion or trophic transfer.

Trash is the most visible form of pollution in the Raritan River and many of its urban tributaries, including Green Brook, Mile Run Brook, Mill Brook, and the South River. The proposed restoration project involves the installation of a trash reduction technology at an appropriate trash 'hotspot' location in a tributary to the lower Raritan River. An appropriate trash 'hotspot' should be located in a highly urbanized area that tends to accumulate trash originating from a population-dense area. The location should be easily accessible for trash trap installation and routine maintenance.

An existing trash reduction technology that may be appropriate in the lower Raritan River system is the Bandalong Litter Trap™ (Bandalong). The Bandalong is a floating device that uses passive downstream currents to direct and trap floating trash items. The Bandalong can operate year-round at a variety of different flow conditions without any mechanical assistance, but the trash will need to be emptied at appropriate intervals. Bandalongs can capture tens of thousands of pounds of trash each year, but the actual success will be highly dependent on where it is installed. An example of a Bandalong device in the Anacostia River watershed is featured in Figure 22.

The Lower Raritan Watershed Partnership and partners currently host more than 12 stream cleanup events each year to remove trash and other floatables within the Raritan River tributaries and floodplain. The installation of a trash reduction device would help to alleviate the manpower associated with riverine cleanup, and would also engage the public as an education and outreach tool. The Lower Raritan Watershed Partnership may engage a partial-volunteer trash removal program that includes training on how to measure and remove trash from the trash traps, which will help to further strengthen community ties and current environmental education outreach

efforts. Reduction of plastic debris would also benefit aquatic and semi-aquatic wildlife by reducing microplastic ingestion and potential exposure to contaminants.

Figure 22. Example of Bandalong Litter Trap™, installed on a tributary to the Anacostia River, Washington, DC. Photo credit: United Nations Information Center, Washington DC.

In addition to the positive benefits to water quality and aquatic taxa, the implementation of a trash trap would benefit the aesthetics of the area and enhance public perception and usability of recreational areas along the lower Raritan River.

The installation of a trash trap device in the lower Raritan River watershed may be accomplished by leveraging additional funds and technical assistance from other non-profit, private, state and/or federal sources. Alternative 3.19 is a Tier II selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the recreational and ecological injuries caused by the release of hazardous substances, but project access and permissions are uncertain at this time. Installing a trash trap at an appropriate location in the lower Raritan watershed will help improve water quality, restore habitat, and serve as a community demonstration and educational project for the local populace.

3.20 Selected Tier II Alternative: Rutgers Ecological Preserve Accessible Trail

The Rutgers Ecological Preserve is located adjacent to the Rutgers University's Livingston Campus in New Brunswick, Middlesex County, New Jersey. The proposed recreational restoration project would create a 0.4-mile ADA accessible trail through the Rutgers Ecological Preserve, create a small pullout area for direct access to the Buell Brook, and install educational signage (Figure 23). This Alternative meets the Trustees identified project categories of land trail recreation, interpretive signage, and ADA accessibility.

The 316-acre Rutgers Ecological Preserve was established in 1976 by the Rutgers Board of Governors to preserve the natural ecological characteristics of the site and serve as an outdoor teaching area. Today, the Ecological Preserve maintains this balance between preserving and restoring the area's ecological system and natural values while continuing to expand the its role as an educational, recreational, and aesthetic resource for University students, faculty and staff, as well as local citizens. The Ecological Preserve has approximately eight miles of multiuse trails for hiking, running, and mountain biking, but no trails are ADA-accessible.

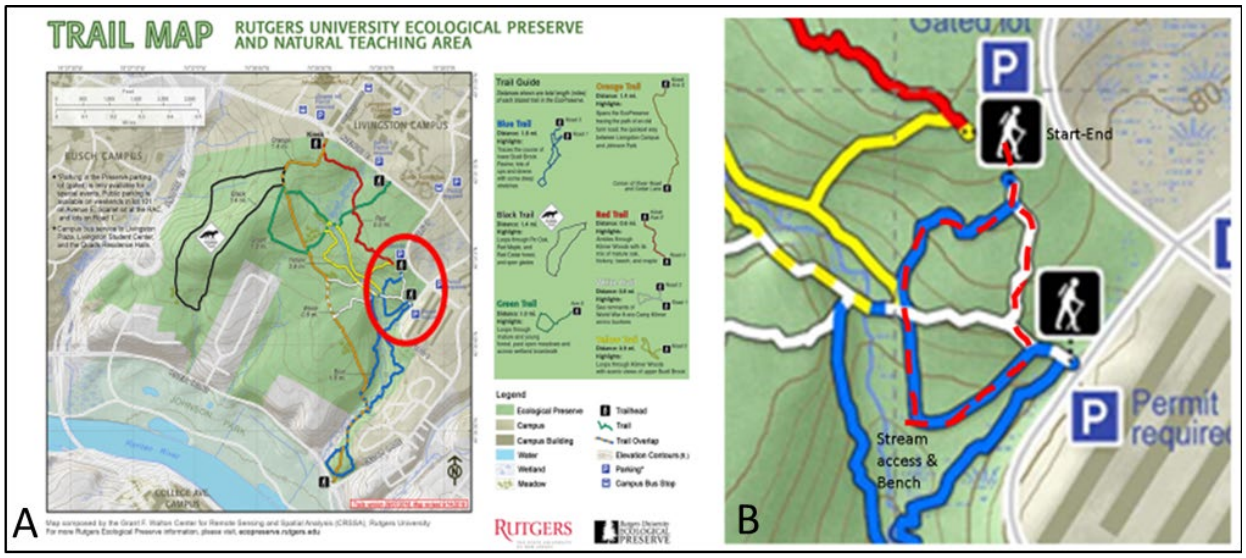

Figure 23. Proposed location of Rutgers Ecological Preserve ADA Trail. Frame A shows the general location of the trail within the Preserve, denoted by the red circle. Frame B shows a close-up of the trail, denoted by dashed red lines.

The proposed recreational restoration project includes: the construction of a 0.4-mile ADA-accessible loop trail (approximately 3.5-feet-wide) at the Rutgers Ecological Preserve that runs through mature forest and provides close-up views of Buell Brook; resurfacing the trail loop with fine, compacted red shale; and the construction of a level pullout and bench near Buell Brook (Figure 24) . The pullout would allow access to a shallow section of Buell Brook so visitors have the opportunity to explore the stream in a safe manner. Rutgers University students will develop a series of educational signage to install along the trail and highlight the area's natural and cultural history. The trail would be open to Rutgers University's students, faculty and staff, as well as the broader community.

Final project designs will be produced and implemented as part of this project. The project designs will ensure that the trail and pullout do not exacerbate runoff and contribute negatively to erosion and sediment loads introduced to Buell Brook.

Figure 24. Existing trail along Buell Brook that will be modified for ADA compliance.

The construction of an ADA-accessible trail and pullout at the Rutgers Ecological Preserve may be accomplished by leveraging additional funds and technical assistance from Rutgers University. Alternative 3.20 is a Tier II preferred alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the recreational injuries caused

by the release of hazardous substances, but may not yield recreational benefits of the magnitude of other Tier I preferred projects. Creation of the ADA trail and pullout area will enhance public recreational and educational opportunities in the Raritan River watershed.

3.21 Selected Tier II Alternative: Bridge over the Delaware and Raritan Canal Spillway

The Delaware and Raritan Canal State Park (D&R Canal Park) is a 70-mile park and towpath that follows the Delaware River from Frenchtown to Trenton, then follows the Delaware and Raritan Canal from Trenton to New Brunswick. In New Brunswick, the D&R Canal Park terminates just past where the towpath intersects with Landing Lane, northwest of Buccleuch Park (Figure 25). At this location, the towpath is interrupted by an impassible 200-foot spillway where the D&R Canal drains to the Raritan River and by a 650-foot trail gap between eastern edge of the spillway and the existing riverside trail that leads to Boyd Park in New Brunswick. The proposed recreational restoration project involves either constructing a bridge over the 200-foot spillway and building 650 feet of connecting trail, or finding a suitable alternative to provide connectivity between the D&R Canal Park towpath and the 2-mile section of riverside trail that runs from U.S. Route 18 east towards Boyd Park in New Brunswick.

The D&R Canal State Park is one of New Jersey's most significant historic and recreational resources as it provides over 70 miles of hiking and biking trails as well as opportunities for canoe and kayak access to the Raritan River. However, a 200-foot spillway and a 650-foot trail gap separates residents of the City of New Brunswick from direct access to the recreational offerings of this greenway. Likewise, the spillway and trail gap separates users of the D&R Canal towpath from easy access to the riverside Boyd Park, historic D&R Canal locks, and New Brunswick Landing. The existing disconnected riverside trail on the eastern side of the spillway is approximately 2 miles long and runs from the eastern side of U.S. Route 18 to Boyd Park in New Brunswick. The first 1.2 miles of the disconnected trail are referred to locally as “the trench”, since the trail runs along a narrow corridor flanked by the Raritan River to the north, and New Jersey U.S. Route 18 to the south.

The proposed action is a recreational project that would increase public access through construction of a prefabricated steel bridge over the 200-foot spillway. The spillway is owned and operated by the NJDEP. The proposed bridge would be at least 200-feet-long and approximately

10-feet-wide and would likely be installed by crane onto concrete pilings and abutments. The pilings and abutments would be constructed so that flow of water across the spillway is not impeded. The proposed action would ensure that the bridge installation would not cause erosion along the riverbanks that flank the spillway. A section of trail approximately 650-feet-long that runs from the eastern side of the spillway to just east of U.S. Route 18 would be constructed to connect the spillway bridge to an existing riverside trail. Alternative configurations of connectivity will be explored during the feasibility phase of this project.

Figure 25. Map showing D&R Canal spillway and proposed location of bridge site.

The construction of a pedestrian and biking bridge would improve access to the Raritan River waterfront in the most densely populated area of the Raritan River watershed. The bridge is an important missing link to a regional network of trails, including the Rutgers University bicycle trail network and the East Coast Greenway. The bridge would extend access from the 70-mile-long D&R Canal State Park into the City of New Brunswick, effectively restoring the historic extent of the original towpath which was severed with the construction of the U.S. Route 18 highway and other infrastructure improvements. The proposed project complements other Raritan River initiatives being considered by other agencies and institutions in the area, including waterfront access projects proposed in the Rutgers University 2030 Physical Master Plan (Rutgers

2015). Improved access to the Raritan River waterfront afforded by this project will increase recreational, educational, and research opportunities for the community. In addition, this project may provide positive public health and recreation benefits to the predominantly low socioeconomic status population of New Brunswick.

The construction of a bridge over the D&R Canal and trail extension may be accomplished by leveraging additional funds and technical assistance from other state, federal, private, and non-governmental sources. Alternative 3.21 is a Tier II selected alternative for this restoration plan because it meets the Trustees' identified restoration objectives and criteria to address the recreational injuries caused by the release of hazardous substances, but project access, permissions, and technical feasibility are uncertain at this time. Construction of a bridge over the D&R Canal Park spillway and trail extension will improve connectivity between the D&R Canal Park and New Brunswick, and would increase and enhance recreational opportunities for a heavily urbanized population.

3.22 Non-Selected Tier III Alternative: Cherry Brook Preserve Constructed Wetland

The Cherry Brook Preserve is located in Montgomery Township, Somerset County, New Jersey. The proposed restoration project is to convert an aging farm pond (*i.e.*, Cherry Brook Pond) into a constructed freshwater wetland. Project components may include: dredging approximately 780 cubic yards of accumulated sediment and silt; regrading of the dredged pond area to create a constructed wetland with varying water depths; reconstruction and/or repair of portions of the existing pond retaining wall; reconstruction of the pond's outlet control structure; replacement of the outlet pipe to a larger box culvert; reconstruction of the downstream outlet headwall; and revegetation (Kleinfelder and Omni Environmental 2012). This Alternative meets the Trustees identified project categories of wetland restoration and floodplain restoration.

Cherry Brook Pond is located on the Cherry Brook Preserve, a Montgomery Township Open Space property, and is situated adjacent to a preserved farmland parcel (Figure 26). The 0.75-acre Cherry Brook Pond is created by the impoundment of a small unnamed tributary to Cherry Brook. The pond is located approximately 0.6 mile upstream of the confluence with Cherry Brook, and the unnamed tributary is likely intermittent along most or all of its length. The Cherry Brook Pond watershed is approximately 150 acres, comprised of forest, active row crop agriculture, and

residential urban land cover. The pond is formed by a concrete and stone retaining wall that is in poor condition; water exits the pond by flowing over an 18-inch-wide weir in the retaining wall and through a 30-inch-diameter reinforced concrete pipe that discharges into the unnamed tributary to Cherry Brook.

Figure 26. Cherry Brook Pond, Montgomery Township, New Jersey. Photo Credit: Kleinfelder and Omni Environmental 2012.

During summer months, pond depths are less than one foot, with patches of exposed sediment throughout. The upstream and downstream reaches surrounding the pond are classified as freshwater forested/shrub wetland. The pond is thought to be a source of phosphorus and sediment to Cherry Brook, although no formal sampling has confirmed this hypothesis. Once the unnamed tributary meets Cherry Brook, Cherry Brook flows approximately 0.5 mile to the confluence with Beden Brook. The most recent New Jersey Integrated Water Quality Assessment Report for EPA 303d requirements indicates that TMDL regulations are in place for total phosphorus and total suspended solids in the portion of Beden Brook that receives flow from Cherry Brook (NJDEP 2019).

The proposed restoration project involves converting the Cherry Brook Pond into a constructed wetland, wherein the accumulated sediment will be dredged and regraded to create three water depth zones: deep pool, shallow, and mid-elevation in order to accommodate the different water height requirements of emergent wetland plant species. A shallow "bench" would be located around the periphery of the existing pond, with depths of less than 6 inches during normal conditions. The mid elevation bench would be located further out from the shoreline, with depths of 6 to 18 inches. The deep pool would be located in the center of the existing pond, with water depths of approximately 4 feet. Appropriate native plant species would be planted at these depths and at the upland edge of the constructed wetland.

Recent research on small headwater ponds indicates that in general, small ponds may be beneficial in that they are collectively responsible for trapping a substantial amount of nutrients and sediments that are exported annually from headwaters (Schmadel *et al*. 2019). The Cherry Brook Pond may serve as a nutrient and sediment sink, rather than source; further investigation of water quality conditions over a variety of annual flow conditions should be performed prior to pond removal or modification. In addition, there may be technical uncertainties in the project's ability to provide hydrological conditions necessary to support freshwater wetlands and unknown water quality issues from runoff from active row crop and residential urban land cover within the project's drainage area.

Alternative 3.22 is a Tier III non-selected restoration project. Technical uncertainties, in addition to uncertainty regarding the project's cost-benefit ratio indicate that this project, as proposed, does not meet the Trustees' identified restoration objectives and criteria to address injuries caused by the release of hazardous substances.

3.23 Non-Selected Tier III Alternative: Raritan Bay Oyster Restoration

This restoration project involves the establishment of oyster reefs within the Raritan Bay. The Raritan Bay is located between the southern portion of Staten Island and the northern edge of New Jersey from Perth Amboy to Sandy Hook. This project would include performing environmental condition indexing, site survival, and growth rate testing to determine appropriate restoration sites; culturing seed oysters in an aquaculture facility; constructing appropriate structures (*e.g*., reefs,

Figure 27) to support oysters; and oyster monitoring. This Alternative meets the Trustees identified project categories of oyster restoration.

Figure 27. Example of oyster castle reefs at Nantuxent Creek, New Jersey. Photo credit: Steve Jacobus.

Human development during the past several centuries led to the extirpation of Raritan Bay oysters; overharvest, habitat degradation by sedimentation, changes in salinity, and industrial pollution precipitated their decline (MacKenzie 1984). However, with the passage of environmental laws, water quality within the New York-New Jersey Harbor has greatly improved and it may be possible to restore aquatic species that have suffered declines in the past to areas of historic presence (Ravit *et al*. 2012; Rutgers CUES 2013). Reintroduction of the Eastern Oyster (*Crassostrea virginica*), could potentially support further improvements in water quality, contribute to the stabilization of coastal shorelines, and accelerate ecosystem-level restoration processes. Oyster reef creation is a technique to support continued water quality improvement and to reestablish habitat utilized by other aquatic species, as well as serve as a natural method to reduce shoreline erosion.

There would be many ecological and human use benefits from restoring oysters within Raritan Bay. Oyster beds are an important component of the ecosystem, as they provide structurally complex habitat for aquatic organisms at many trophic levels. Oysters clean the surrounding waters and can filter sediment and excess nutrients from up to 50 gallons of water per day, contributing to both water column and benthic productivity. Reef restoration also directly benefits waterfront communities by providing storm surge protection for waterfront structures and serves to protect and fortify existing wetlands, which improves their function as protective barriers to storm surge as well.

Alternative 3.23 is a Tier III non-selected restoration project. The Trustees agree that oyster restoration in the Raritan Bay will offer many ecological and human use benefits. However, this Final RP/EA presents numerous feasible projects that restore freshwater environments that contain natural resources more similar to those injured by hazardous substances at the Cornell-Dubilier Site than those proposed by this restoration alternative. Therefore, in comparison to other higher-ranked feasible projects, this project does not meet the Trustees' identified restoration goals and objectives criteria to address injuries caused by the release of hazardous substances.

3.24 Non-Selected Tier III Alternative: South River Tidal Marsh Restoration

The South River Tidal Marsh Restoration Project is a proposed marsh restoration project on the lower South River, in South River and Sayreville, New Jersey. The proposed restoration project includes: creation of improved tidal marsh habitat; expansion of high marsh habitat; reduction and control of *Phragmites australis*; implementation of shoreline erosion control measures; creation of living shoreline areas; protection of restored vegetation areas with a goose exclusion fence; and if warranted, the excavation and relocation of contaminated soils and sediments and backfilling with clean material. This Alternative meets the Trustees identified project categories of tidal wetland restoration and floodplain restoration.

The South River Tidal Marsh Restoration is a proposed marsh restoration of approximately 258 acres of existing marsh situated between the lower South River and the Washington Canal and adjacent to the mainstem Raritan River (Figure 28). The site is part of a larger 650-acre tidal salt marsh that spans between the lower South River and Washington Canal. The site is dominated by *Phragmites australis*, and most of the wetlands within the project area have been altered by

anthropogenic activity including soil removal, dredge material deposition, brick/asphalt/concrete waste fill, and ditching for mosquito control (USACE 2002). There are approximately 38,836 feet of streams within the site footprint.

Past studies have shown that residential communities adjacent to the South River, located in flood-prone areas, have a history of flooding following storms (USACE 2002). The projected impacts of sea level rise will further exacerbate the impacts of future storms potentially resulting in continued socioeconomic losses. The stated goal of the proposed project is to restore marsh habitat to serve as flood protection for adjacent communities, and provide high quality, non-degraded habitat for aquatic and terrestrial species.

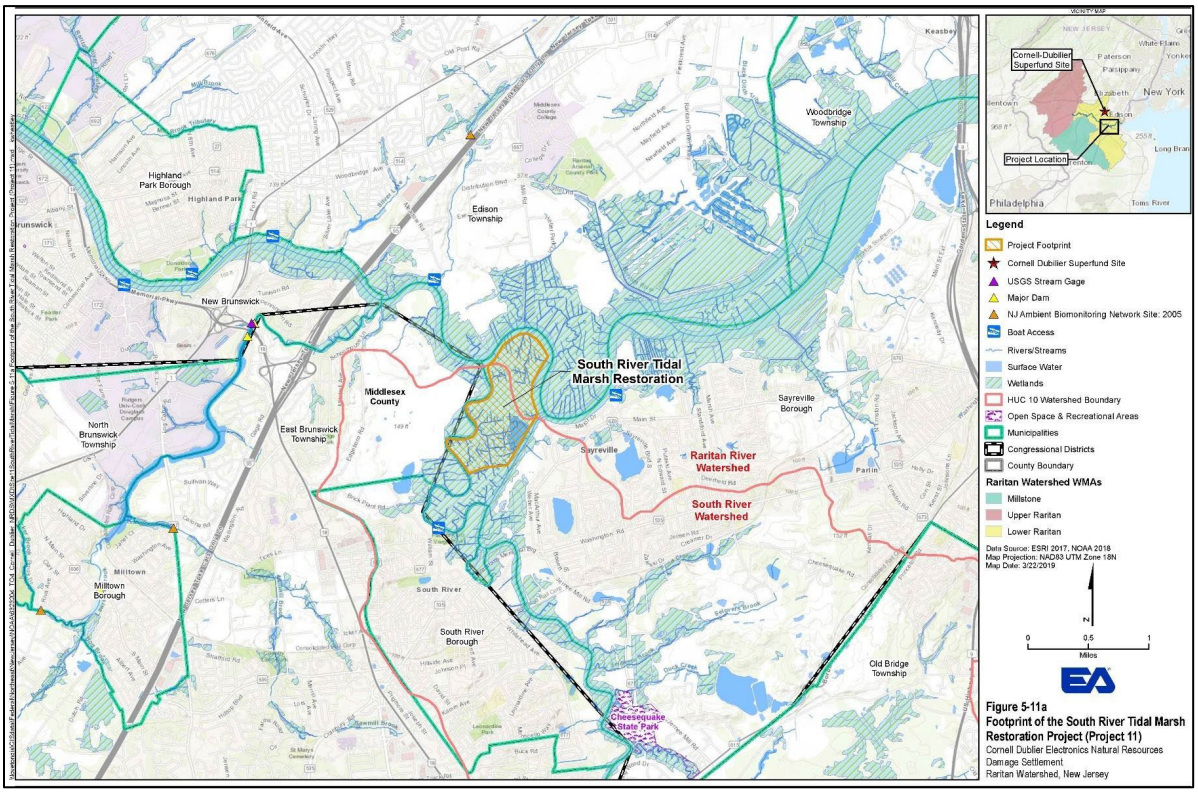

Figure 28. Proposed location of South River Tidal Marsh Restoration project, denoted by hashed orange lines.

The proposed restoration project includes restoration features roughly described in the U.S. Army Corps of Engineers' 2002 South River Hurricane and Storm Damage Reduction Feasibility Study and Environmental Impact Statement (USACE 2002). This document evaluated a range of structural and nonstructural measures that would increase hurricane and storm damage reduction

and determined that the preferred alternative for the South River is to construct a levee/floodwall system with an upstream storm surge barrier. Although the proposed restoration project will not involve the construction of a levee/floodwall system, it will include restoration actions that were selected in the USACE 2002 as potential mitigation for levee/floodwall construction activities. The proposed restoration project includes the following elements: creation of improved tidal marsh habitat; expansion of high marsh habitat; reduction and control of *Phragmites australis*; implementation of shoreline erosion control measures; creation of living shoreline areas; and protection of restored vegetation areas with a goose exclusion fence. If contamination is identified during feasibility or construction phases, then this project may involve the excavation, relocation, and/or capping of contaminated soils or sediments and backfilling with clean material.

The proposed project site is comprised of both public and privately owned parcels. Most of the site is at least partially owned by the Borough of Sayreville. Complete tax parcel and ownership information are not available for the proposed project site. Due to the industrialized nature of the surrounding project area, it is likely that the proposed restoration parcels contain contaminants consistent with those present throughout the lower Raritan River watershed.

Alternative 3.24 is a Tier III non-selected restoration project. Technical uncertainties, uncertainties regarding the amount and extent of potential onsite contamination, and uncertainty regarding the project's cost-benefit ratio, indicate that this project, as proposed, does not meet the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances.

3.25 Non-Selected Tier III Alternative: Edison Landfill Capping and Wetland Restoration

The Edison Landfill Wetland Restoration project is a proposed landfill capping and restoration of an adjacent wetland. The Edison Landfill is located along the mainstem Raritan River in Edison Township, Middlesex County, New Jersey. The proposed wetland restoration project includes: excavation and relocation of municipal waste, soils, and sediments of the lower Edison landfill; backfilling with clean material and regrading; capping of relocated waste materials; and replanting with native tidal salt marsh grasses and protection of those grasses with a goose exclusion fence.

This Alternative meets the Trustees identified project categories of tidal wetland restoration and floodplain restoration.

The Edison Landfill spans for 4,839 feet along the mainstem Raritan River, and is located just south of the Kin-Buc Landfill Superfund Site (Figure 29). The landfill consists of two main areas: the main landfill mound located on the upper portion of the site, and the lower landfill area located to the southwest and immediately adjacent to the Raritan River. The main landfill mound is unlined and accepted waste between 1958 and 1990. Waste at the main landfill mound is approximately 80 to 100 feet thick and is covered with 1 to 4 feet of soil. The lower landfill is also unlined and accepted waste during the 1950s and 1960s. The lower landfill is heavily vegetated with *Phragmites australis*, and surficial waste is exposed along the edge of the Raritan River.

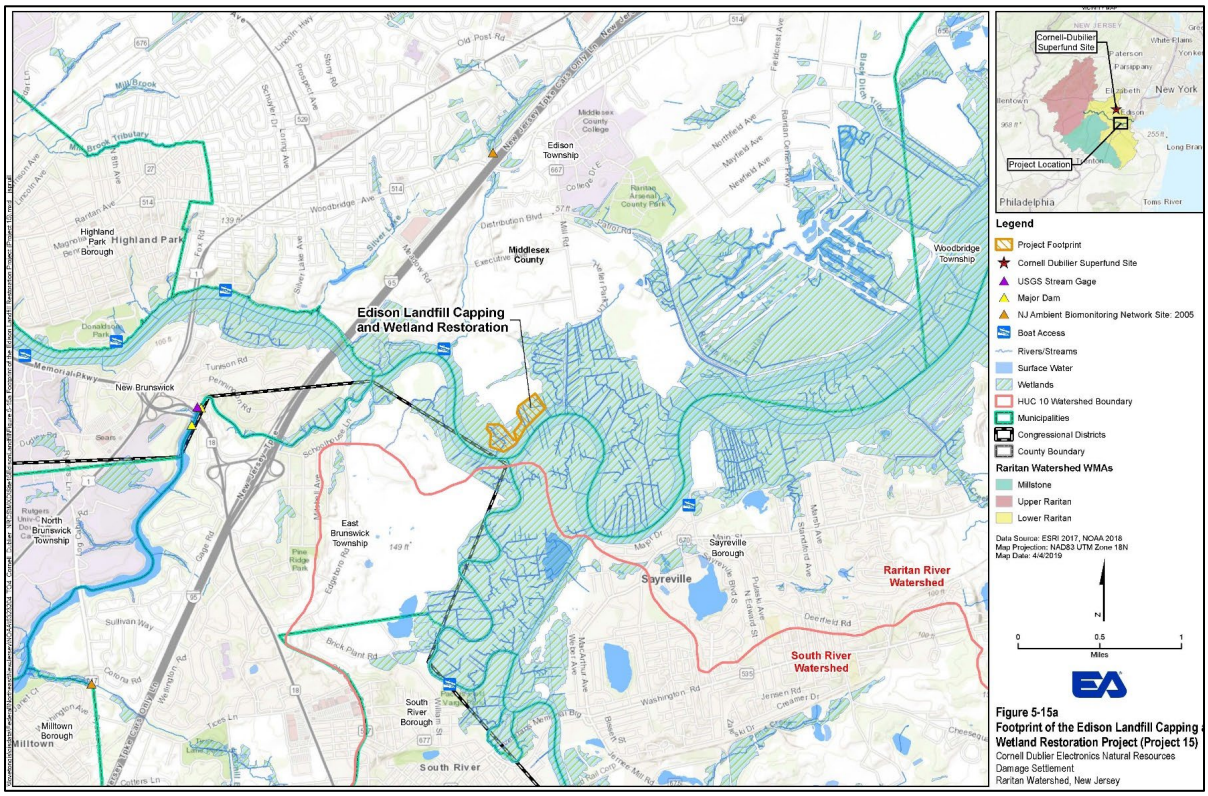

Figure 29. Proposed location of Edison Landfill Capping and Wetland Restoration project, denoted by hashed orange lines.

The Edison Landfill accepted municipal solid waste, construction debris, dry industrial waste, animal processing waste, and vegetative and bulky waste. Previous groundwater monitoring results show that some water quality parameters exceed Ground Water Quality Standards, although the

quantity of waste and extent of potential contamination is unknown. Edison Township has submitted versions of landfill closure plans in 1992, 2004, 2010, and 2013, but the NJDEP has found them deficient and therefore an official closure plan has never been approved.

The proposed action is to remove waste from the 26.9-acre lower landfill, relocate the waste to the main landfill mound, and cap the main landfill mound. The lower landfill will be excavated and regraded to improve tidal flushing and maintain elevations conducive to native saltwater wetland marsh grasses. Some clean backfill material may be necessary to bring the lower landfill's elevation to proper grade after removal of the waste materials. Replanting of native marsh plant species would encourage native wetland plant species to flourish, especially *Spartina* species.

The proposed project site is comprised primarily of land parcels owned by Edison Township. Complete tax parcels and ownership information are not publicly available for the proposed project site. Due to the industrialized nature of the surrounding project area, the fact that the site is a historic landfill, and the fact that the site is adjacent to the Kin-Buc Landfill Superfund Site, it is likely that the proposed restoration parcels contain contaminants of concern, consistent with those present throughout the lower Raritan River watershed.

Alternative 3.25 is a Tier III non-selected restoration project. Technical uncertainties, the lack of an approved closure plan, uncertainties regarding the amount and extent of onsite contamination, and uncertainty regarding the project's cost-benefit ratio indicate that this project, as proposed, does not meet the Trustees' identified restoration objectives and criteria to address the injuries caused by the release of hazardous substances.

CHAPTER 4 NEPA AFFECTED ENVIRONMENT

This section describes the general environmental setting that may be affected by the restoration alternatives presented in this Final RP/EA. This section includes information on the physical, biological, and socioeconomic environments of the Raritan River Watershed, as well as specific resources that may be affected by the restoration alternatives described in Chapter 3.

4.1 Affected Environment

The Raritan River watershed is located entirely within the State of New Jersey and includes the mainstem Raritan River, the North and South Branches of the Raritan River, and major tributaries including the Manalapan Brook, South River, Lawrence Brook, Millstone River, Stony Brook, Green/Bound Brook, Neshanic Creek, Lamington/Black River, and Rockaway Creek (Figure 30). The affected environment includes portions of these waterways and adjacent lands that may be affected by the restoration alternatives presented in Chapter 3.

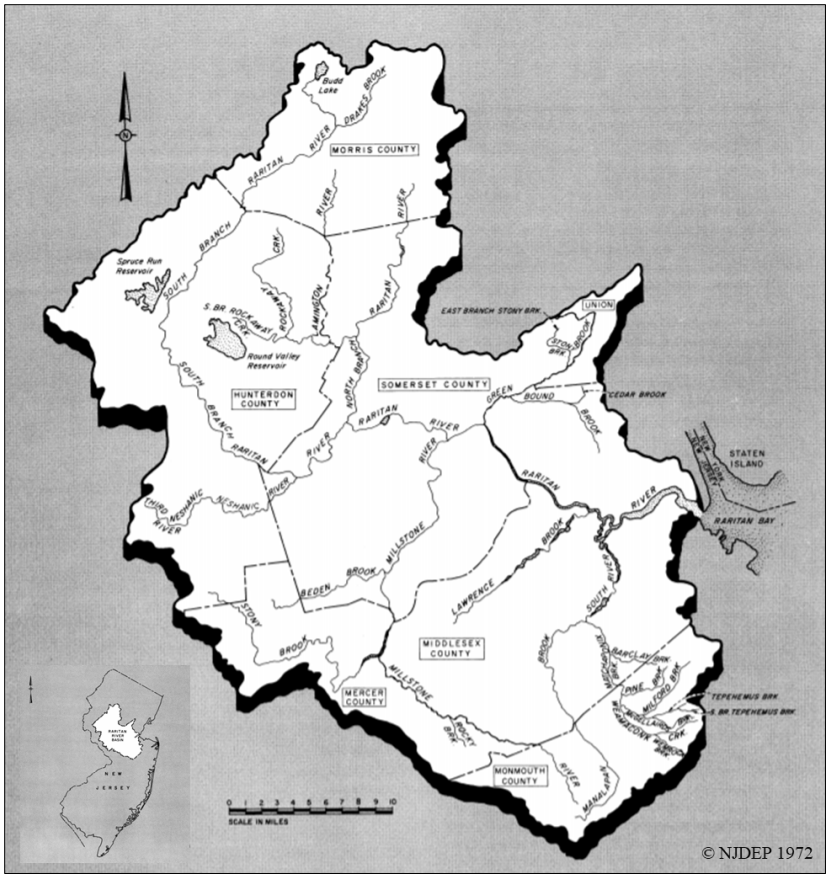

Figure 30. The major rivers and tributaries of the Raritan River Watershed, NJDEP 1972.

4.2 Physical Environment

4.2.1 *Surface Water*

The Raritan River watershed spans 1,105 square miles and encompasses 98 municipalities. Approximately 1.3 million people live in the watershed and more than 793,000 work in the watershed (NJDOL 2020). The watershed includes portions of Morris, Hunterdon, Union, Somerset, Middlesex, Mercer, and Monmouth counties. The Raritan River basin is the largest watershed located entirely within New Jersey. The watershed contains three primary subwatersheds: the Upper Raritan, the Lower Raritan, and the Millstone (Figure 31). The Upper Raritan includes the North and South Branch Raritan Rivers and spans approximately 468 square miles. Major tributaries to the North Branch Raritan include the Lamington/Black River and Rockaway Creek. Major tributaries to the South Branch River include Neshanic Creek. The North and South Branch Raritan Rivers meet to form the mainstem Raritan River, which demarks the upstream boundary of the Lower Raritan watershed. The Lower Raritan watershed is 352 square miles and includes the Green/Bound Brook, Lawrence Brook, the Manalapan Brook, and the South River. The Lower Raritan drains to the Raritan Bay. The Millstone watershed meets the Lower Raritan watershed near Manville, New Jersey. The Millstone watershed covers 285 square miles and includes the Stony Brook and Millstone River as well as a significant section of the Delaware and Raritan Canal.

The top ten causes of water quality impairment in the Raritan River watershed include: *Escherichia coli* (impairs recreation); arsenic (impairs water supply); total phosphorus, pH, temperature, dissolved oxygen, and biological cause unknown (impairs aquatic life); and mercury, PCB, and dioxin in fish tissue (impairs fish consumption; NJDEP 2019). Many of these water quality impairments are covered under an approved TMDL.

Impervious surface land cover is the best and most reliable predictor of water quality (as indicated by biological integrity) in the Raritan River watershed (NJDEP 2019). When watershed impervious land cover exceeds ten percent, biological integrity declines. Maintenance of appropriately sized riparian buffer zones that include wetlands are particularly important to water quality and watershed health. New Jersey has Surface Water Quality (SWQ) antidegradation policies that provide special protection to Category One (C1) waters; a designation based on

ecological significance, exceptional water supply, recreation and fisheries. The State SWQ guidelines for C1 streams dictate a 300-foot riparian buffer to protect the water quality, aesthetic value, and ecological integrity of these high-value streams. The State also dictates that 150-foot riparian buffers be maintained along trout production waters and all upstream tributaries; 150-foot riparian buffers be maintained along trout maintenance waters and within 1-mile upstream; and requires a 50-foot buffer along all other waters.

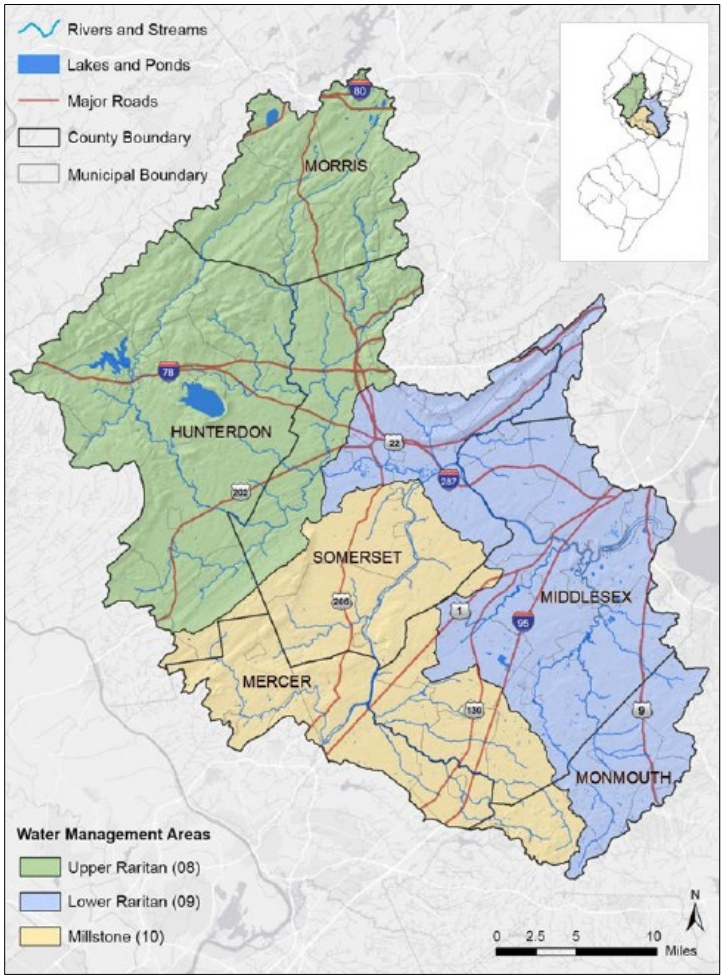

Figure 31. Raritan River sub-watersheds. Source: SRRI 2016.

Although the biota in the Raritan River watershed reflect extensive water quality impairment, there are large areas where water quality is good and biological communities are healthy, particularly in the Upper Raritan watershed, the Stony Brook, and Manalapan Brook watersheds (NJDEP 2019). The NJDEP routinely monitors fish and macroinvertebrate taxa as indicators of water quality in this region.

4.2.2 *Regional Geology and Soils*

The Raritan River watershed spans across three EPA level III ecoregions, including the northeastern highlands, the northern piedmont, and the Atlantic coastal pine barrens (EPA 2013). The northeastern highlands are characterized by high-gradient rugged ridge topography separated by narrow valleys; this area is comprised mostly of igneous and sedimentary rock. The northern piedmont is comprised of rolling plains separated by higher ridges, and is comprised mostly of sedimentary and igneous rock. The Atlantic coastal pine barrens are characterized by low gradient topography and sandy and acidic soils.

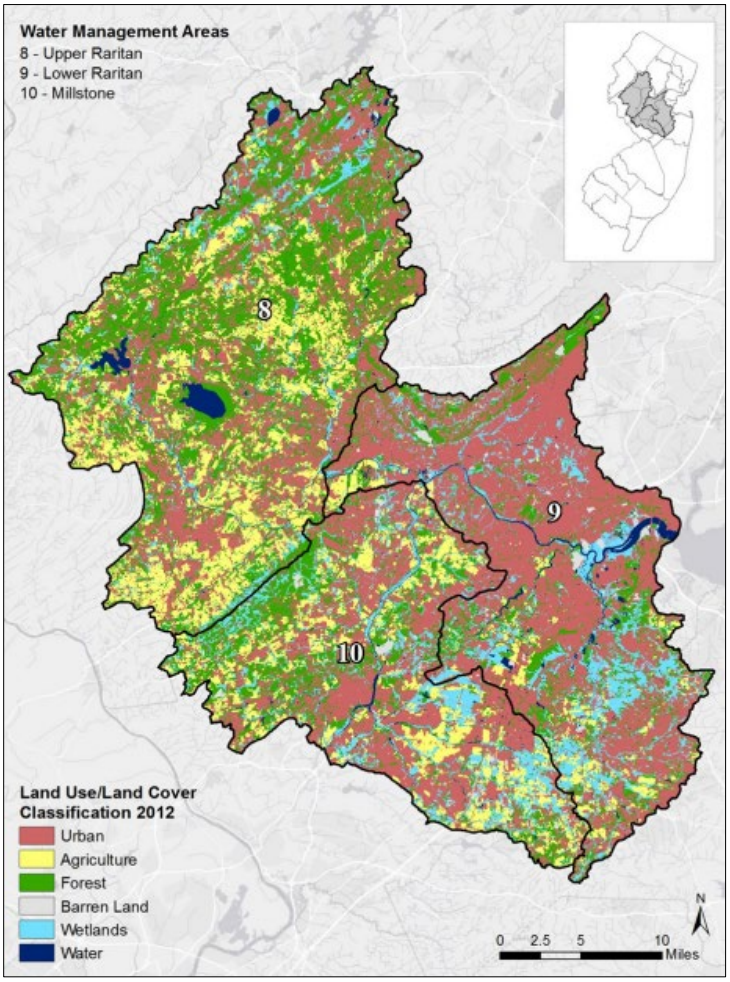

Figure 32. Land cover in the Raritan River watershed. Source: SRRI 2016.

4.2.3 *Land Cover*

Land cover in the region has changed drastically over the last 50 years and the most current land use analysis (2012) revealed that the Raritan River watershed as a whole is 44% urbanized, 16% in agricultural use, 25% forested, and 14% wetlands and waterbodies (SRRI 2016; Figure 32). Urban land is the dominant land cover in the Lower Raritan (60%) and Millstone (41%) subwatersheds, while forest is the dominant land cover in the Upper Raritan (35%). The rate of urban development in the watershed has slowed in recent years, however the increase in urban cover was gained at the expense of a net loss in agricultural lands, wetlands, and forest cover. These types of land cover conversions tend to have a negative impact on water quality and aquatic health.

4.2.4 *Air*

The Raritan River watershed generally supports good air quality. Sources of air pollutants include, but are not limited to, fuel combustion (stationary and mobile), industrial processes, solvent uses, agriculture, dust, and fires. The Clean Air Act (CAA; 42 U.S.C. §§ 7401-7626) regulates air emissions from stationary and mobile sources to protect human health and the environment. Under the CAA, the EPA defines National Ambient Air Quality Standards (NAAQS) for pollutants that are harmful to public health and the environment (EPA 2018). The EPA is responsible for establishing primary and secondary NAAQS for six criteria pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide. All seven counties in the Raritan River watershed are currently in attainment of EPA's NAAQS for all criteria pollutants except ozone (8-hour ozone; EPA 2020b).

4.2.5 *Climate*

The Raritan River watershed has a relatively moderate climate characterized by cold winters and warm, humid summers. Average annual precipitation is approximately 51 inches (ONJSC 2020). Fall months are typically the driest, while other seasons average between 9 and 12 days per month with measurable precipitation. Snow may fall from November to April. Climate change is affecting New Jersey faster than much of the rest of the United States. As of 2019, New Jersey was one of the fastest-warming states in the nation with an approximate two degree Celsius increase in average temperatures since 1895 (Mufson *et al*. 2019).

4.3 Biological Environment[2]

4.3.1 *Terrestrial and Aquatic Habitat*

The affected environment includes a variety of habitats that support fish, birds, and other wildlife. The Raritan River watershed is heavily developed and has experienced an extensive loss and fragmentation of grassland, wetland, and forest habitats over time (NJDEP 2008). Despite these losses, the region maintains smaller habitat patches of grassland and agricultural areas, mixed-deciduous forests, hardwood swamps, tidal freshwater and brackish marshes, and relatively extensive riparian areas throughout the landscape. Streams and rivers range from low-gradient, low-flow brackish and freshwater stream and swamp habitats to high-gradient, high-flow freshwater habitats. Most aquatic environments show signs of historic stressors and degradation over time.

4.3.2 *Fish and Wildlife*

A variety of endemic game and nongame mammals, birds, reptiles, amphibians, invertebrates, and freshwater fish occur in the Raritan River watershed. New Jersey hosts approximately 90 mammal species, over 400 bird species, 74 reptiles and amphibian species, 91 species of freshwater fish, and numerous marine fish species. Because the Raritan River watershed ranges from coastal to highland ecoregions, many of these species are found in the watershed.

Common mammals include: white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), eastern gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), groundhog (*Marmota monax*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), black bear (*Ursus americanus*), raccoon (*Procyon lotor*), North American beaver (*Castor canadensis*), striped skunk (*Mephitis mephitis*), Virginia opossum (*Didelphis virginiana*), northern short-tail shrew (*Blarina brevicauda*), eastern mole (*Scalopus aquaticus*), American mink (*Neovision vison*), and North American river otter (*Lontra canadensis*).

The Raritan River watershed is located within the Atlantic flyway and provides habitat for both migrating and resident birds. Bird species that frequent the region include: American robin (*Turdus*

[2] Biological resources described in Sections 4.3.1 and 4.3.2 are analogous to "living coastal and marine resources" cited in Section 5.3, below.

migratorius), Canada goose (*Branta canadensis*), red-winged blackbird (*Agelaius phoeniceus*), common grackle (*Quiscalus quiscula*), gray catbird (*Dumetella carolinensis*), blue jay (*Cyanocitta cristata*), northern cardinal (*Cardinalis cardinalis*), European starling (*Sturnus vulgaris*), American crow (*Corvus brachrhynchos*), tufted titmouse (*Baeolophus bicolor*), herring gull (*Larus smithsonianus*), mourning dove (*Zenaida macroura*), red-bellied woodpecker (*Melanerpes carolinus*), wood thrush (*Hylocichla mustelina*), common yellowthroat (*Geothlypis trichas*), and song sparrow (*Melospiza melodia*; Tsipoura *et al*. 2012).

Common reptiles and amphibians in the Raritan River watershed include: northern watersnake (*Nerodia sipedon*), eastern ratsnake (*Pantherophis alleghaniensis*), common snapping turtle (*Chelydra serpentina*), eastern painted turtle (*Chrysemys picta picta*), spotted turtle (*Clemmys guttata*), eastern mud turtle (*Kinosternon subrubrum subrubrum*), eastern musk turtle (*Sternotherus odoratus*), American bullfrog (*Lithobates catesbeianus*), northern green frog (*Lithobates clamitans*), pickerel frog (*Lithobates palustris*), southern leopard frog (*Lithobates sphenocephalus*), spring peeper (*Pseudacris crucifer*), marbled salamander (*Ambystoma opacum*), northern dusky salamander (*Desmognathus fuscus fuscus*), northern two-lined salamander (*Eurycea bislineata*), and slimy salamander (*Plethodon glutinosus*).

Common freshwater fish species include: American eel (*Anguilla rostrata*), rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), spottail shiner (*Notropis hudsonius*), blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*), channel catfish (*Ictalurus punctatus*), margined madtom (*Noturus insignis*), rock bass (*Ambloplites rupestris*), bluegill (*Lepomis macrochirus*), redbreast sunfish (*Lepomis auritus*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), and tessellated darter (*Etheostoma olmstedi*).

Common diadromous fish species include: American eel (*Anguilla rostrata*), American shad (*Alosa sapidissima*), alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), hickory shad (*Alosa mediocris*), gizzard shad (*Dorosoma cepedianum*), sea lamprey (*Petromyzon marinus*), and striped bass (*Morone saxatillis*).

4.3.3 *Threatened and Endangered Species*

The Raritan River watershed provides habitat for several federally listed mammals, reptiles, and plants. Federally listed species include the Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), bog turtle (*Clemmys muhlenbergii*), Knieskern's beaked-rush (*Rynchospora knieskernii*), small whorled pogonia (*Isotria medeoloides*), and swamp pink (*Helonias bullata*; USFWS 2020). Approximately 65 U.S. Fish and Wildlife Service Birds of Conservation Concern (BCC) are found in the vicinity of the Raritan River watershed, and are protected under the Migratory Bird Treaty Act of 1918 (16 U.S.C. §§ 703-712), and the Bald and Golden Eagle Protection Act (16 U.S.C. § 668). Several prominent BCC birds include: the bald eagle (*Haliaeetus leucocephalus*), black-capped chickadee (*Poecile atricapillus practicus*), blue-winged warbler (*Vermivora cyanoptera*), prarie warbler (*Setophaga discolor*), red-headed woodpecker (*Melanerpes erythrocephalus*), and wood thrush (*Hylocichla mustelina*).

Numerous state listed threatened and endangered species are also found the Raritan River watershed, including, but not limited to: bobcat (*Lynx rufus*), northern harrier hawk (*Circus hudsonius cyaneus*), bobolink (*Dolichonyx oryzivorus*), upland sandpiper (*Bartramia longicauda*), night-heron (*Nycticorax nycticorax*), upland sandpiper (*Bartramia longicauda*), peregrine falcon (*Falco peregrinus*), wood turtle (*Glyptemys insculpta*), eastern box turtle (*Terrapene carolina carolina*), longtail salamander (*Eurycea longicauda*), brook floater (*Alasmidonta varicosa*), green floater (*Lasmigona subviridis*), triangle floater (*Alasmidonta undulata*), eastern lampmussel (*Lampsillis radiata*), and eastern pondmussel (*Ligumia nasuta*).

4.4 Socioeconomic Resources

As of the 2010 U.S. Census, the Raritan River watershed had a population of 1,307,003 (SRRI 2016). The Lower Raritan had the highest population, with 819,136 individuals, and the Upper Raritan and Millstone had similar population sizes, at 223,002 and 264,864 individuals, respectively. The Raritan River watershed is located in the middle of one of the most densely populated states in the nation. The population density of the Lower Raritan is approximately 2,327 persons per square mile, and the population densities of the Upper Raritan and Millstone is approximately 476 and 929 persons per square mile, respectively. The New Jersey Department of

Labor estimates that populations will continue to grow across the region in coming decades (NJDOL 2020).

Median household income in the counties that make up the Raritan River watershed are higher than the national median (national median = $63,937 in 2018 dollars), however the average cost of living in New Jersey is also higher than the national average (Guzman 2019). Somerset and Middlesex Counties are located almost entirely within the Raritan River watershed. The median household income of Somerset County is $111,772 in 2018 dollars, and the median household income of Middlesex County is $85,954 in 2018 dollars (U.S. Census Bureau 2018). A moderate proportion of Morris and Hunterdon Counties are located within the Raritan River watershed. The median household income of Morris County is $111,316 in 2018 dollars, and the median household income of Hunterdon County is $112,535 in 2018 dollars. A small proportion of Mercer and Monmouth Counties are located within the Raritan River watershed. The median household income of Mercer County is $79,990 in 2018 dollars, and the median household income of Monmouth County is $95,699 in 2018 dollars. A very small portion of Union County is located within the Raritan River watershed. The median household income of Union County is $77,095 in 2018 dollars.

4.4.1 *Environmental Justice*

Executive Order 12898, titled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," guides federal agencies to "make environmental justice part of its mission by identifying and addressing, as appropriate, disproportionally high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The EPA Environmental Justice (EJ) Mapper indicated that there may be sensitive EJ communities within the Raritan River watershed, based on environmental and demographic indicators (EPA 2020). In general, the Lower Raritan subwatershed has higher indicators of potential EJ communities than either the Upper Raritan or the Millstone. On a county-basis, Mercer County has a 10.9% population poverty rate; Middlesex has 8.2%; Monmouth has 6.7%; Somerset has 4.9%; Morris has 4.7%; Hunterdon has 4.4%, and Union has 7.8% (U.S. Census Bureau 2018).

4.5 Cultural and Historic Resources

The Raritan River watershed has played a central role in New Jersey's history, beginning with the Lenape Indians who inhabited the area prior to European settlement (Schneider 2019). The Dutch and English arrived in 1683 and spread their farms and settlements throughout the watershed. Coastal shipping and commerce became prevalent in the lower Raritan River throughout the 1700s, and the river became a focal area for several Revolutionary War battles in 1777. By the early 1800s, the American industrial revolution was underway, and the Raritan River and its tributaries became home to numerous mills and factories; most of the region's dams were built in this period. The Delaware and Raritan Canal was built in 1834 to move goods throughout the area and between the Delaware and Raritan Rivers. However, railroads would soon make the canal obsolete. By 1888, the Raritan River Railroad was built, connecting the burgeoning industries throughout the region to the shipping port at Raritan Bay. New Jersey's population doubled between 1900 and 1930, and manufacturing became a four-billion dollar industry. During this time, the public became increasingly aware of pollution due to local industry; the mainstem Raritan River was closed to swimming in the 1920s after numerous reports that the river tasted and smelled bad. Nonetheless, industry only expanded throughout the watershed during World War II, as corporations established large-scale electronics and chemical industrial operations such as CDE.

Historic federal environmental protections of the early 1970s, including the Clean Water Act, changed the Raritan River's relationship with industry forever. As a navigable water of the United States, the Raritan River gained legal protections against point-source pollution, marking the beginning of a new era of environmental cleanup actions in the region. CERCLA (*i.e.*, Superfund Law) was enacted in 1980, and numerous contaminated sites located in the Raritan River watershed were listed on the NPL shortly thereafter. Today the Raritan River watershed is home to 20 NPL sites and 1,703 other State-listed known contaminated sites (SRRI 2019). Of these, 8 NPL sites and 469 other known contaminated sites have been fully closed with institutional controls in place.

Many of the selected projects in this Draft RP/EA involve dam removal and fish passage enhancement. Dam construction in the Raritan River watershed dates to the 1600s to supply water for private and municipal use, but early industry's reliance on dams to supply hydropower to small mills in the early 1800s marked the golden age of dam building in the Raritan River watershed.

While some dams continue to serve specific purposes including water supply or flood control, many dams are obsolete, in disrepair, and degrade local water quality and aquatic habitats. Today it is estimated that there are 149 dams that are greater than 5 feet tall in the Raritan River watershed (SRRI 2019). Sixty-six dams are located in the Upper Raritan, 38 dams are located in the Lower Raritan, and 45 dams are located in the Millstone.

CHAPTER 5 NEPA ENVIRONMENTAL CONSEQUENCES

5.1 NEPA Environmental Consequences

As noted in Section 1.3.2, this document constitutes as the EA for the proposed restoration of natural resources, to address the potential impact of proposed restoration actions on the quality of the physical, biological, and cultural environment. The Trustees integrated the CERCLA and NEPA processes in this Final RP/EA, as recommended under 40 C.F.R.

5.2 Scope of NEPA Analysis and Trustee Approach

Restoration actions taken by the Trustees under CERCLA and other federal laws are subject to NEPA, 42 U.S.C. §§ 4321 *et seq*., and the NEPA regulations at 40 C.F.R. §§ 1500-1508. In general, agencies contemplating implementation of a major federal action must produce an EIS if the action is expected to have significant impacts on the quality of the human environment. When it is uncertain whether the proposed action is likely to have significant impacts, agencies prepare an EA to evaluate the need for an EIS. If the EA demonstrates that the proposed action will not significantly impact the quality of the human environment, the agencies issue a Finding of No Significant Impact (FONSI), which satisfies the requirements of NEPA, and no EIS is required.

This Final RP/EA complies with NEPA by: (1) describing the purpose and need for restoration (Section 1.2); (2) addressing public participation for this process (Section 1.8); (3) identifying and describing restoration alternative actions (Chapter 3); (4) summarizing the affected environment (Chapter 4); and (5) analyzing environmental consequences (Chapter 5).

In 2015, the NOAA Restoration Center developed a "Programmatic Environmental Impact Statement for Habitat Restoration Activities Implemented throughout the Coastal United States" (PEIS; NOAA 2015). NOAA developed the PEIS to evaluate coastal habitat restoration activities routinely funded or implemented through its existing programs. The Service documented their adoption of the PEIS with a Record of Decision, dated August 20, 2019 (84 Federal Register 45515). The PEIS is available at: https://www.fisheries.noaa.gov/resource/document/restoration-center-programmatic-environmental-impact-statement. The PEIS includes an evaluation of typical impacts for a suite of restoration activities that are inclusive of the restoration alternatives identified in this Final RP/EA, including:

- Planning, Feasibility Studies, Design Engineering, and Permitting
- Implementation and Effectiveness Monitoring
- Fish and Wildlife Monitoring
- Environmental Education Classes, Programs, Centers, Partnerships, and Materials
- Riverine and Coastal Habitat Restoration: Debris Removal
- Fish Passage: Dam and Culvert Removal, Modification or Replacement
- Fish Passage: Technical and Nature-Like Fishways
- Fish, Wildlife, Vegetation Management: Invasive Species Control
- Freshwater Stream Restoration: Channel Restoration
- Freshwater Stream Restoration: Bank Restoration and Erosion Reduction
- Shellfish Reef Restoration
- Road Upgrading and Decommissioning: Trail Restoration
- Road Upgrading and Decommissioning: Signage and Access Management
- Wetland Restoration: Levee and Culvert Removal, Modification, and Set-Back
- Wetland Restoration: Restoration and Shoreline Stabilization Techniques
- Wetland Restoration: Wetland Planting

To avoid duplication of effort and streamline the NEPA analysis in this Final RP/EA, the Trustees are using the PEIS for NEPA compliance. Impacts are summarized briefly below in Section 5.3. However, the full analysis covered by the PEIS is incorporated by reference (40 C.F.R. § 1502.21).

5.3 Impacts of Proposed Alternatives

5.3.1 *No Action*

Under the No Action alternative, there would be no direct impacts to the ecological and socioeconomic environment since no actions would be taken to restore, rehabilitate, replace, and/or acquire the equivalent of injured natural resources or the supporting habitats and services they provide. Project area water, geological/soil, land cover, and climate conditions would not be affected since no restoration would occur. Terrestrial and aquatic habitats would not be affected, and the trajectory of any ecologically degraded areas would remain unchanged. Project area fish, wildlife, and threatened and endangered species would not be affected. Project area socioeconomic

variables would not be affected, and potential economic and ecological benefits to EJ communities would not be realized. There would be no effect on cultural and historic resources.

5.3.2 *Planning, Feasibility Studies, Design Engineering, and Permitting*

The PEIS Section 4.5.1.1 states the following regarding the potential impacts of Planning, Feasibility Studies, Design Engineering, and Permitting.

"*The completion of project planning, feasibility studies, design engineering studies, and permitting activities would cause indirect, long-term, beneficial impacts to the affected environment. These activities would support the continued implementation of the most successful projects and therefore result in effective and efficient habitat restoration. Some feasibility studies would cause direct, short-term, minor impacts through associated fieldwork, including drilling into soil or sediment with an augur, drill rig, or other tools to remove surface, subsurface, or core samples. These impacts would be very minor and localized to the project site given how small such areas are in relation to an overall project area. Similar short-term impacts to living coastal resources…essential fish habitat…and threatened and endangered species may include effects from handling, noise, and displacement (see PEIS Section 4.7)*."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. All restoration alternatives will involve planning and/or feasibility studies and/or design engineering and/or permitting.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.3 *Implementation and Effectiveness Monitoring*

The PEIS Section 4.5.1.2 states the following regarding the potential impacts of Implementation and Effectiveness Monitoring.

"*The environmental consequences of the initial implementation of restoration monitoring could cause direct and indirect, short-term, minor, localized, adverse impacts. Impacts to threatened*

and endangered species may include effects from handling, noise, turbidity, displacement, and mortality (see PEIS Section 4.7). These impacts would result from activities associated with in-water or on-site observation or experimentation, such as the use of equipment for sampling or monitoring of organisms. Although these adverse impacts may occur, the monitoring products would result in indirect, long-term, minor to major beneficial impacts that extend beyond the project site. The benefits would allow future restoration proposals to be planned with better information and implemented more effectively by using the most successful methods, materials, or equipment for achieving the goal of restoration."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. All restoration alternatives will involve implementation and effectiveness monitoring.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.4 *Fish and Wildlife Monitoring*

The PEIS Section 4.5.1.3 states the following regarding the potential impacts of Fish and Wildlife Monitoring.

"*Fish and wildlife monitoring activities are related to monitoring the performance and progress of restoration projects relative to their established project goals. Because monitoring can allow for smarter decision-making, projects using this technique could cause indirect, long-term, minor to major beneficial impacts to geology and soils, water resources, living coastal and marine resources, and threatened and endangered species that may be localized or extend beyond the project site. The data gathered by trained individuals would be used to establish baseline information on species abundance and diversity and then to evaluate changes in these metrics through time. These data would be used as a basis for future aquatic habitat management decisions to benefit various programs. The observational data gathered by trained individuals would be used to develop baseline and ongoing measurements on species composition, diversity, and richness of*

habitat. These data would then be used as a basis for future habitat management decisions and restoration actions to substantially benefit various wildlife species."

"*In addition, indirect and direct, short-term, localized, minor to moderate adverse impacts to living coastal resources and essential fish habitat, and threatened and endangered species may include effects from handling, noise, turbidity, displacement, and mortality (see PEIS Section 4.7). Cultural and historic resources may be impacted if disturbed during monitoring activities. Projects with successful monitoring programs would likely be more successful that those without such programs because monitoring would allow problems and flaws to be identified quickly, contained, and eradicated before they become widely established. Monitoring programs would have direct and indirect, long-term, minor beneficial impacts on land use and socioeconomics that extend beyond any project site, because the information gathered and any involvement of local citizens in environmental projects would promote environmental stewardship, and understanding of environmental issues, and a sense of community pride*."

"*Despite the beneficial impacts expected from this activity, monitoring could cause adverse impacts. Direct, short-term, localized, minor adverse impacts are expected to geology and soils from human presence and movement around the project site (i.e., from soil compaction). Direct, short-term, localized, minor adverse impacts are also expected to air quality and noise at the project site due to the presence of crew members (and in the case of electrofishing, the operation of gas- or battery-powered electrofishing equipment). Direct, short-term, localized, minor adverse impacts may occur to water quality because, depending on the water body's substrate, turbidity may increase from the movement of crewmembers throughout the project site. Potential impacts to air quality could include direct, short-term, minor adverse impacts to air quality during construction or other on-the-ground activities. These impacts include exhaust emissions from off-road construction equipment, boats, and employee commuting vehicles. These impacts may extend beyond the project site. Direct, short-term, localized, minor, adverse impacts would occur to land use and recreation because anglers or other individuals recreating the project site may need to vacate or avoid the site in order to avoid interacting with monitoring activities*."

"*Adverse population level effects are not expected from monitoring activities (e.g., electrofishing) because the activity typically takes place over a relatively small area compared with the overall distribution of the population being monitored. Regardless of the level of mortality observed from*

a monitoring event, it is reasonable to expect that areas that may observe mortality would be rapidly recolonized by individuals from surrounding, connected waters (e.g., Berra and Gunning 1970; Smock 2006)."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***Island Farm Weir Fish Passage***: pre- and- post-project monitoring.
ii. ***Headgates Dam Removal***: pre- and- post-project monitoring.
iii. ***Califon Dam Removal***: pre- and- post-project monitoring.
iv. ***Blackwells Mills Dam Removal***: pre- and- post-project monitoring.
v. ***Nunn's Mill Dam Removal***: pre- and- post-project monitoring.
vi. ***North Branch Raritan River Corridor Riparian Buffer Restoration***: pre- and post- project monitoring.
vii. ***East Brunswick Swamp Pink Restoration***: pre- and post-project monitoring.
viii. ***Rockafellows Mills Dam Removal***: pre- and- post-project monitoring.
ix. ***Klines Mill Dam Fish Passage***: pre- and- post-project monitoring.
x. ***Beisler Lake Dam Removal***: pre- and post-dam removal monitoring.
xi. ***Mill Lane Dam Removal***: pre- and post-dam removal monitoring.
xii. ***North Branch Raritan River, Lamington River, and Stony Brook Mussel Restoration***: mussel and habitat surveys, genetic and genomic studies.
xiii. ***Raritan Bay Oyster Restoration***: oyster monitoring.
xiv. ***South River Tidal Marsh Restoration***: pre- and post-project monitoring.
xv. ***Edison Landfill Capping and Wetland Restoration***: pre- and post-project monitoring.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.5 *Environmental Education Classes, Programs, Centers, Partnerships, and Materials*

The PEIS Section 4.5.1.4 states the following regarding the potential impacts of Environmental Education Classes, Programs, Centers, Partnerships, and Materials.

"*Projects that provide environmental educational classes, programs, and centers; encourage and maintain partnerships with local school systems; and fund the development of education materials would have direct and indirect, long-term, minor beneficial impacts on geology and soils, water resources, living coastal resources and essential fish habitat, threatened and endangered species, land use, and socioeconomics. The beneficial impacts would result because education of local citizens and youth about environmental issues in the community and beyond, habitat restoration, and conservation would promote environmental stewardship, an understanding of living coastal resources and environmental issues, and a sense of community pride. Educational materials developed would encourage conservation and environmental stewardship, and educate the public on the benefits of habitat restoration projects*."

"*Projects that train volunteers to participate in restoration projects and provide outreach and education to the community would have indirect, long-term, minor beneficial impacts on all resources because training and involvement of local citizens in environmental projects would promote environmental stewardship, an understanding of living coastal resources and environmental issues, and a sense of community pride. Projects are not likely to adversely impact threatened and endangered species*."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***Lost Valley Nature Park***: installation of educational and informational signage.
ii. ***North Branch Raritan River Corridor Riparian Buffer Restoration***: volunteer and education/outreach activities.
iii. ***Stony Brook Green Infrastructure Demonstration Project***: education/outreach activities.
iv. ***Lake Manalapan Riparian Restoration***: volunteer and education/outreach activities.
v. ***Trash Trap Installation in the Lower Raritan River Watershed***: volunteer and education/outreach activities.
vi. ***Rutgers Ecological Preserve Accessible Trail***: volunteer and education/outreach activities.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.6 *Riverine and Coastal Habitat Restoration: Debris Removal*

The PEIS Section 4.5.2.2 states the following regarding the potential impacts of Debris Removal.

"Most debris removal activities would have both adverse and beneficial impacts on the affected environment in the project area, but would ultimately restore habitat for marine species and reduce the hazards of debris to trust resources. Generally, debris removal projects would cause direct, short- and long-term, localized, minor to moderate beneficial impacts. By identifying, locating, and removing unwanted debris from the affected environments, beneficial impacts to geology, soils, and land use and recreation would occur simply because areas are cleaner. In some cases (e.g., general solid waste and unwanted natural debris), debris would re-accumulate in the project area and benefits would be short-lived. In other cases (e.g., derelict fishing gear, abandoned vessels, and pilings), pollution would no longer occur and benefits would be local and long-term or even permanent in some cases. Whether short- or long-term, there would be direct, moderate beneficial impacts to water quality when debris is removed and the debris or associated leachate is no longer present in the coastal environment. Implementation of debris removal projects would also result in indirect, long-term, moderate beneficial impacts on living coastal resources and essential fish habitat, and on the threatened and endangered species because habitats would be cleared of potentially injurious debris – these impacts would likely extend beyond the project site."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***Trash Trap Installation in the Lower Raritan River Watershed***: installation of trash trap technology to remove unwanted debris from riverine environment.
ii. ***South River Tidal Marsh Restoration***: identification, assessment, and the use of machinery to remove unwanted debris.
iii. ***Edison Landfill Capping and Wetland Restoration***: identification, assessment, and the use of machinery to remove unwanted debris.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.7 *Fish Passage: Dam and Culvert Removal, Modification or Replacement*

The PEIS Section 4.5.2.3.1 states the following regarding the potential impacts of Dam and Culvert Removal, Modification, or Replacement.

"*In general, dam and culvert removal, modification, or replacement projects… produce short-term ecological impacts and considerations, but the long-term ecological benefits – improved water quality, sediment transport, and native resident and migratory species recovery – demonstrate that removal of these barriers could be an effective long-term and beneficial river restoration tool (Bednarek 2001).*"

"*Barrier removals may include indirect and direct, short-term, minor, moderate, or major adverse impacts on geology and soils, water resources, air quality, and living resources and essential fish habitat, both localized to the project site and beyond the project site. They may also have direct, long-term impacts to land use and recreation. Indirect and direct, short-term, minor, and moderate adverse impacts to threatened and endangered species may include effects from handling, noise, turbidity, contaminants, changes to hydraulics and local hydrology, additional habitat quality/quantity, and displacement (see PEIS Section 4.7). However, indirect and direct, long-term, moderate, and major benefits to threatened and endangered species, as well as other resources may result as well.*"

"*Adverse impacts to geology and soils during project construction are direct and indirect, short-term, and of minor to moderate effect, and may be localized to the project site or realized beyond the project site. These impacts stem from the use of heavy machinery and construction equipment and include soil compaction, temporary grading, minor bedrock removal, short-term downstream sediment deposition, and increased soil erosion and runoff in the immediate area of construction operations. The scales and duration of impacts may depend on the size of the dam or culvert to be removed, but more often will depend on the magnitude of the overall project footprint and include many factors such as the construction of haul roads, stockpile areas, cofferdams, or the size of area to be cleared for equipment storage. Post-construction scouring of the channel bed caused by a release of water and sediments that accumulated in the impounded area may occur, depending on the size and spatial configuration of the quantity of impounded sediment, the grain size of impounded sediments, flow competence, and other factors (Collins et al. 2007). Downstream*

migration of impounded sediments can increase downstream flood elevations. Changes to any flood elevations would only occur after appropriate regulatory consultations."

"Long-term, post-construction impacts from the removal of dams and culverts result in direct and indirect, long-term, moderate, and major impacts to water resources. Such removals may reintroduce nutrients downstream through sediment transport. The magnitude of changes is often, but not always, based on the size of the dam and impoundment. The removal of small run-of-river dams have shown in some cases to improve water quality to such a point that the river reach was removed from state impaired water lists. Within the former impoundment area, the stream channel may have higher dissolved oxygen levels than existed prior to removal."

"Potential impacts to air quality could include direct, short-term, minor adverse impacts to air quality during construction or other on-the-ground activities."

"Adverse impacts to living coastal resources such as vegetation and wildlife are direct and indirect, short-term, and of minor to moderate effect. Wildlife species near the project site, including endangered or threatened species, may be temporarily displaced or harassed during construction activities due to reverberations, noise, air quality impacts, and artificial lighting. Habitat may be lost by the filling or cutting off side channels from sediment deposits following dam removal, or when vegetation is uprooted by migrating stream channels. These types of habitat loss impacts are anticipated to be temporary until a large flood event or groundwater sources carve new channels in such areas. Human activities may also be temporarily affected."

"*Eroded sediments can impact downstream floodplain and aquatic habitat and spawning grounds, as well as water and food quality. Sediment releases may also increase bed elevations, which can cause short-term increases in flood stages and potentially impact bridges, floodplain land uses (including low-lying structures), and recreational uses. Sediments can be quickly flushed out following a dam removal (Heinz Center 2002; Stanley and Doyle 2003), or may be released in pulses over time (Pearson et al.* 2011). *Sediment deposition downstream does not always cause measurable changes in algal or invertebrate communities (Stanley and Doyle 2003), and, if they do show decreases, they may be short-term and can realize a relatively quick recovery (Orr et al. 2008). In other cases, there is evidence of shifts in downstream riverine and estuarine food webs following dam removal that show animals with invertebrate diets shifting increasingly to*

terrestrial-based invertebrates for their food source (NIFC 2013). One study showed that some fish were impacted by sediment accumulation downstream, but effects appeared short-term (Bushaw-Newton et al. 2002)."

"Post-construction impacts to living resources also occur. A reduction in species preferring reservoir habitats may occur, as conditions change to favor more lotic than lentic species. Without obstruction, migratory fish can reach historic spawning areas (Baish et al. 2002). Additional impacts are triggered by the shifts in temperature and nutrient gradients…which lead to changes such as fish assemblages and behavior; re-establishment of natural flow regimes; sediment, nutrient, and organic material being available to downstream habitats; and possible reductions in flood elevations in the former impoundment upstream. Dam removal may increase the abundance and diversity of aquatic insects, fish, and other organisms (Heinz Center 2002), and may even decrease invasive and undesirable species (Bednarek 2001)."

"*A dam and culvert removal, modification, or replacement project that results in a reduced impoundment frequently causes changes in land use and recreation, along with the composition of localized ecosystems. They may have direct, long-term, minor adverse impacts to land use that extend beyond the project site, as well as direct, long-term, moderate beneficial impacts. This includes direct impacts such as the conversion of wetland areas to uplands around the former reservoir margins, as well as the potential colonization of invasive vegetation on newly exposed soils. Barrier removal can impact some recreational users, as well as aesthetic conditions for those who prefer flat water created by an impoundment. Beneficial impacts may also result. Although wetlands may decrease at the former impounded area edge, they could redevelop both above and below the dam site. The downstream channel may also improve its connection to the floodplain, enhancing existing riparian wetlands. In addition, these projects can create new recreational opportunities and waterfront revitalization, provide sediment to replenish beaches, and decrease safety and liability concerns. Lastly, despite barrier removal costs and the value of lost services (if applicable), removal may save financial resources otherwise required for operating costs and rehabilitation of the dam for safety or ecological reasons*."

"*Many dam and culvert removal, modification, or replacement projects result in long-term changes to cultural and historic resources. In some cases, cultural and historic sites are made accessible after a barrier removal where they were once submerged by reservoirs. Such activities*

may be considered to have direct, long-term, or potentially permanent, major beneficial impacts to such cultural/historic resources. However, if the barrier (usually a dam) meets criteria for eligibility in the National Register of Historic Places, removal will have major impacts to historic resources. In such cases [the Trustees] will enter into agreement with the relevant agency (through a memorandum of agreement or other formal or informal means) that will determine the specific steps needed to mitigate adverse impacts to cultural and historic resources. Historic and cultural resources will only be adversely affected under [the] PEIS once National Historic Preservation Act consultation requirements are complete."

"*There are generally direct and indirect, long-term socioeconomic impacts related to changes in aesthetics at a removal site, increased access for recreation, and increased business opportunities for the local recreation sector, which are largely beneficial*."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***Island Farm Weir Fish Passage***: design and construction of dam infrastructure modifications associated with installation of rock ramp fishway, scour protection.
ii. ***Headgates Dam Removal***: design and construction of dam removal, restoration and reconstruction of surrounding channel and habitat, scour protection, rerouting public utility infrastructure.
iii. ***Califon Dam Removal***: design and construction of dam removal, removal and disposal of sediment, restoration and reconstruction of surrounding channel and habitat, scour protection.
iv. ***Blackwells Mills Dam Removal***: design and construction of dam removal, restoration and reconstruction of surrounding channel and habitat, relocation and/or recalibration of USGS gage infrastructure (similar to installation of new infrastructure to meet needs provided by original barrier and rerouting public infrastructure), scour protection.
v. ***Nunn's Mill Dam Removal***: design and construction of dam removal, removal and disposal of sediment, restoration and reconstruction of surrounding channel and habitat, scour protection.
vi. ***Pond Removal on Tributary to Rockaway Creek***: design and construction of weir removal, restoration and reconstruction of surrounding channel and habitat.

vii. ***Rockafellows Mills Dam Removal***: design and construction of dam removal, removal and disposal of sediment, restoration and reconstruction of surrounding channel and habitat, scour protection.

viii. ***Klines Mill Dam Fish Passage***: design and construction of dam removal or fishway, removal and disposal of sediment, restoration and reconstruction of surrounding channel and habitat, scour protection, diverting water flows through side channel.

ix. ***Beisler Lake Dam Removal***: design and construction of dam removal, reconstruction of surrounding channel and restoration of surrounding habitat, scour protection.

x. ***Mill Lane Dam Removal***: design and construction of dam removal, restoration and reconstruction of surrounding channel and habitat, scour protection, relocation and/or recalibration of USGS gage infrastructure (similar to installation of new infrastructure to meet needs provided by original barrier and rerouting public infrastructure).

xi. ***Cherry Brook Preserve Constructed Wetland***: reconstruction or repair of portions of the existing pond retaining wall, replacement of the outlet pipe to a box culvert, reconstruction of the outlet control structure and outlet headwall.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.8 *Fish Passage: Technical and Nature-Like Fishways*

The PEIS Section 4.5.2.3.2 states the following regarding the potential impacts of Technical and Nature-Like Fishways.

"*Fishway projects result in some adverse impacts, but the long-term ecological benefits to native resident and migratory species make this an effective habitat restoration tool. During construction direct, short-term, localized, minor to moderate, adverse impacts to geology and soils may result including soil compaction, temporary grading, and increased erosion. These impacts would occur due to the use of heavy machinery, construction equipment, and the movement of restoration practitioners throughout the project site during construction of access roads, staging areas, and/or the fishway itself. Water and air resources may also be affected during construction with direct, short-term, minor to moderate, adverse impacts expected to water and air quality. Due to the*

introduction of fine sediment to the water column during construction, water turbidity would increase at the project site, and may extend beyond the project site, depending on the degree of attenuation. Also, as is the case during any construction activity, an accidental contaminant spill (e.g., fuel, oil, grease, hydraulic fluid) may have short-term, direct adverse impacts on water quality."

"*During construction, fishway projects could result in direct and indirect, short- to long-term, minor to moderate adverse impacts to living coastal resources, and threatened and endangered species, which are localized or extend beyond the project site. Most directly, these projects may temporarily displace aquatic organisms from the immediate project area because construction may require the use of a cofferdam or other method used to exclude aquatic organisms. Additionally, fishway projects could delay upstream or downstream migration of aquatic organisms during construction. However, this delay would only be temporary. Increased sedimentation and turbidity during construction could also negatively impact aquatic organisms with increased mortality, reduced physiological function, and decreases in available or apparent food resources possible (Henley et al. 2000). These impacts could be localized or extend beyond the project site, depending on the degree of attenuation. Riparian vegetation may also be removed or crushed during construction in order to build staging areas, increase access to the project site, or to make room for the fishway itself. This reduction in riparian vegetation could indirectly affect aquatic organisms by altering water temperatures at the project site, or decreasing the amount of large woody debris available for input into the water body*."

"*Land use and recreation may be temporarily disturbed, as people not associated with the project will be unable to access the project site during construction. Increases in noise from the operation of heavy machinery and construction equipment could also result in short-term adverse impacts to land use and recreational activities in the area surrounding the project site*."

"Fishway projects could also result in direct, long-term, localized, minor changes to adverse impacts to cultural and historic resources. A fishway project site may meet criteria for eligibility in the National Register of Historic Places and, consequently, altering these sites may have impacts to historic resources. Construction would begin at these sites under this PEIS only after a consultation that meets the requirements of the National Historic Preservation Act has been completed."

"*Fishway projects may also result in direct and indirect, short- and long-term, minor beneficial impacts to socioeconomic resources, as we would expect a varying number of jobs to be created and a beneficial impact on the local economy to result from the funding spent on project construction*."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***Island Farm Weir Fish Passage***: design and construction of rock ramp fishway.
ii. ***Klines Mill Dam Fish Passage***: design and construction of fishway, if applicable.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.9 *Fish, Wildlife, Vegetation Management: Invasive Species Control*

The PEIS Section 4.5.2.4.1 states the following regarding the potential impacts of Invasive Species Control.

"*The impacts of invasive species removal ultimately benefit the immediate ecosystem by allowing native species the chance to re-establish. Generally, invasive species removal activities may cause direct, short-term, localized, minor adverse impacts to the affected area from mechanical or human activities. For terrestrial and aquatic invasive plant removal, direct adverse impacts to geology and soils may include compaction, whereas impacts to in-water substrate and water resources may include ephemeral sedimentation, turbidity, or other water quality impacts. However, long-term moderate to major beneficial impacts to geology and soils, water resources, coastal resources and essential fish habitat, and threatened and endangered species would result as non-native species are replaced by diverse native plant and animal communities*."

"*Herbicide use for removal of invasive plant species could cause direct, short-term, moderate, adverse impacts to geology and soils, water, air, living coastal resources and essential fish habitat, threatened and endangered species, and land use and recreation. These impacts would result from the potential for lethal effects on soil biota and the short-term loss of shading and habitat for prey species provided by the invasive plant. The potential impacts to birds, aquatic organisms, and*

terrestrial organisms will be mitigated by the use of the least toxic herbicides, surfactants, and spray pattern indicators available, but sub-lethal impacts are possible. These include impacts to reproduction, survival to adulthood, and disrupted food webs (NMFS 2005). Potential impacts to non-target plant species are reduced when proper application methods are prescribed, but rainfall and wind may cause herbicides to leach into the surrounding soil or be transported to non-invasive plants, causing unintentional damage. Appropriate herbicide application methods should reduce the risk of such herbicide drift. Suggested methods include backpack spraying, cut stump, and hack-and-squirt; however, other methods may be used as the site or target species dictates. These methods also greatly reduce the chance of exposing surface waters and their ecological communities to these chemicals due to the high level of applicator control. Methods that do not require surfactants would be used when possible. If necessary, surfactants would be limited to products determined to be the least toxic to the terrestrial, aquatic, and marine/estuarine organisms found in the immediate area. Herbicide tracers (i.e., spray pattern indicators) should be used whenever possible to track herbicide application progress. Where feasible, the area will be regularly monitored for regrowth of the target or new invasive species. Generally, use of herbicides in project areas would be conducted according to established protocols for the locality, as determined by a licensed herbicide applicator. Such protocols would include information and guidelines for appropriate chemical to be used, timing, amounts, application methods, and safety procedures relevant to the herbicide application."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***Pond Removal on Tributary to Rockaway Creek***: invasive species control.
ii. ***Lost Valley Nature Park***: invasive species control.
iii. ***North Branch Raritan River Corridor Riparian Buffer Restoration***: invasive species control.
iv. ***East Brunswick Swamp Pink Restoration***: invasive species control.
v. ***Stony Brook Green Infrastructure Demonstration Project***: invasive species control.
vi. ***Lake Manalapan Riparian Restoration***: invasive species control.
vii. ***South River Tidal Marsh Restoration***: invasive species control.
viii. ***Edison Landfill Capping and Wetland Restoration***: invasive species control.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.10 *Freshwater Stream Restoration: Channel Restoration*

The PEIS Section 4.5.2.5.1 states the following regarding the potential impacts of Channel Restoration.

"Construction activities related to restoration of in-stream channel and off-channel habitat can cause direct and indirect, short- and long-term, minor and moderate, localized, beneficial and adverse impacts. Geology and soils and water resources would receive direct, short-term, minor adverse impacts due to a temporary increase in turbidity and exposure of bare stream banks as a result of the restoration activity. Channel and in-stream restoration can involve the use of heavy equipment, which could disturb soil and the channel beds."

"*Reconnection of side channels and installation of habitat features can redirect water flows within the stream corridor, which can lead to bank erosion or channel evulsion, or expansion of invasive species populations. Woody debris structures could mobilize and deposit in undesirable places downstream. While these adverse impacts are possible, they are unlikely to occur or unlikely to last at a restoration site because in-stream habitat features would likely be anchored in areas without any human infrastructure, such as bridges, and habitat features would be installed by specialists with the goal of reducing adjacent bank erosion and resulting turbidity. Direct, long-term, moderate beneficial impacts (including increased bank stability, water oxygenation and in-stream wood retention, diverse winter rearing habitat, and increased pool depth for aquatic resources) would likely be the predominant result from this restoration activity*."

"In-stream and off-channel restoration could have direct and indirect, short- and long-term, minor and moderate, beneficial and adverse impacts to living coastal resources and essential fish habitat and threatened and endangered species. More in-stream complexity promotes higher benthic organism productivity throughout the system, increased feeding opportunities, lowered predation rates on juvenile fish, more suitable spawning substrate, and deeper rearing habitat – conditions that are beneficial to living coastal resources and essential fish habitat, and threatened and endangered species. In-stream restoration construction activities could cause temporarily

alteration of essential fish habitat and disruption or mortality of living coastal resources and threatened and endangered species."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***Headgates Dam Removal***: side channel restoration.
ii. ***Blackwells Mills Dam Removal***: side channel restoration.
iii. ***Pond Removal on Tributary to Rockaway Creek***: excavating and creating floodplain topography, creation of off-channel vernal pool habitat.
iv. ***Lost Valley Nature Park***: design and implementation of rain gardens, constructed wetlands, and other green infrastructure for stormwater management.
v. ***Stony Brook Green Infrastructure Demonstration Project***: design and implementation of bioswales and other green infrastructure for stormwater management.
vi. ***Klines Mill Dam Fish Passage***: side channel restoration.
vii. ***Beisler Lake Dam Removal***: creation of off-channel vernal pool habitat.
viii. ***Cherry Brook Preserve Constructed Wetland***: dredging and regrading of accumulated sediments and conversion of existing pond into wetland/floodplain environment.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.11 *Freshwater Stream Restoration: Bank Restoration and Erosion Reduction*

The PEIS Section 4.5.2.5.2 states the following regarding the potential impacts of Bank Restoration and Erosion Reduction.

"*Bank restoration and erosion reduction activities would cause direct and indirect, short-term, minor adverse impacts on geology and soils, water, air quality, living coastal resources and essential fish habitat, and threatened and endangered species during the on-the-ground implementation phase. Impacts to threatened and endangered species may include effects from handling, noise, turbidity, contaminant exposure, altered hydrology, additional habitat quality/quantity, displacement, and mortality (see PEIS Section 4.7). These impacts would result*

from installation of natural features or geotextile materials, stabilization of slopes, removal of bulkheads or other artificial shoreline armoring, or introduction of new vegetation (planting). Depending on the nature of each project, the installation of materials and stabilization of slopes could require small or large earth-moving machines, which would cause minor amounts of localized soil compaction, may introduce non-native species if not properly decontaminated, and other impacts as described above. The duration of impacts typically range from weeks to months, depending on the length of the shoreline or stream bank. Wildlife would also be displaced temporarily during construction activities. By protecting erodible or unstable soils, bank restoration and erosion reduction would result in indirect, long-term, minor and moderate beneficial impacts to water quality and benthic habitat in wetlands, water bodies, and other sensitive riparian or coastal habitats where benthic habitat in wetlands, water bodies, and other sensitive riparian or coastal habitats where erosion is a problem beyond the project site. Natural processes (beginning after planting) would help stabilize banks and shorelines. Installation of biologs or geotextile materials also would stabilize areas of high erosion."

"*Habitat restoration practices that are most likely to take place on stream banks, riparian habitat, and coastal areas usually involve revegetation, placement of woody debris, stabilization of banks, removal of bulkheads or other artificial shoreline armor, and stormwater management practices. Revegetation usually results in minor disturbance of the surrounding habitat, which is quickly remedied by the revegetation of the area itself. However, the placement of woody debris and other wildlife habitat features, stabilization of banks, removal of bulkheads or other artificial shoreline armor, and stormwater management practices may require the use of heavy machinery. The use of heavy machinery can often cause damage to the surrounding riparian area such as clearing of existing vegetation, compaction, and disruption of the soil. This, in turn, may cause sedimentation in the adjacent stream, with turbidity plumes typically being short-term and quickly dispersed by the river current*."

"The restoration activity will also have direct, short- and long-term, minor and moderate, adverse and beneficial impacts to land use and recreation because increases in recreational opportunity will likely occur in the project area and beyond in the larger river system in the long term; however, short-term use may be curtailed during construction activities."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***Lost Valley Nature Park***: removal of impervious surfaces and replacement with pervious surfaces, design and implementation of constructed wetland for stormwater management, planting of native vegetation.
ii. ***North Branch Raritan River Corridor Riparian Buffer Restoration***: stream bank riparian plantings to improve water quality.
iii. ***Stony Brook Green Infrastructure Demonstration Project***: design and implementation of bioswales, removal of impervious surfaces and replacement with pervious surfaces, and planting of native vegetation.
iv. ***Lake Manalapan Riparian Restoration***: riparian shoreline plantings to improve water quality.
v. ***Bridge over the Delaware and Raritan Canal Spillway***: erosion and sediment control measures, bank stabilization with biodegradable and plant material.
vi. ***Cherry Brook Preserve Constructed Wetland***: design and implementation of constructed wetland and planting of native vegetation.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.12 *Shellfish Reef Restoration*

The PEIS Section 4.5.2.6.2 states the following regarding the potential impacts of Shellfish Reef Restoration.

"*Shellfish reef restoration activities may have direct, short-term, minor adverse impacts as well as indirect, long-term, moderate beneficial impacts*."

"*Impacts to geology and soils may include short-term adverse impacts such as compaction to underlying soils where reef material is placed. Long-term beneficial impacts may occur through reductions in wave energy, thereby reducing erosion along adjacent shorelines*."

"*Direct, short-term, minor adverse impacts and indirect, long-term, minor beneficial impacts to water resources could result from reef restoration. The direct impacts include increased turbidity during project construction and the indirect impacts may include improvements to water quality in the immediate project area as a result of increased oyster filtering capacity over the long term. Turbidity related to construction activities can be reduced through the use of Best Management Practices (BMPs). Few, if any, adverse effects are expected from building and operating small-scale aquaculture facilities to assist in shellfish restoration. No long-term impacts to the aquatic environment or marine species from the water discharge are anticipated; unlike some forms of aquaculture, shellfish culture does not create high nutrient discharge because shellfish often feed on phytoplankton in seawater, rather than needing nutrient-rich feed (Mugg et al. 2000)*."

"When shells are imported from other locations, they may carry other organisms or diseases. Several states have recognized the risk in transporting shells from one area to another and have instituted requirements or recommendations for shells transplanted into state waters. Research and biosanitary protocols are used to prevent the spread of invasive species and diseases through the relocation of bivalve shells (Cohen and Zabin 2009). Although deployment of shellfish does have the potential to spread shellfish diseases or non-native organisms, restoration will use BMPs and follow state regulations that require that shellfish be certified as disease-free (Bushek et al. 2004)."

"*Reef restoration projects have the potential to convert one habitat type into another. This conversion frequently involves re-establishing a reef in a formerly degraded shellfish area. In general, shellfish restoration projects convert shallow, open water habitats to subtidal or intertidal reefs or beds (the latter in the case of Ostrea lurida and some Atlantic state estuaries). While open water habitats are valuable, the historical loss of shellfish habitat within the coastal United States has been significant. For example, in the United States there has been an estimated 88 percent decline in oyster biomass and an estimated 63 percent decline in the spatial extent of oyster habitat over the past 100 years (zu Ermgassen et al. 2012), making this conversion a minor impact in most locations*."

"*Coral reefs, artificial reef, and live/hard bottom – all in the marine environment – are not impacted due to their location relative to typical oyster restoration sites. Oyster reefs or beds may promote the development (or re-establishment) of submerged aquatic vegetation beds or marsh*

habitat in their landward or intertidal areas through increased shoreline stabilization. In either configuration, oysters serve as habitat, providing food and refuge for recreationally and commercially important fish and crustaceans (e.g., crabs and shrimp) and their pretty. In addition, these habitats can help protect marsh habitat by reducing the erosion caused by wave action."

"All restoration actions occurring in near shallow or intertidal habitat may displace living coastal resources through the increased activity and noise associated with restoration project construction. Vegetation may be disturbed if the shellfish restoration site is accessed from land instead of by boat. These impacts are expected to be temporary. In most cases, fish return to restoration sites almost immediately after construction."

"Both water- and land-based recreation and land use activities near a shellfish restoration site may be adversely impacted in short-term, minor ways by changing boat traffic or other resource use patterns, or beneficially impacted by improved recreational fishing near successfully restored oyster reefs. In building and operating small-scale aquaculture facilities to assist in shellfish restoration, little or no impact is expected. Facilities are frequently located in areas of existing marine industry."

"*The socioeconomic benefits of conducting reef restoration projects may result insofar as such projects create viable habitat that support a diverse array of commercial and recreational fish species, and therefore communities that benefit from these resources may realize benefits related to increased ecological productivity*."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***North Branch Raritan River, Lamington River, and Stony Brook Mussel Restoration***: mussel relocation, propagation at pre-permitted rearing facilities, and stocking.
ii. ***Raritan Bay Oyster Restoration***: design and construction of oyster reefs in the Raritan Bay.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.13 *Road Upgrading and Decommissioning: Trail Restoration*

The PEIS Section 4.5.2.7 states the following regarding the potential impacts of Trail Restoration.

"*Road upgrading and decommissioning, and trail restoration activities would cause direct and indirect, short-term, minor and moderate adverse impacts, typically in riparian and upland affected environments, resulting from temporary construction activities in the project area. Aside from construction impacts, however, most of the impacts resulting from these activities would be direct and indirect, moderate to major beneficial impacts, as they are designed to control access to sensitive areas, limit the use of sensitive areas as routes for vehicular transportation, and reduce a road's propensity for erosion*."

"*Trail restoration projects would take place in all types of habitat areas; however, they have historically occurred most frequently in riparian and upland affected environments. These activities would cause direct, short-term, minor, adverse impacts on geology and soils, water, and air quality, and would cause direct and indirect, short-term, minor, adverse impacts on living coastal resources and essential fish habitat, and threatened and endangered species, resulting from temporary construction activities, as previously described. There may be direct, long-term minor to moderate adverse impacts that result from increased shading over previously exposed habitat that depends on photosynthetic processes. Areas that experience such impacts are relatively small, and may be reduced with BMPs (e.g., increased spacing of boardwalk boards). Trail restoration projects would cause indirect, short-term, minor impacts on land use, resulting from construction activities required to restore the trail (e.g., temporarily blocking trails with machinery). Impacts to threatened and endangered species may include effects from handling, noise, turbidity, contaminant exposure, altered hydrology, additional habitat quality/quantity, displacement, and mortality (see PEIS Section 4.7)*."

"*Trail restoration projects would also cause direct and indirect, long-term, minor to major beneficial impacts on geology and soils, water, living coastal resources and essential fish habitat, threatened and endangered species, cultural and historic resources, and socioeconomics. The beneficial impacts would result from reduced erosion potential and rates after projects were implemented and from both allowing and controlling access to sensitive areas*."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***County Boat Launch and Fishing Platform at Lincoln Avenue Park***: resurfacing and grading of existing boat launch and parking area, design and construction of raised fishing platform (similar to raised walkway).
ii. ***Lost Valley Nature Park***: design and construction of walkways and driving paths, regrading and pervious material resurfacing of driving paths and parking areas.
iii. ***Rutgers Ecological Preserve Accessible Trail***: creation and resurfacing of ADA accessible trail and pullout area.
iv. ***Bridge over the Delaware and Raritan Canal Spillway***: design and construction of raised footbridge over spillway and trail extension.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.14 *Road Upgrading and Decommissioning: Signage and Access Management*

The PEIS Section 4.5.2.8 states the following regarding the potential impacts of Signage and Access Management.

"*The installation of temporary or permanent fencing, signage, or netting would have direct, long-term (fencing would likely have a long-term impact, but not netting), moderate beneficial impacts on the geology and soils of the project site, and on water resources, living coastal resources and essential fish habitat, and threatened and endangered species beyond the project site. The benefits of these actions are reduced disturbance by humans, animals, and vehicles*."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***County Boat Launch and Fishing Platform at Lincoln Avenue Park***: installation of informational and wayfinding signage.
ii. ***Lost Valley Nature Park***: installation of informational and wayfinding signage.

iii. ***East Brunswick Swamp Pink Restoration***: installation of deer exclusion fencing and anti-herbivory cages.

iv. ***Lake Manalapan Riparian Restoration***: installation of temporary fencing to exclude geese and humans.

v. ***Rutgers Ecological Preserve Accessible Trail***: installation of educational signage.

vi. ***South River Tidal Marsh Restoration***: installation of goose exclusion fencing.

vii. ***Edison Landfill Capping and Wetland Restoration***: installation of goose exclusion fencing.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.15 *Wetland Restoration: Levee and Culvert Removal, Modification, and Set-Back*

The PEIS Section 4.5.2.11.1 states the following regarding the potential impacts of Levee and Culvert Removal, Modification, and Set-Back.

"*The removal and/or modification of levees, dikes, culverts, and similar infrastructure would cause direct and indirect, short-term, localized, minor adverse impacts on geology and soils, water, air, living coastal resources and essential fish habitat, and threatened and endangered species during the construction phase of the project. These impacts also apply to the construction of new or replacement levees (set-back levees) as part of the overall project. The use of heavy machinery and construction equipment is the primary cause of the direct, adverse impacts associated with this activity, which may include soil compaction, emissions from heavy equipment, removal or crushing of understory vegetation, increased soil erosion in the immediate area of construction operations, and unintentional introduction of non-native, potentially invasive, species.*"

"*These restoration activities would provide direct and indirect benefits to geology and soils, water, living coastal resources and essential fish habitat, and threatened and endangered species. These projects result in benefits to riparian, stream and river channel habitats, and shoreline habitats such as wetlands, mangrove swamps, beaches, and mudflat areas. Restoration of natural hydrology would aid in the development of vegetated communities that provide vital rearing, feeding, and refuge habitat for fish and benthic communities and wildlife species. This technique*

is beneficial for anadromous fish that need connected coastal waterways and rivers with unaltered hydrology for passage during migration events, as well as for estuarine fish species that benefit from increased habitat area. Long-term major beneficial effects to the quality of surface water resources at the project site and beyond are expected due to restoration of tidal flow and water movement. Restoration of these areas to natural states would enhance water quality and salinity, reduce turbidity and soil erosion, increase carbon sequestration and storage capacity (providing climate change mitigation), and enhance habitat quality, although some increases in turbidity in the water column could result due to increased water movement. In areas where berms and levees bounded ponded areas restored to wetland, indirect, long-term minor beneficial effects would be expected by uptake and transformation of nutrients resulting from enhanced vegetative growth in the restoration area."

"Cultural and historic resources and land use could experience indirect, long-term, minor adverse impacts resulting from levee modification or removal. The land use in the floodplain, including any potentially culturally sensitive areas, would change as the water resources in the floodplain changed. Because land use would stabilize in the floodplain over time, the impact would be minor."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***South River Tidal Marsh Restoration***: levee and/or berm modification, site grading and placement of clean fill to establish appropriate marsh elevations.
ii. ***Edison Landfill Capping and Wetland Restoration***: levee and/or berm modification, site grading and placement of clean fill to establish appropriate marsh elevations.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.16 *Wetland Restoration: Restoration and Shoreline Stabilization Techniques*

The PEIS Section 4.5.2.11.2 states the following regarding the potential impacts of Wetland Restoration and Shoreline Stabilization Techniques.

"*Construction impacts from sediment removal, materials placement, and shoreline stabilization activities are similar, and would cause direct and indirect, short-term, localized, minor adverse impacts on geology and soils, water, living coastal resources and essential fish habitat, and threatened and endangered species during the implementation phase of the projects*."

"Potential impacts to air quality could include direct, short-term, minor adverse impacts to air quality during construction or other on-the-ground activities. These impacts include exhaust emissions from off-road construction equipment, on-road hauling, construction worker employee commuting vehicles, and fugitive dust emissions from paved roads and earthmoving activities."

"*Impacts to living coastal resources, essential fish habitat, and threatened and endangered species may include effects from handling, noise, turbidity, contaminants, changes to hydrology, and displacement (see PEIS Section 4.7). In the case of any activities using heavy machinery to conduct restoration work for marsh restoration activities, potential impacts are related to compaction of the soils, leaking petroleum products, and increased turbidity at the restoration site. Many of these impacts would be ameliorated through the use of BMPs*."

"*These restoration activities may impact vegetation on the project site or nearby. Impacts to vegetation should be minimal, as the most frequently removed mature plants would not be native to the site or would be invasive species. For instance, shrub and tree species would be removed if the end goal is a habitat dominated by wetland obligate species. The removed plant species may not provide the same quality of habitat for fish as the goal habitat and consequently the overall impact of this removal is low. In instances where sediment and vegetation are not removed from the site, those working on the site may potentially trample existing vegetation or unintentionally introduce non-native species, but this would be kept to a minimum through the use of BMPs*."

"*Increased water turbidity and temporary decreases in water quality may result from sediment removal, materials placement, and shoreline stabilization activities, which may in turn impact living resources in the area. Behavior of species that use wetlands impacted by this restoration activity may be temporarily modified. Mitigation for potential impacts would focus on implementation of BMPs. Direct short-term, localized moderate impacts would be expected on benthic fauna and infauna smothered by sediment placement. Materials with contaminant*

concentrations consistent with published sediment quality guidelines and background levels rarely impact biota, and will be considered non-significant."

"*After construction, these projects would result in direct and indirect long-term or permanent, moderate to major beneficial impacts to geology and soils, water, living coastal resources and essential fish habitat, and threatened and endangered species, and minor beneficial impacts related to socioeconomic resources as a result of increased tourism opportunities that could result from an improved resource*."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***South River Tidal Marsh Restoration***: site grading and placement of clean fill to establish appropriate marsh elevations, bank stabilization with biodegradable and plant materials, shoreline erosion control measures and installation of living shorelines, installation of stormwater management infrastructure.
ii. ***Edison Landfill Capping and Wetland Restoration***: site grading and placement of clean fill to establish appropriate marsh elevations, bank stabilization with biodegradable and plant materials, shoreline erosion control measures, installation of stormwater management infrastructure.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.17 *Wetland Restoration: Wetland Planting*

The PEIS Section 4.5.2.11.3 states the following regarding the potential impacts of Wetland Planting.

"*Wetland planting may occur as a separate restoration activity or in combination with other restoration types described in this [PEIS] document. Planting may cause short-term, direct adverse impacts to living coastal and marine resources when existing vegetation is trampled during the donor harvest or planting process. Planting is generally short-term in duration, lasting days to weeks, but the length of time between the restoration efforts that prepare a site for planting*

and when planting is begun may be several months, as planting cannot be completed outside the local growing season. For this reason, active wetland restoration activities may last over a year, even at smaller sites. Short-term damage to stands of healthy wetland vegetation may occur where native species are harvested from donor sites using species-appropriate techniques. The growth habit and length of the growing season determines how rapidly a donor site would recover. Generally, the benefits of using a local, native plant source outweigh the damage to the donor site, which is temporary. For restoration activities that involve building native plant nurseries, although he nursery use may be long-term, the impacts are low because the sites are generally constructed in areas that do not have existing habitat value (e.g., a school playground, a disturbed upland area, or former sewage treatment plant or aquaculture pond). Minor adverse impacts to cultural and historic resources may occur during wetland restoration, when historic structures are present within a project site."

"Long-term, moderate beneficial impacts to water resources, living coastal resources and threatened and endangered species would occur due to the erosion reduction and increased shelter provided by wetland plants. Wetland planting activities would result in beneficial impacts by restoring or creating wetland and/or shallow-water habitats that provide areas for feeding and shelter for fish, as well as nutrient cycling and carbon sequestration and storage capacity."

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***Lost Valley Nature Park***: installation of native plants for pollinator gardens, green infrastructure, wetlands, uplands, meadows, and transitional areas.
ii. ***South River Tidal Marsh Restoration***: planting of native marsh vegetation.
iii. ***Edison Landfill Capping and Wetland Restoration***: planting of native marsh vegetation.
iv. ***East Brunswick Swamp Pink Restoration***: implement best forestry practices to promote new growth of white cedar stand and/or plant white cedar saplings.

The Trustees have determined that the impacts from these proposed restoration alternatives fall within the range of alternatives and scope of potential environmental impacts analyzed in the PEIS and do not have significant adverse impacts.

5.3.18 *Impacts Not Addressed in the PEIS*

Riverine and coastal habitat projects that include environmental justice impacts and contaminated debris removal and associated remediation (e.g., capping) are not directly addressed in the PEIS, therefore, the Trustees have provided additional NEPA analysis for projects that include these potential activities and impacts.

Environmental Justice

Restoration activities supported by the Trustees help to ensure the enhancement of environmental quality for all populations in New Jersey. The Trustees have determined that all proposed restoration projects would provide long-term or permanent beneficial impacts to the Environmental Justice communities described in Section 4.41 by improving the quality of the natural environment and ecosystem services, and providing recreational and educational benefits to local communities. None of the alternatives are expected to adversely impact minority or low-income populations.

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. All restoration alternatives will involve Environmental Justice.

The Trustees have determined that the impacts from these proposed restoration alternatives do not have significant adverse impacts to Environmental Justice.

Contaminated Sediment Debris Removal and Sediment Capping

Contaminated Sediment/Debris Removal: Sediment removal and/or dredging of wetland areas affected by contamination would likely result in increased injury to wetlands and associated living coastal resources, representing short-term minor to moderate adverse impacts due to physical habitat disturbance, including the removal of well-developed wetland geology, soils, and existing vegetation. Direct, short-term, localized, minor adverse effects to air quality and noise are expected at the project site due to the operation of heavy equipment and other on-the-ground activities. Direct and indirect, short-term moderate beneficial impacts to socioeconomic resources are expected from job creation as a result from the funding spent of the projects. Following sediment

and debris removal, clean fill would need to be brought in and the site revegetated. Losses in habitat value would occur until the dredged areas recovered from remedial activities. The removal of contaminated sediments and debris would have short- or long-term moderate beneficial impacts to water quality, and short- or long-term moderate beneficial impacts on living coastal resources and threatened and endangered species because habitats would be cleared of potentially deleterious contamination. However, the site should be monitored for potential recontamination from external sources, which may reinjure wetlands and habitats and put living coastal resources at risk of further exposure to contaminants.

Sediment Capping: Sediment capping would likely require 1-2 feet of fill, and would alter the bottom contours of the wetland causing changes in wetland sediments, hydrology, and associated plant communities. Considerable time and effort would be required to revegetate capped areas, including effort to keep invasive species at bay. Short-term losses of wetland habitat would occur while remedial activities were conducted. Long-term negative impacts may result from changes in hydrology that arise from partially filling the wetland. However, sediment capping will result in direct, long-term benefits to water quality, geology and soils, and living coastal resources due to the prevention of future leaching of contaminants.

There is potential for sediment/debris removal and sediment capping activities to impact cultural and historic resources. Care would be taken to ensure such properties are avoided during removal, and coordination with the State Historic Preservation Officer would be carried out, as appropriate. Short- or long-term beneficial impacts to recreation would occur simply because the area is cleaner.

The Trustees determined that the following restoration alternatives are relevant to this impact category:

i. ***South River Tidal Marsh Restoration***: contaminated sediment/debris removal and sediment capping, as warranted.
ii. ***Edison Landfill Capping and Wetland Restoration:*** contaminated sediment/debris removal and sediment capping

The Trustees have determined that the impacts from these proposed restoration alternatives do not have significant adverse impacts.

5.3.19 *Summary of Impacts*

Based on the analysis in this Final RP/EA, the Trustees have made the determination that all proposed restoration alternatives are either within the range of alternatives and scope of potential environmental consequences analyzed in the PEIS or in Section 5.3.18, and do not have significant adverse impacts. Moreover, the Trustees have fully considered and determined that there are no geographic, project- or site-specific conditions, sensitivities, unique habitat, or resources that warrant additional NEPA analyses beyond which is provided in the PEIS or Section 5.3.18.

As projects progress (*e.g.*, during the feasibility and design process), if it is determined that project activities no longer fall within the scope of the PEIS or Section 5.3.18, additional NEPA review may be warranted and would be conducted and provided in a subsequent NEPA document subject to public review.

5.4 Cumulative Impacts

5.4.1 *Cumulative Impacts of No Action Alternative*

The No Action alternative would have long-term, minor adverse effects to physical and biological resources in the Raritan River watershed, since no active restoration would occur. Natural resources would not return to baseline and interim losses would not be compensated.

5.4.2 *Cumulative Impacts of Selected Alternatives (Preferred Alternatives)*

The selected preferred alternatives would have no major adverse impacts on habitats, lands, or waterways in the Raritan River watershed. The selected alternatives may result in minor, short-term adverse impacts and both short- and long-term beneficial impacts to habitats and the natural resources they support. When considered in tandem with other past, present, and reasonable foreseeable future actions within the Raritan River watershed, the selected alternatives are not anticipated to have adverse cumulative impacts. Direct and indirect adverse impacts are likely to be short-term and will occur primarily during and immediately after periods of active construction. The selected alternatives are expected to result in long-term, beneficial cumulative impacts on the human environment since they may positively impact the areas land use, recreational use, and economic activity through habitat restoration, land preservation, and improved public access and recreational activities.

5.4.3 *Cumulative Impacts of Non-Selected Alternatives (Non-Preferred Alternatives)*

The Raritan Bay Oyster Restoration non-selected alternative would have no major adverse impacts on habitats, lands, or waterways. This alternative may result in minor, adverse impacts during construction, but impacts would be localized and short-term. The Cherry Brook Preserve Constructed Wetland non-selected alternative may have some minor long-term adverse effects on water quality, and the South River Tidal Marsh Restoration and the Edison Landfill Capping and Wetland Restoration non-selected alternatives may have some minor adverse impacts on climate change 'resiliency', as currently proposed. These alternatives may additionally result in minor, adverse impacts during construction, but impacts would be localized and short-term. When considered in tandem with other past, present, and reasonably foreseeable future actions within the Raritan River watershed, the non-selected alternatives are not anticipated to have adverse cumulative impacts, and may result in localized beneficial impacts to biological and habitat resources.

CHAPTER 6 COMPLIANCE WITH OTHER LAWS AND REGULATIONS

As appropriate, the Trustees will ensure compliance with applicable statutes, regulations, and policies prior to implementation of any restoration alternatives. The following is a list of statutes that may apply to proposed projects. Compliance with these authorities, and other authorities not listed, is considered part of the restoration planning process. All projects that receive funding will be responsible for obtaining necessary permits and complying with relevant statutes, regulations, and policies.

6.1 Federal Laws

6.1.1 *National Environmental Policy Act*

The National Environmental Policy Act (NEPA; 42 U.S.C. §§ 4321 *et seq*.), requires that federal agencies consider the environmental impacts of proposed actions and reasonable alternatives to those actions. The Authorized Official will determine, based on the facts and recommendations in this document and input from the public, whether this EA supports a FONSI or whether an EIS should be prepared.

6.1.2 *Federal Water Pollution Control Act* (*Clean Water Act*)

The Clean Water Act (CWA; 33 U.S.C. §§ 1251 *et seq*.), is the principle law governing pollution control and water quality of the nation's waterways. Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the United States. Section 401 of the CWA requires any applicant for a federal license or permit that conducts any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the discharge originates or would originate. The Trustees will require all necessary permits to be in place prior to all construction activities.

6.1.3 *Fish and Wildlife Coordination Act*

The Fish and Wildlife Coordination Act (16 U.S.C. §§ 661 *et seq*.) requires that federal agencies consult with the Service, NOAA, and state wildlife agencies regarding activities that affect, control, or modify waters of any stream or bodies of water, in order to minimize the adverse impacts of such actions on fish and wildlife resources and aquatic environments. This coordination

is generally incorporated into compliance processes used to address the requirements of other applicable statutes, such as Section 404 of the CWA.

6.1.4 *Endangered Species Act*

The Endangered Species Act (ESA; 16 U.S.C. §§ 1531 *et seq*.), is intended to protect species that are threatened with extinction. It provides for the conservation of habitats and ecosystems that these species depend on and produces a program for identification and conservation of these species. Federal agencies are required to ensure that any actions are not likely to jeopardize the continued existence of a threatened and endangered species. The Trustees will engage in required ESA consultations prior to implementing any restoration actions.

6.1.5 *Migratory Bird Treaty Act*

The Migratory Bird Treaty Act of 1918 (16 U.S.C. §§ 703-712), protects all migratory birds and their eggs, nests, and feathers and prohibits the taking, killing, or possession of migratory birds. The proposed restoration actions would not result in the taking, killing, or possession of any migratory birds.

6.1.6 *National Historic Preservation Act*

The National Historic Preservation Act (NHPA; 16 U.S.C. §§ 470 *et seq*.), is intended to preserve historic and archaeological sites. Compliance with the NHPA would be fulfilled through coordination with the State Historic Preservation Office (SHPO). Federal agencies will consult with SHPO and Tribal Historic Preservation Officers (if applicable) to identify historic properties that may be affected by a proposed project and to assess potential adverse effects of restoration actions.

6.1.7 *Occupational Safety and Health Act*

The Occupational Safety and Health Act (OSHA; 29 U.S.C. §§ 651 *et seq*.), governs the health and safety of employees from exposure to recognized hazards, such as exposure to toxic chemicals, excessive noise, mechanical dangers, and unsanitary conditions. Work conducted on the proposed restoration actions will comply with OSHA requirements.

6.1.8 *Americans with Disabilities Act*

The Americans with Disabilities Act (ADA; 42 U.S.C. § 12101), is a civil rights law that prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public. The purpose of the law is to ensure that people with disabilities have the same rights as opportunities as everyone else. The preferred recreational alternatives will comply with ADA requirements.

6.1.9 *Coastal Zone Management Act*

The Coastal Zone Management Act (CZMA; 16 U.S.C. §§ 1451-1464), encourages states to preserve, protect, develop, and where possible, restore and enhance the nation's coastal resources. Restoration actions undertaken or authorized by federal agencies within a state's coastal zone are required to comply, to the maximum extent practicable, with the enforceable policies of a state's federally approved Coastal Zone Management Program. The proposed projects will comply with the CZMA and be consistent with state policy.

6.1.10 *Magnuson-Stevens Fishery and Conservation Management Act*

The Magnuson-Stevens Fishery and Conservation Management Act (MSFCMA; 16 U.S.C. §§ 1801 *et seq*.), requires federal agencies to consult with the National Marine Fisheries Service when their actions or activities may adversely affect habitat identified as essential fish habitat. The Trustees will require MSFCMA consultation prior to implementing any pertinent restoration actions.

6.1.11 *Rivers and Harbors Act*

The Rivers and Harbors Appropriation Act (33 U.S.C. §§ 403 *et seq*.), regulates development and use of the nation's navigable waterways, and regulates obstruction or alteration of navigable waters. The Trustees will require all necessary permits be in place prior to construction activities.

6.1.12 *Floodplain Management, Executive Order 11998*

Executive Order 11998 (42 Federal Register 26951) requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there

is a practicable alternative. The Trustees will ensure compliance with this executive order as part of the state permitting process.

6.1.13 *Protection of Wetlands, Executive Order 11990*

Executive Order 11990 (42 Federal Register 26961) requires federal agencies to take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for acquiring, managing, and disposing of federal lands and facilities; providing federally undertaken, financed, or assisted construction and improvements; and conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. The Trustees will ensure compliance with this executive order as part of the state permitting process.

6.1.14 *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Executive Order 12898*

Executive Order 12898 (59 Federal Register 7629) directs federal agencies to identify and address the disproportionally high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law. The Executive Order directs each agency to develop a strategy for implementing Environmental Justice, is intended to promote nondiscrimination in federal programs that affect human health and the environment, and provides minority and low-income communities access to public information and public participation. The Trustees have not identified any disproportionate adverse impacts on human health or the environment for minority and low-income populations due to the implementation of the selected projects. Anticipated beneficial impacts to Environmental Justice communities are discussed in Section 5.3.18.

6.2 State and Local Laws

The Natural Resource Trustees will ensure compliance with all applicable state and local laws and other applicable federal laws and regulations relevant to the State of New Jersey. All projects that receive funding will be responsible for obtaining necessary permits and complying with relevant statutes, regulations, and policies.

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List of Agencies and Persons Consulted

- NJDEP Office of Natural Resource Restoration
- U.S. Fish and Wildlife Service, Ecological Services
- NOAA Restoration Center
- NOAA Assessment Restoration Division
- Project Sponsors, including but not limited to: The Watershed Institute, New York-New Jersey Harbor and Estuary Program, Rutgers University, Borough of Highland Park, City of New Brunswick, Borough of Manville, Montgomery Township, Raritan Headwaters Association, Lower Raritan Watershed Partnership, Rutgers Cooperative Extension of Middlesex County, Natural Resources Conservation Service, Ridge and Valley Chapter of Trout Unlimited, The Nature Conservancy, GreenTrust Alliance, Inc., Township of Raritan, Franklin Township, Bethlehem Township, Township of Plainsboro, East Amwell Township, East Windsor Township, City of Perth Amboy, Hunterdon County, Middlesex County, and North Jersey Resource Conservation and Development.

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APPENDIX A SUMMARY OF RESPONSE TO PUBLIC COMMENTS

The Draft Restoration Plan and Environmental Assessment (Draft RP/EA) was released for a 30-day public comment period that began on February 9, 2021 and ended on March 10, 2021. The U.S. Fish and Wildlife Service (Service) posted the Draft RP/EA on its website, sent an email blast to 155 recipients, and published a legal notice in the Trenton Times and NJ.com, inviting comment on the Draft RP/EA for the 30-day period. The Trustees received 15 written comments from the public. Table A-1, found at the end of this Appendix, provides a list of all commenters. The Trustees value stakeholder input and have considered all written comments received.

This Appendix summarizes public comments on the Draft RP/EA, grouped by general topic or by project, and provides the Trustees' response to those comments.

A. General Comments

A.1 *The combined impact of proposed restoration activities will have a significant positive impact on the water quality, migratory fish passage and aquatic connectivity, recreational access, and the overall health of the Raritan River watershed.*

Response: The Trustees received seven comments that fully supported the preferred projects presented in the Draft RP/EA. Comments of support were received from non-governmental organizations (NGOs), local governments, and private businesses.

A.2 *Are the projects listed in order of priority within Tiers?*

Response: No, the projects are not listed in order of priority within Tiers. The Trustees have selected both Tier I and Tier II projects for implementation and will fund or partially fund as many Tier I and Tier II projects as feasible. The Trustees classified proposed projects into Tiers using primary and secondary evaluation criteria, discussed in Chapter 2 of the Draft RP/EA. Tier I alternatives are projects that provide the most appropriate restoration of natural resources injured, as outlined in Section 2.2. The Trustees anticipate sufficient funding available for Tier I projects at the current estimated funding levels. Tier II alternatives are projects that would also result in appropriate restoration of the injured natural resources, and will be funded if settlement monies remain after funding the higher priority Tier I projects and/or as Tier I projects are implemented by different entities or become infeasible for any reason.

A.3 *The Trustees received several comments regarding corrections or additions to dam structural specifications (Island Farm Weir Fish Passage, Headgates Dam Removal, Mill Lane Dam Removal), dam name (Mill Lane Dam), hazard classification status (Blackwells Mills Dam), and site access (Mill Lane Dam Removal).*

Response: The Trustees have incorporated these corrections and additions into the project descriptions found in Chapter 3 of the Final RP/EA.

A.4 *The Draft RP/EA does not propose remediation work that is sufficient to clean up areas of Bound Brook that are affected by the Cornell-Dubilier Electronics, Inc. Superfund Site (Cornell-Dubilier Site or Site). Specifically, the Draft RP/EA does not address remediation work along the stretch of Bound Brook that flows from the Cornell-Dubilier Site to New Market Pond and other areas downstream*.

Response: The Environmental Protection Agency's (EPA) remedial process is distinct and separate from the Trustees' Natural Resource Damage Assessment and Restoration (NRDAR) process outlined in this document. The goal of EPA's remedial process (*i.e.*, clean-up) is to implement institutional and engineering controls at the Superfund Site (*e.g.*, deed restrictions, contaminant excavation and capping, groundwater treatment) to eliminate, reduce, or control risks to human health and the environment. In contrast, the statutory mandate of the Trustees' NRDAR process is to restore, rehabilitate, replace, and/or acquire the equivalent of injured natural resources as those injured or destroyed by the release of a hazardous substance.

The commenter(s) are requesting that the Trustees perform remediation at the Cornell-Dubilier Site. However, the EPA is responsible for remedial activities, and the remedial process is ongoing at the Cornell-Dubilier Site, as described below.

The EPA divided the Cornell-Dubilier Site into four operable units (OUs) to address remedial actions (see Section 1.5 for more detail). Operable Unit 4 (OU4) addresses contamination found in adjacent stream channels to the Site and floodplain sediments (Figure A-1). The EPA has selected a remedial action for OU4 that includes excavation and off-site disposal of capacitor debris located along the portion of Bound Brook that is adjacent to the former Cornell-Dubilier Electronics, Inc. facility (Facility) property; the relocation of a waterline that transects the former Facility property; capping and treatment of groundwater along the boundary of the former Facility

property and Bound Brook; and excavation and removal of contaminated sediment and floodplain soils in areas of the Bound Brook and its floodplains, inclusive of the New Market Pond. The remedial design for OU4 is pending, and no remedial actions for OU4 have been implemented to date. Additional information on the EPA's remedial activities can be found at: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0201112.

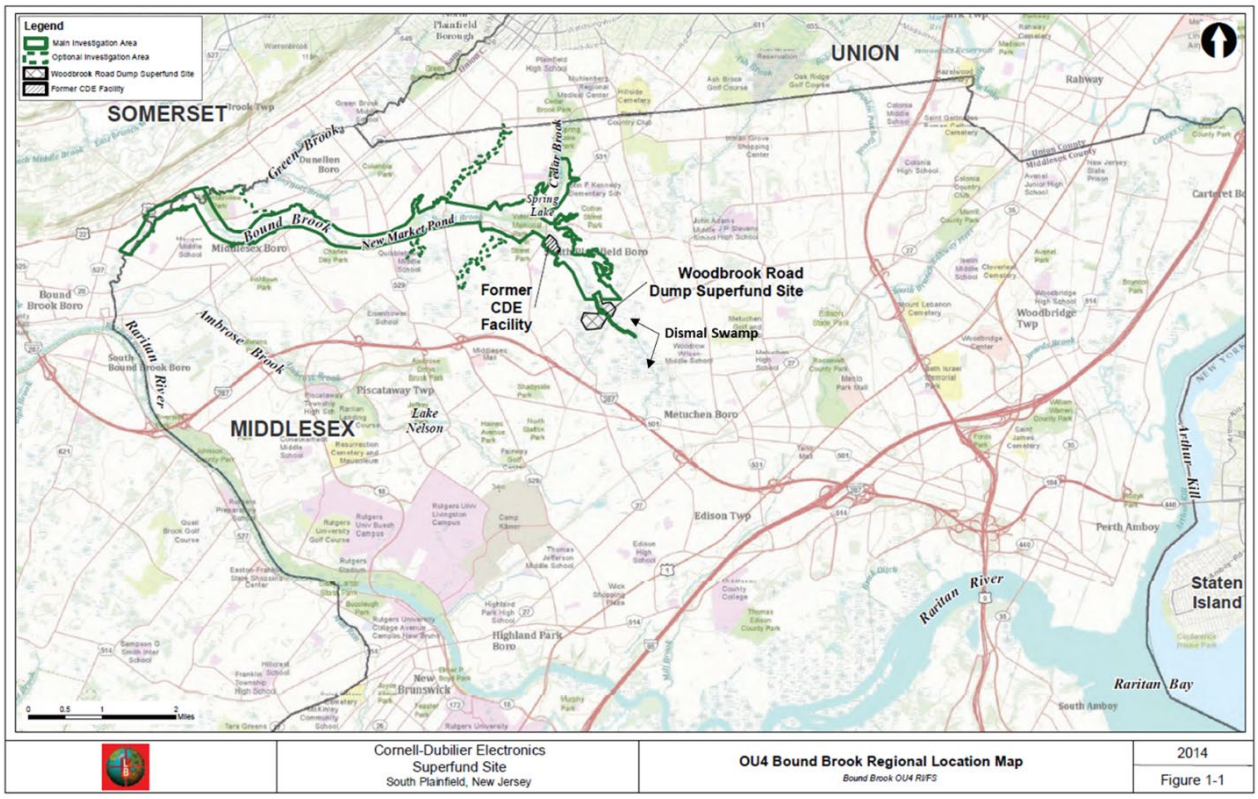

Figure A-1. Map of the Cornell-Dubilier Superfund Site OU4 and the Woodbrook

Road Dump Superfund Site. Source: USACE 2014.

A.5 *The Trustees should consider restoration projects located in the immediate vicinity of the Cornell-Dubilier Site such as property acquisition in Edison adjacent to the Raritan River, the removal of the New Market Pond Dam, or trash and invasive species removal within the Dismal Swamp.*

Response: The Trustees evaluated the immediate vicinity of the Cornell-Dubilier Site for potential restoration but determined that potential projects in this area were not feasible because the EPA has not completed remedial activities (*i.e.*, Cornell-Dubilier Site OU4; Figure A-1), and therefore

the area remains impacted by contamination. Potential projects located in the Dismal Swamp, positioned just upstream of the Cornell-Dubilier Site, were evaluated but not deemed feasible due to their proximity to the Woodbrook Road Superfund Site, where remedial actions are also incomplete (Figure A-1). Projects were considered and selected in the Edison and New Brunswick area, including the Trash Trap Installation in the Lower Raritan River Watershed, the Rutgers Ecological Preserve Accessible Trail, and the Bridge over the Delaware and Raritan Canal Spillway.

A.6 *The Trustees should focus on projects located in the Raritan River watershed downstream of the Cornell-Dubilier Site, including more focus on recreational projects that benefit Environmental Justice (EJ) communities located downstream of the Cornell-Dubilier Site (e.g., the Bridge Over the Delaware and Raritan Canal project should be reclassified as Tier I). The commenter indicates that 'downstream' is defined as the lower Raritan River.*

Response: The Trustees selected several restoration projects located along the lower Raritan River downstream of the Cornell-Dubilier Site, including: Trash Trap Installation in the Lower Raritan River Watershed, Rutgers Ecological Preserve Accessible Trail, and the Bridge over the Delaware and Raritan Canal Spillway. Two additional projects, the East Brunswick Swamp Pink Restoration and the Lake Manalapan Riparian Restoration, are located in sub-watersheds downstream of the Cornell-Dubilier Site. However, it is important to note that the natural resources injured at the Cornell-Dubilier Site do not exclusively occupy and rely on downstream habitats, but instead are found throughout the Raritan River watershed and are dependent on the watershed's health at large. As such, the Trustees focused on restoration projects located throughout the Raritan River watershed that would maximize ecological uplift of the watershed as a whole. Specifically, the Trustees focused on restoration projects whose benefits will export to other areas of the watershed, cumulatively benefitting a breadth of both upstream and downstream areas (*e.g.*, aquatic connectivity, water quality improvement, recreational fishing and boating opportunities).

The majority of monetary recoveries associated with the Cornell-Dubilier NRDAR are intended for ecological restoration projects and only a small portion of funds are specifically earmarked for recreational projects, as determined by the NRDAR injury assessment and resultant settlements (see Sections 1.6 and 1.7). Although the Trustees reviewed a number of recreational projects throughout the watershed, the Trustees were only able to select a small subset of those projects for

funding. However, the Trustees prioritized ecological restoration projects that additionally provide recreational benefits. In addition, the Trustees intentionally selected restoration projects located in EJ communities throughout the watershed, and prioritized ecological restoration projects that would export positive ecological and recreational benefits to EJ communities (*e.g.*, freshwater wetland restoration, dam removal, riparian restoration, floodplain restoration, aquatic connectivity, freshwater mussel conservation and enhancement, instream enhancement, boat launches, river trails, land trails, interpretive signage, docks and piers).

The Bridge over the Delaware and Raritan Canal was selected as a Tier II project, primarily due to the fact that no feasibility work has been conducted that provides any information regarding selection criteria of project design (*i.e.*, "Proven Technology"), "Cost Effectiveness", and "Site Ownership / Availability". In contrast, all Tier I projects have information regarding at least two or more of these primary criteria and will likely be implemented more quickly. Regardless, the Trustees reiterate that both Tier I and Tier II projects were selected for implementation and the Trustees will fund or partially fund as many projects as feasible.

Since the release of the Draft RP/EA it has come to the Trustees' attention that there is a 650-foot trail gap on the eastern side of the Delaware and Raritan Canal spillway that was previously unaccounted for. This finding further highlights the fact that no feasibility work has been conducted for the Bridge over the Delaware and Raritan Canal project and reaffirms that a Tier II designation is appropriate. As such, this project would additionally involve either constructing 650 feet of new trail (if possible), or finding an alternative solution to create connectivity. Multiple solutions will be explored as part of the feasibility process. The Trustees incorporated edits to the project description in Section 3.21 of the Final RP/EA to acknowledge this new information.

A.7 *Dam removal could result in negative water quality impacts to the Raritan River public water supply system by (a) increased sediment loads that could impact downstream water supply impoundments or intakes, and by (b) the potential release of sediment-bound contamination.*

Response: All dam removals that involve substantial amounts of upstream sediments that may be released or otherwise affected by dam removal will involve evaluations of sediment quantity and quality as part of the feasibility study. This information will help project managers develop

appropriate sediment management plans. All sediment management plans will be reviewed and approved by the appropriate permitting agencies prior to construction.

All dam removal projects that involve state-regulated structures and/or wetland habitat modifications will require a number of state-issued permits issued by several divisions within the New Jersey Department of Environmental Protection (NJDEP). Should the Trustees move forward with a dam removal project, the state-issued permits associated with dam removal and associated restoration activities will mandate a 30-day public comment period where members of the public can comment on specific project concerns, including sediment management.

If permitted, any dam removal project will be subject to intense permitting requirements that may include, but are not limited to, timing restrictions for work performed in the water, sediment management protocols and restrictions, and other conditions intended to protect infrastructure, human health and safety, aquatic and terrestrial taxa, historical features, and stream integrity (erosion, water quality, *etc*.).

A.8 *One commenter requested that the public comment period be extended to a total of 60 days so that additional restoration projects can be submitted.*

Response: The Trustees' restoration planning process was initiated in 2018, when the Trustees hired a contractor to identify and contact stakeholders in the Raritan River watershed and solicit restoration project ideas that would be appropriate to restore, rehabilitate, replace, and/or acquire the equivalent of injured natural resources as those injured or destroyed by the release of hazardous substances at the Cornell-Dubilier Site (https://pub-data.diver.orr.noaa.gov/admin-record/6229/CornellDubilier_RestorationScopingReport.pdf). In this scoping process, the Trustees identified and contacted 144 NGOs, academic institutions, state agencies, federal agencies, public and private utilities, and all municipalities and counties in the Raritan River watershed. The Trustees screened appropriate projects using standardized evaluation criteria (See Chapter 2 of the Draft RP/EA), and presented preferred projects in the Draft RP/EA. Upon public release of the Draft RP/EA, the Trustees directly contacted over 155 stakeholders to request feedback on the document, and posted the public comment opportunity in the Trenton Times and NJ.com. Although the Draft RP/EA public comment period was only 30 days, the entire restoration project scoping and planning process took more than two years to complete. The Trustees

apologize to any stakeholders that were not captured by the restoration scoping and planning process, but assert that due diligence was afforded to identify and notify interested parties and solicit appropriate restoration projects.

A.9 *One commenter made the Trustees aware of a Bald Eagles nest located in the vicinity of the Island Farm Weir Fish Passage Project.*

Response: The Trustees will address the potential effects of individual projects on state and federally listed threatened and endangered species and critical habitat as part of each project's state permitting and federal compliance process.

A.10 *The Mill Lane Dam Removal and the Rockafellows Mills Dam Removal should be elevated from Tier II to Tier I status due to their high potential for ecological uplift.*

Response: The Trustees classified proposed projects into Tiers using primary and secondary evaluation criteria, discussed in Chapter 2 of the Draft RP/EA. Both the Mill Lane Dam and the Rockafellows Mills Dam removals ranked as Tier II projects largely due to the fact that "Site Ownership and Availability" is currently unknown; it is unclear at this time if the Trustees could gain permission to implement these projects. As such, both projects also ranked low on the secondary criteria "Timeframe of Potential Benefits", since it may take a number of years to acquire permissions to implement these projects. In contrast, Tier I projects may already have site permissions in place and will likely be implemented more quickly.

B. Project-Specific Comments

B.1 Island Farm Weir Fish Passage

B.1.1 *The impoundment associated with the Island Farm Weir (IFW) is relied upon as a public drinking water source for the Raritan Basin Water Supply System. The IFW impoundment must be maintained at an exact pool elevation in order to properly operate the site's raw water supply intakes and to maintain a minimum permitted passing flow.*

Response: The Trustees are aware of the mandatory requirement of maintaining headpond elevation in the impoundment upstream of the IFW, and agree that no design or project should be implemented that reduces the headpond elevation. The Trustees will continue to share information

and work closely with the New Jersey Water Supply Authority (NJWSA) and New Jersey American Water (NJAW) to ensure that this requirement is met.

B1.2 *Access to the IFW through Raritan-Millstone Water Treatment Plant during construction activities would disrupt normal operations, compromise site safety, and degrade existing roads. The Trustees should consider alternative access and staging areas.*

Response: The Trustees are aware of concerns related to site access and will continue ongoing discussions with the NJWSA and NJAW to address these concerns in a manner that is amenable to all parties.

B.2 Headgates Dam Removal

B.2.1 *The most recent New Jersey Water Supply Plan, adopted in 2017, references a 1990 Eastern Raritan Study that evaluated several potential future water projects that could improve the safe yield of the Raritan Basin Water Supply System. One of the potential future projects is the Confluence Pump Station Project, which calls for a pump station to be situated near the confluence of the North and South Branches of the Raritan River. The project requires an impoundment, and the Headgates Dam impoundment could serve this purpose. As such, the commenter requests that the Trustees consider alternatives to the complete removal of the dam.*

Response: The Trustees acknowledge that, although currently not needed, the NJWSA has reserved a plan for implementing the Confluence Pump Station Project should the project be required to meet future water supply demand. The Trustees also recognize that the Confluence Pump Station Project may require an alternative engineering solution for extracting water should the Trustees decide to move forward with the Headgates Dam Removal project.

B.3 Blackwells Mills Dam Removal

B.3.1 *The Blackwells Mills Dam houses a U.S. Geological Survey (USGS) gage that measures stage and discharge. The data from the Blackwells Mills gage is used to determine the timing and quantity of releases from the Round Valley and Spruce Run Reservoirs and the Delaware and Raritan Canal, particularly during low-flow periods. One commenter suggests that the Trustees consider alternatives to removal such as notching .or a rock*

ramp that will leave the existing gage in place. A second commenter requests that the project be removed from consideration, and suggests that the project will result in a significant negative impact to stream gage data, which could result in further negative impacts to the environment.

Response: The Trustees acknowledge that the Blackwells Mills Dam houses a USGS gage that provides data used to inform the Raritan Basin Water Supply System, and acknowledge that any project implemented at Blackwells Mills Dam will require continued stream-gaging capacity at or near this location. Additional detailed comments were received from the second commenter, but are not reported here since they are being addressed as part of ongoing, evolving, internal discussions among the dam owner (NJDEP), NJWSA, NJAW, USGS, and the Service. The Trustees acknowledge that the outcome of these discussions may influence nature and scale of actions taken at the Blackwells Mills Dam. The inclusion of the Blackwells Mills Dam Removal restoration project in the Draft RP/EA reflects a consensus among the Trustees that the removal of the Blackwells Mills Dam would be ecologically beneficial to the Raritan River watershed, and acknowledges that any action taken to improve fish passage (e.g., dam removal, notching, nature-like fishway) would impact stream gaging and require additional actions to maintain the accuracy, reliability, and continuity of flow data at or near this location. The Trustees additionally note that restoration projects included in this document do not imply or guarantee project implementation.

B.4 Mill Lane Dam Removal

B.4.1 *The Mill Lane Dam houses a USGS gage that measures stage and discharge. The Draft RP/EA does not cite a specific plan that states how this gage will be addressed as related to dam removal.*

Response: The intent of the Draft RP/EA is to propose restoration projects that will restore, rehabilitate, replace, and/or acquire the equivalent of injured natural resources as those injured or destroyed by the release of hazardous substances at the Cornell-Dubilier Site. The Trustees proposed a number of projects that will require additional actions prior to implementation, including feasibility studies and project designs. Specific actions related to the USGS gage located at the Mill Lane Dam Removal will be addressed as part of this project's feasibility and design process.

B.5 South River Tidal Marsh Restoration

B.5.1 *The South River Tidal Marsh Restoration project would benefit EJ communities and should be reconsidered in the prioritization process. The commenter provided a map and briefly proposed a new project in the South River watershed that is located along the eastern edge of the Washington Canal, comprised of 6,750 feet of living shoreline restoration, 80 acres of coastal forest, 80 acres of tidal wetland restoration, and 5 acres of upland enhancement.*

Response: The Trustees did not evaluate the new project submitted by the commenter under the selection criteria, however the new project is very similar in nature, although smaller in scope, to the project included in the Draft RP/EA. One of the Trustees' primary concerns with the South River Tidal Marsh Restoration is "Cost Effectiveness". The Trustees estimate that projects of this nature cost between $250,000 and $515,000 per acre to implement. As such, if the Trustees were to implement the South River Tidal Marsh Restoration (or the new project), no funds would remain to implement restoration at other locations. The Trustees have evaluated all proposed projects based on primary and secondary evaluation criteria (see Chapter 2 of the Draft RP/EA), and determined that 20 other projects meet a greater breadth of criteria than the South River Tidal Marsh Restoration project. The Trustees assert that the most cost-effective use of CDE settlement funds is to implement multiple projects that provide multiple ecological and recreational benefits throughout the Raritan River watershed, rather than implementing a single restoration project that provides limited ecological and recreational benefits. The Trustees also reiterate that numerous projects were selected in EJ communities (see Response to comment A6, above), and that almost all selected projects will yield ecological benefits to more than one natural resource and will export positive benefits to EJ communities (*e.g.*, water quality benefits, aquatic connectivity, recreational fishing and boating opportunities).

Table A-1. List of commenters on the Cornell-Dubilier Electronics, Inc. Draft RP/EA.

Edison Township Open Space Advisory Committee
Lower Raritan Watershed Partnership
Raritan Headwaters Association
The Watershed Institute
The Nature Conservancy
Piscataway Township
Readington Township Committee
Readington Township Open Space Advisory Board

Table A-1. continued

Readington WaterWatch
U.S. Geological Survey
New Jersey American Water
New Jersey Water Supply Authority
Stantec
2 private citizens

UNITED STATES FISH AND WILDLIFE SERVICE

ENVIRONMENTAL ACTION STATEMENT

Restoration Plan and Environmental Assessment
Cornell-Dubilier Electronics, Inc. Superfund Site
South Plainfield, Middlesex County, New Jersey

Within the spirit and intent of the Council of Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and have determined that the action of the Final Restoration Plan and Environmental Assessment for the Cornell-Dubilier Electronics, Inc. Superfund Site, South Plainfield, New Jersey:

___ is a categorical exclusion as provided by 516 DM 6 Appendix 1 and 516 DM 6, Appendix 1. No further documentation will therefore be made.

_X_ is found not to have significant environmental effects as determined by the attached Environmental Assessment and Finding of No Significant Impact.

___ is found to have significant effects, and therefore further consideration of this action will require a notice of intent to be published in the Federal Register announcing the decision to prepare an Environmental Impact Statement (EIS).

___ is not approved because of unacceptable environmental damage, or violation of Fish and Wildlife Service mandates, policy, regulations, or procedures.

___ is an emergency action within the context of 40 CFR 1506.11. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.

Other supporting documents (list):

Restoration Plan and Environmental Assessment for the Cornell-Dubilier Electronics, Inc. Superfund Site, South Plainfield, New Jersey.

WENDI WEBER Digitally signed by WENDI WEBER
Date: 2021.08.16 10:44:27 -04'00'

Regional Director/DOI Authorized Official Date

FINDING OF NO SIGNIFICANT IMPACT

Restoration Plan and Environmental Assessment
Cornell-Dubilier Electronics, Inc. Superfund Site
South Plainfield, Middlesex County, New Jersey

The U.S. Department of Interior, U.S. Department of Commerce, and State of New Jersey have completed a Final Restoration Plan and Environmental Assessment (RP/EA) that explains the decisions of the Trustees to provide funds to multiple projects in the Raritan River watershed, New Jersey. This restoration effort will be a multi-year program that will restore, replace, rehabilitate, and/or acquire the equivalent of the natural resources injured as a result of hazardous substances released from the Cornell-Dubilier Electronics, Inc. Superfund Site.

The Trustees provided the Draft RP/EA for public review from February 9, 2021, through March 10, 2021. Trustee responses to public comments are presented in Appendix A of the Final RP/EA. In general, the comments supported the restoration project selections identified by the Trustees. Some clarifications and additional information have been provided as a result the projects selected for funding.

Based on a review and evaluation of the information contained in the Final RP/EA, I have determined that the proposed actions do not constitute a major federal action which would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969. Accordingly, the preparation of an environmental impact statement on the proposed actions is not required at this time.

WENDI WEBER Digitally signed by WENDI WEBER
Date: 2021.08.26 14:37:07 -04'00'

Regional Director/DOI Authorized Official Date

FINDING OF NO SIGNIFICANT IMPACT

Final Restoration Plan and Environmental Assessment for the Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey

Background:
Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Natural Resource Trustee Agencies (Trustees), including the National Oceanic and Atmospheric Administration (NOAA) on behalf of the Department of Commerce, the U.S. Fish and Wildlife Service (USFWS) on behalf of the Department of the Interior, and the New Jersey Department of Environmental Protection (NJDEP) on behalf of the State of New Jersey, prepared a Final Restoration Plan and Environmental Assessment (RP/EA) for the Cornell-Dubilier Electronics Superfund Site in South Plainfield, NJ. The Final RP/EA evaluates restoration alternatives for natural resource injuries resulting from historical releases of contaminants at and from the Cornell-Dubilier Electronics Superfund Site, ("the Site") in South Plainfield, NJ.

The Cornell-Dubilier Site is a 26-acre industrial facility (Facility) and adjacent areas that were contaminated as a result of releases of hazardous substances at and from the Facility, located in South Plainfield, Middlesex County, New Jersey. Cornell-Dubilier Electronics, Inc. (CDE) manufactured electronic parts and components, including capacitors, from 1936 to 1962 at the Facility. CDE allegedly released and buried materials contaminated with polychlorinated biphenyls (PCBs) which contaminated Site soils; groundwater in the aquifer beneath the Site; soils and groundwater of nearby residential and commercial properties; and the surface water, soils, and sediments of an unnamed tributary, the Bound Brook, and adjacent wetlands. The contaminant of greatest concern at the Site is PCBs, however, elevated concentrations of heavy metals, chlorinated volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), dichlorodiphenyltrichloroethane (DDT), dioxins, and furans have also been identified at levels of ecological concern.

The Trustees determined that the hazardous substances released at and from the CDE Site degraded at least 252 acres of forested wetland and 132 acres of emergent freshwater wetland, including open water areas of the Bound Brook corridor extending from the Site downstream to the New Market Pond Dam. In addition to injuries to ecological resources, Site-related contamination resulted in injuries to recreational fishing.

To date, there have been three natural resource damage assessment and restoration (NRDAR) settlements associated with the CDE Site, as summarized below.

Dana Corporation Bankruptcy Settlement: In June 2008, the Federal Trustees settled environmental claims against Chapter 11 debtors Dana Corporation and 40 affiliated companies (DANA) under CERCLA. The Federal Government claimed that DANA was liable at the CDE Site based on its prior ownership of the real property and buildings at the CDE Site from 1936 to 1956. According to the Federal Government's Proof of Claim, during that time, DANA leased the property and buildings to CDE. The Government alleged that PCB contamination from CDE's operations during DANA's ownership caused injury to natural resources at the CDE Site,

including injuries to migratory birds and fish. Under the DANA settlement, NOAA and USFWS recovered DANA stock for natural resource damages, with a 2008-cashed value of $88,900.

Cornell-Dubilier Electronics, Inc. (ability to pay) Settlement: In October 2014, the Federal Trustees settled environmental claims against CDE under CERCLA, and the State additionally found CDE liable under the New Jersey Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 *et seq.*; the Industrial Site Recovery Act, N.J.S.A. 13:1K6, *et seq.*; and the common law of nuisance, negligence and strict liability. The U.S. Department of Justice (DOJ) entered a judgment against CDE for $75,040,000. However, the DOJ examined the company's financial and insurance information and determined that CDE had limited financial ability to pay for response costs and natural resource damages. Therefore, the DOJ ordered CDE to pay $75,040,000 using their best effort to maximize insurance proceeds from companies against which CDE has asserted a claim. To date, natural resource damages collections from CDE total $20,687,126.

D.S.C. of Newark Enterprises, Inc. Settlement: In February 2015, the Federal and State Trustees settled environmental claims against D.S.C. of Newark Enterprises, Inc. under CERCLA, and the State additionally found D.S.C. of Newark Enterprises, Inc. liable under the New Jersey Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 *et seq.*, and the Industrial Site Recovery Act, N.J.S.A 13:1K-6 *et seq.* The Federal Government and State of New Jersey asserted that D.S.C. of Newark Enterprises, Inc. was liable based on its current ownership of real property and buildings at the Site, having owned and operated the Site since 1976 as an industrial park, and having owned and operated the Site at a time at which hazardous substances were disposed of. The Trustees recovered $4,821,005 in natural resource damages in the D.S.C. of Newark Enterprises, Inc. settlement.

Alternatives Considered Under CERCLA:
The Trustees considered 24 alternatives in the Draft RP/EA. In compliance with the CERCLA NRDA regulations and the National Environmental Policy Act (NEPA), the Trustees published the Draft RP/EA and held a public notice and comment period that commenced on February 9, 2021 and ended on March 10, 2021. The Trustees considered and responded to all comments submitted by the public before issuing this Final RP/EA.

As presented in the Final RP/EA, the Trustees' selected a restoration alternative that includes a suite of habitat restoration and public outreach/education components.[1] The Trustees have grouped 24 preferred projects into three tiers. Projects in the first tier are proposed to have top priority for funding. Trustees may consider implementing projects in the second tier if funding remains after the first tier projects have been completed or removed from consideration. The Trustees gave priority consideration to restoration projects sited closest to the location of injury, thereby likely to restore the injured resources and benefit the impacted communities.

[1] The Executive Branch of the United States issued multiple Executive Orders (EOs) relating to Environmental Justice and climate change while this Final RP/EA was being drafted. Although not explicitly cited in the Final RP/EA, NOAA considered and complied with the following EOs for this agency action: EO 13985 (Executive Order on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government," Jan. 20, 2021); EO 13990 (Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, Jan. 20, 2021); and EO 14008 (Executive Order on Tackling the Climate Crisis at Home and Abroad, Jan. 27, 2021).

Areas of New Jersey have been designated as Environmental Justice Communities by the State. Numerous Tier I and Tier II restoration projects have been selected in areas of the Raritan River Watershed where Environmental Justice communities are located. Primary consideration was given to projects that would restore similar resources located within the same watershed basin as the Site. No secondary consideration was given to projects that fell outside the Raritan River Watershed Basin where the Site is located.

The Trustees recognize that although projects proposed satisfactorily meet the Tier 1 evaluation criteria at this time, factors such as the degree of advanced planning, costs, additional sources of funds and the ability to leverage funds, and implementation readiness may change over time. Accordingly, the Trustees anticipate some projects in the Tier 2 category later qualifying for implementation if funds are available after the Tier 1 projects are completed.

Restoration Projects:
The Trustees evaluated a no-action alternative that is not preferred due to the need to utilize the NRDAR settlement funds to accomplish restoration of the natural resources injured by releases at and from the Site. Thus, the Trustees cooperatively developed the Final RP/EA, which examines and evaluates potential restoration alternatives to restore natural resources injured as a result of hazardous substances released at the CDE Site. The Trustees selected the following restoration alternatives:

Tier 1 Projects – Selected for Funding
Island Farm Weir Fish Passage. The proposed restoration project includes the installation of a rock ramp fishway at the IFW to enhance fish passage.

Headgates Dam Removal. The proposed restoration project involves the removal of the Headgates Dam; appropriate relocation or reconfiguration of the Bridgewater North Branch Trunk sewer line located approximately 90 feet upstream; appropriate adjustment or modification of the Raritan Water Power Canal located approximately 0.15 mile upstream; appropriate restoration and stabilization of the adjacent stream reaches and impoundment area; revegetation of exposed and newly formed banks; and scour protection measures, as warranted.

Califon Dam Removal. The proposed restoration project involves the removal of the Califon Dam; appropriate restoration, stabilization, and revegetation of adjacent stream reaches and the impoundment area; appropriate characterization, dredging, removal, and storage/disposal of upstream sediments, as warranted; and scour protection measures at the Highway 512 Bridge and other areas, as warranted.

Blackwells Mills Dam Removal. The proposed restoration project involves the removal of the Blackwells Mills Dam; appropriate restoration and stabilization of the adjacent stream reaches; native plantings to stabilize banks; installation, relocation and/or recalibration of U.S. Geological Survey (USGS) stream gaging equipment; and scour protection measures at the Blackwells Mills Road Bridge and other areas, as warranted.

Nunn's Mill Dam Removal. The proposed restoration project involves the removal of the Nunn's Mill Dam; appropriate characterization, dredging, removal, and storage/disposal of upstream sediments, as warranted; appropriate restoration, stabilization, and revegetation of adjacent

stream reaches and the impoundment area; and scour protection measures at the Four Bridges Road Bridge and other areas, as warranted.

Pond Removal on Tributary to Rockaway Creek. This project will remove a small inline farm pond on a private property. The pond is located on an unnamed tributary to Rockaway Creek, in Readington Township, Hunterdon County, New Jersey. The proposed restoration project includes: the removal of a small pond weir structure; the restoration of the stream corridor within and adjacent to the small pond; the removal of exotic invasive plant species; the revegetation and stabilization of stream banks; and the creation/restoration of floodplain topography to restore floodplain hydrology and improve connectivity between the stream and its floodplain.

County Boat Launch and Fishing Platform at Lincoln Avenue Park. The proposed recreational restoration project includes: the restoration of an existing dirt and gravel boat launch at the Lincoln Avenue Park; the installation of an accessible fishing platform, as feasible, in the vicinity of the boat launch; the installation of appropriate safety and informational signage associated with the boat launch and platform; and the creation or expansion of unpaved parking, as warranted.

Lost Valley Nature Park. The proposed restoration project includes a mix of recreational and ecological improvements, that may include but are not limited to: the removal of existing impervious surfaces; trail and path development; planting pollinator garden areas; installing rain gardens; expansion and revegetation of wetland areas; tree plantings; upland meadow plantings; improvements to a gravel driving path; installation of a new gravel parking area; and installation of educational and wayfinding signage.

North Branch Raritan River Corridor Riparian Buffer Restoration. The proposed restoration project includes the establishment and restoration of riparian buffers on publicly-owned open space properties along the North Branch Raritan River corridor.

East Brunswick Swamp Pink Restoration. The proposed restoration project involves the protection of an extant swamp pink (*Helonias bullata*) population and the restoration and protection of adjacent Atlantic white cedar (*Chamaecyparis thyoides*) habitat in East Brunswick, New Jersey.

Stony Brook Green Infrastructure Demonstration Project. The proposed recreational and ecological restoration project involves the removal of impervious driving surfaces and the 14,000 square feet impervious parking area located on The Watershed Reserve property; the installation of multiple demonstration porous paving alternatives; the installation of bioswales to capture and treat stormwater along the entry drive; the removal of invasive species along the entry drive and adjacent tributary stream; and native plantings along the entry drive and adjacent tributary stream. This project will serve as a green infrastructure demonstration project to educate Watershed Reserve visitors on alternative green infrastructure practices and will also serve as a research site for local academic groups.

Tier 2 Projects – Selected for Implementation if Appropriate and Funds Remain after Tier 1 Projects are Completed.

Rockafellows Mills Dam Removal. The proposed restoration project involves the removal of the Rockafellows Mills Dam; appropriate stabilization, restoration and vegetation of the adjacent stream reaches and impoundment area; appropriate characterization, dredging, removal, and storage/disposal of upstream sediments, as warranted; and scour protection measures for the Black River & Western Railroad Flemington through truss bridge, the Rockafellows Mill Road bridge, and other areas, as warranted.

Klines Mill Dam Fish Passage. The proposed restoration project involves the restoration of fish passage at the Klines Mill Dam through dam removal, partial dam removal, or the installation of a nature like fishway. The project may also include appropriate restoration, stabilization, and revegetation of the adjacent stream and millrace reaches; and scour protection measures at the Klines Mill Road and bridge, as warranted.

Beisler Lake Dam Removal. The proposed restoration project includes the partial removal of the earthen dam at Beisler Lake; stream channel restoration and stabilization in the former impounded area and downstream; revegetation of the former impounded area and other disturbed areas; and the creation of vernal pools in and around the former impoundment footprint.

Mill Lane Dam Removal. The proposed restoration project involves the removal of the Mill Lane Dam; relocation and/or recalibration of an adjacent USGS stream gage; appropriate restoration and stabilization of the adjacent stream reaches and impoundment area; revegetation of exposed and newly formed banks; and scour protection measures at the U.S. Route 202 bridge and other areas, as warranted.

Lake Manalapan Riparian Restoration. The proposed restoration project would create 600 feet of riparian buffer along the western shoreline of Lake Manalapan to stabilize banks and reduce erosion, reduce sediment and nutrient loading from runoff, and deter Canada geese.

North Branch Raritan River, Lamington River, and Stony Brook Mussel Restoration. The proposed project involves: expanding current mussel surveys within the North Branch Raritan River, the Lamington River, and the Stony Brook; determining environmental correlates to mussel decline in those waterways; and determining and potentially implementing appropriate restoration actions that may benefit imperiled mussel species. The identification of survey areas may include a review of historic and current distribution information, identification of locations that have never been surveyed or are under-surveyed, and the use of eDNA as a survey location screening tool. Determination of environmental correlates may involve habitat surveys, habitat modeling, and GIS modeling. Determination and implementation of appropriate restoration actions may include: genetic and genomic studies; relocation of non-reproducing mussels to areas with suitable stable habitat; and propagation and stocking of mussels as a long-term conservation strategy. Special focus will be given to the brook floater and green floater, since they are both state-listed endangered and have both been considered for federal listing.

Trash Trap Installation in the Lower Raritan River Watershed. The proposed restoration project involves the installation and maintenance of a trash trap device at an easily accessible trash 'hotspot' location on a tributary to the Raritan River between Cuckels Brook at State Route 287

and the mouth of the Raritan River at Perth Amboy. The project area may include portions of South Bound Brook Borough, Highland Park Borough, Sayreville Borough, Perth Amboy, and South Amboy.

Rutgers Ecological Preserve Accessible Trail. The proposed recreational restoration project would create a 0.4-mile ADA accessible trail through the Rutgers Ecological Preserve, create a small pullout area for direct access to the Buell Brook, and install educational signage.

Bridge Over the Delaware and Raritan Canal Spillway. The proposed recreational restoration project involves either constructing a bridge over the 200-foot spillway and building 650 feet of connecting trail, or finding a suitable alternative to provide connectivity between the D&R Canal Park towpath and the 2-mile section of riverside trail that runs from U.S. Route 18 east towards Boyd Park in New Brunswick.

Non-Preferred Projects (Not Selected for Funding)
The Trustees also evaluated additional projects and determined that these were non-preferred projects.

Cherry Brook Preserve Constructed Wetland. The proposed restoration project is to convert an aging farm pond (i.e., Cherry Brook Pond) into a constructed freshwater wetland. Project components may include: dredging approximately 780 cubic yards of accumulated sediment and silt; regrading of the dredged pond area to create a constructed wetland with varying water depths; reconstruction and/or repair of portions of the existing pond retaining wall; reconstruction of the pond's outlet control structure; replacement of the outlet pipe to a larger box culvert; reconstruction of the downstream outlet headwall; and revegetation.

Raritan Bay Oyster Restoration. The proposed restoration project would include performing environmental condition indexing, site survival, and growth rate testing to determine appropriate restoration sites; culturing seed oysters in an aquaculture facility; constructing appropriate structures (e.g., reefs, Figure 27) to support oysters; and oyster monitoring.

South River Tidal Marsh Restoration. The proposed restoration project includes: creation of improved tidal marsh habitat; expansion of high marsh habitat; reduction and control of *Phragmites australis*; implementation of shoreline erosion control measures; creation of living shoreline areas; protection of restored vegetation areas with a goose exclusion fence; and if warranted, the excavation and relocation of contaminated soils and sediments and backfilling with clean material.

Edison Landfill Capping and Wetland Restoration. The proposed wetland restoration project includes: excavation and relocation of municipal waste, soils, and sediments of the lower Edison landfill; backfilling with clean material and regrading; capping of relocated waste materials; and replanting with native tidal salt marsh grasses and protection of those grasses with a goose exclusion fence.

Public Involvement:
Throughout the NRDA process, the Trustees have made information available to the public. The Trustees in accordance with NRDA regulations, identified and evaluated multiple restoration project alternatives to compensate for natural resource injuries, including a "No Action" alternative. In compliance with the CERCLA NRDA regulations and the National Environmental Policy Act (NEPA), the Trustees published the Draft RP/EA and held a public notice and comment period that commenced on February 9, 2021 and ended on March 10, 2021. The Trustees considered and responded to all comments submitted by the public before issuing this Final RP/EA. Prior to the issuance of the Draft RP/EA to the public, the Trustees identified restoration alternatives through a variety of approaches, including: 1) reviewing information on potential projects from existing public and reports and datasets; 2) consulting individuals and/or local groups with knowledge of specific projects or restoration opportunities; and 3) soliciting input on potential ecological and recreational restoration opportunities from the public as part of a Restoration Scoping effort (https://pub-data.diver.orr.noaa.gov/admin-record/6229/CornellDubilier_RestorationScopingReport.pdf; NOAA 2019).

NOAA Environmental Review and Adoption of Final RP/EA:
USFWS acted as the lead federal Trustee for the RP/EA and NOAA participated as a cooperating federal agency pursuant to NEPA (40 C.F.R. § 1508.5). As a Trustee for the Cornell-Dubilier Electronics case and a cooperating federal agency for NEPA, NOAA has participated in the development and finalization of the Final RP/EA. Participating as a Trustee and a cooperating agency allowed NOAA to ensure that the necessary information and analyses were included in the Final RP/PEA to support the proposed action and allow for consideration of adoption of the document as a Final RP/EA for NOAA's NEPA purposes.

NOAA has evaluated the Final RP/EA and found that it includes all required components for adoption by NOAA: sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or Finding of No Significant Impact (FONSI); brief discussion of the purpose and need for the proposed action; a listing of the alternatives to the proposed action; a description of the affected environment; a discussion of the environmental impacts of the proposed action and alternatives; and a list of agencies and persons consulted.

As a result of this review, NOAA has determined that it is not necessary to prepare a separate EA or EIS to identify and select the preferred alternative to compensate for injuries resulting from the release of hazardous substances at the CDE Site, and has adopted the Final RP/EA under the Council on Environmental Quality's Regulations for Implementing NEPA (40 C.F.R. § 1506.3) and has issued a separate FONSI. This FONSI documents NOAA's determination to adopt the Final RP/EA.

Environmental Consequences:
NEPA requires an analysis of the effects of federal actions on the quality of the human environment. The federal Trustees have determined it is appropriate to combine the RP and NEPA impacts analysis into one document, and have included an evaluation of alternatives for restoration under both the CERCLA NRDA regulations and NEPA in the Final RP/EA. NOAA's Companion Manual (Jan 13, 2017) for NOAA's Administrative Order (NAO) 216-6A (April 22, 2016) contains criteria for determining the significance of the impacts of a proposed action. In addition, the CEQ regulations at 40 C.F.R. § 1508.27 state that the significance of an

action should be analyzed both in terms of "context" and "intensity." The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. The criteria listed below are relevant to making a Finding of No Significant Impact, and have been considered individually, as well as in combination with the others, and include:

(1) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson Stevens Act and identified in Federal Management Plans (FMPs)?

> Response: No. As documented in the Final RP/EA, the Trustees do not expect the selected projects to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act. Any short-term and temporary localized impacts from the restoration activities, such as those associated with constructing fish passage or implementing stream restoration, would be minimized by the use of Best Management Practices (BMPs). As documented in the Final RP/EA, the Trustees expect the selected projects to result in long-term, beneficial impacts to coastal estuarine and riverine habitat and associated species by increasing the area and ecological function of estuarine, riverine and wetland habitat, including increased habitat stability.

(2) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator prey relationships, etc.)?

> Response: No. The selected projects are not expected to have any substantial impacts beyond a local level; the beneficial impacts on ecosystem function and species biodiversity would not be substantial at a regional or larger scale. As documented in the Final RP/EA, the proposed projects are expected to result in long-term beneficial impacts to plants and wildlife, providing additional habitat to support recovery of these sensitive communities and resulting in greater habitat complexity, diversity, and productivity. The projects are expected to increase the availability and quality of freshwater wetland and stream habitat and provide diadromous fish and shellfish access to important spawning and rearing habitat. As such there would be an expected increase in ecosystem function and species biodiversity. Any potential adverse impacts are expected to be minimal, short term, localized, and not expected to decrease function or species biodiversity.

(3) Can the proposed action reasonably be expected to have a substantial adverse impact on public health and safety?

> Response: No. The selected projects are not expected to have any impacts on public health and safety. The implementation of the proposed restoration projects would not present any unique physical hazards to humans.

(4) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

Response: No. The selected projects are not expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species. Overall, the selected projects are expected to benefit species through improved habitat availability and function.

(5) Are significant social or economic impacts interrelated with natural or physical environmental effects?

Response: No. The Trustees do not expect there to be significant adverse social or economic impacts interrelated with natural or physical environmental effects of the selected projects. It is anticipated that the selected projects will provide positive social interactions with the natural environment.

(6) Are the effects on the quality of the human environment likely to be highly controversial?

Response: No. The effects on the quality of the human environment from the proposed action are not highly controversial. The selected projects are anticipated to have long-term, beneficial impacts to the human environment through improved public access to natural resources and recreation. These impacts have not shown to be controversial.

(7) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas?

Response: No. The project area and associated environment includes freshwater wetlands, freshwater stream habitat and tidal brackish habitat. While these areas do contain unique characteristics, the proposed projects are expected to be beneficial to the unique ecological characteristics of the area, and improve ecological function. Furthermore, no unique or rare habitat would be destroyed due to the restoration proposed in the Final RP/EA. Additionally, the projects will not adversely affect National Historic Places or cultural, scientific, or historic resources. Consultation with the New Jersey State Historic Preservation Office pursuant to Section 106 of the National Historic Preservation Act will be undertaken as part of the project permitting process.

(8) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: No. The project area is well known to the project implementers, and project implementation techniques are not unique, controversial, or untried.

(9) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: No. The Trustees evaluated the restoration projects selected in the Final RP/EA in conjunction with other known past, proposed or foreseeable closely related projects and determined that there are no significant cumulative impacts. The projects will only temporarily impact resources during construction activities and will utilize all BMPs to minimize these impacts. Cleanup activities and other restoration projects that may occur in the vicinity would similarly incorporate BMPs. Over the mid- and long-term, the projects will be wholly beneficial with no potential for incremental contribution to significant cumulative impacts.

(10) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response: No. As noted above, the projects will not adversely affect National Historic Places or cultural, scientific, or historic resources, and all necessary consultations and concurrences are underway.

(11) Can the proposed action reasonably be expected to result in the introduction or spread of a non- indigenous species?

Response: No. Several of the selected projects expect to reduce invasive, non-indigenous species through species removal and by improving hydrologic and ecological function and stability.

(12) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

Response: No. The selected restoration projects are not expected to set a precedent for future actions that would significantly affect the human environment or represent a decision in principle about a future consideration.

(13) Can the proposed action reasonably be expected to threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment?

Response: No. Implementation of the selected projects would not require any violation of federal, state or local laws designed to protect the environment. The Trustees will ensure that the proposed restoration actions are in compliance with all relevant federal, state and local laws and regulations prior to project implementation.

(14) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Response: No. As described above and in the Final RP/EA, the Trustees evaluated the restoration projects and determined that there are no significant cumulative impacts.

DETERMINATION

Based upon an environmental review and evaluation of the "Final Restoration Plan and Environmental Assessment for the Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey", as summarized above, it is determined that implementation of the Final RP/EA does not constitute a major Federal action significantly affecting the quality of the human environment under the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). Accordingly, an environmental impact statement is not required for this action.

Christopher Doley

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Date: 2021.08.13 13:48:49 -04'00'

Chris Doley Date
Chief, Restoration Center
National Marine Fisheries Service
As designated by the Director of the Office of Habitat Conservation

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Date: 2021.08.13 15:37:53 -04'00'

Tony Penn Date
Chief, Assessment and Restoration Division
National Ocean Service
As designated by the Director of the Office of Response and Restoration

Department of Interior

U.S. Fish and Wildlife Service

Approval of the Final Restoration Plan and Environmental Assessment
Cornell-Dubilier Electronics, Inc. Superfund Site
South Plainfield, Middlesex County, New Jersey

In accordance with U.S. Department of 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 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 Cornell-Dubilier Electronics, Inc. Superfund Site is the Regional Director for the U.S. Fish and Wildlife Service's North Atlantic Appalachian Region.

By the signatures below, the Final Restoration Plan and Environmental Assessment is hereby approved.

Approved:

WENDI WEBER

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Date: 2021.08.13 16:32:26 -04'00'

Wendi Weber — Date
Regional Director
North Atlantic Appalachian Region
U.S. Fish and Wildlife Service

Concurred:

BRIANNA KENNY

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Date: 2021.07.29 10:54:43 -04'00'

Brianna C. Kenny — Date
Attorney
Northeast Region
Office of the Solicitor

Department of Commerce

National Oceanic and Atmospheric Administration

Approval of the Final Restoration Plan and Environmental Assessment
Cornell-Dubilier Electronics, Inc. Superfund Site
South Plainfield, Middlesex County, New Jersey

By the signature below, the Final Restoration Plan and Environmental Assessment for the Cornell-Dubilier Electronics Inc. Superfund Site is hereby approved.

Approved by:

Christopher Doley

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DOLEY.CHRISTOPHER.D.1365844042
Date: 2021.08.13 13:47:52 -04'00'

Christopher Doley
Division Chief
NOAA Restoration Center
U.S. Department of Commerce

Date

State of New Jersey

New Jersey Department of Environmental Protection

Approval of the Final Restoration Plan and Environmental Assessment
Cornell-Dubilier Electronics, Inc. Superfund Site
South Plainfield, Middlesex County, New Jersey

In accordance with Trustee protocol regarding documentation for Natural Resource Damage Assessment and Restoration Projects, the New Jersey Department of Environmental Protection is providing its approval of the Final Restoration Plan and Environmental Assessment for the Cornell-Dubilier Electronics Inc. Superfund Site.

Approved By:

John Sacco

19 May 2021

John Sacco
Assistant Director
Division of Parks and Forestry
New Jersey Department of Environmental Protection

Date