FINAL

IN-RIVER RESTORATION PLAN/ ENVIRONMENTAL ASSESSMENT (RP/EA)

FOR THE AMERICAN CYANAMID CO. SUPERFUND SITE, BRIDGEWATER TOWNSHIP, SOMERSET COUNTY, NEW JERSEY

October 2016

Prepared by:

National Oceanic and Atmospheric Administration

In coordination with:

United States Fish and Wildlife Service

on behalf of

United States Department of the Interior

and

New Jersey Department of Environmental Protection

TABLE OF CONTENTS

LIST OF FIGURES iii
LIST OF TABLES iv
EXECUTIVE SUMMARY ES-1
1. INTRODUCTION: PURPOSE OF AND NEED FOR RESTORATION 1-1
1.1 Description of Response Activities at the Site 1-1
1.2 Proposed Action 1-3
1.3 Purpose and Need 1-3
1.4 Natural Resource Trustees and Authorities 1-4
1.5 Determinations Supporting Development of this Restoration Plan 1-4
1.6 National Environmental Policy Act 1-4
1.7 Public Participation 1-5
1.8 Administrative Record 1-6
2. AFFECTED ENVIRONMENT 2-1
2.1 Physical Environment 2-1
2.2 Biological Environment 2-2
2.3 Cultural and Human Use Environment 2-5
2.3.1 Prehistoric 2-5
2.3.2 Historic 2-6
2.4 Socioeconomic Resources 2-7
2.4.1 Population 2-7
2.4.2 Economy, Income and Employment 2-7
2.4.3 Environmental Justice 2-7
3. ASSESSMENT OF ENVIRONMENTAL INJURIES 3-1
3.1 Delineation of Injured “Site” 3-1
3.2 Lost Resources 3-1
3.3 Direct Biological Loss 3-2
3.4 Site Recovery Monitoring and Outlook 3-2
4. RESTORATION PLAN - ALTERNATIVES CONSIDERED & PREFERRED ACTIONS 4-1
4.1 Overview of Restoration Planning Process 4-1
4.2 Objectives of Compensatory Restoration Planning for the Site 4-1
4.3 Criteria for Identification and Evaluation of Alternatives 4-1
4.4 Identified Restoration Alternatives under NEPA and Related Laws 4-6
4.4.1 Proposed (Preferred Project) Alternative 4-8
4.4.2 No Action 4-18
4.4.3 Alternatives Considered, but Rejected 4-18
5. ENVIRONMENTAL CONSEQUENCES 5-1
5.1 Preferred Alternative 5-2

5.1.1 Weston Mill Dam Removal and IFW Fish Passage Re-Design 5-2
5.1.1.1 Physical Environment 5-2
5.1.1.2 Biological Environment 5-3
5.1.1.3 Cultural and Human Use Environment 5-4
5.1.1.4 Socioeconomic Resources 5-5
5.1.1.5 Threatened and Endangered Species 5-6
5.2 No Action Alternative 5-6
5.3 Summary of Environmental Impacts 5-6
6. CUMMULATIVE EFFECTS 6-1
6.1 Past, Present, and Reasonably Foreseeable Future Actions 6-1
6.2 Cumulative Effects 6-2
6.2.2 Physical Environment 6-2
6.2.3 Biological Environment 6-2
6.2.4 Cultural and Human Use Environment 6-3
6.2.5 Socioeconomic Resources 6-3
6.3 Climate Change 6-3
6.4 Relationship of Short-term Uses and Long-Term Productivity 6-5
6.5 Irreversible and Irretrievable Commitments of Resources 6-5
7. COMPLIANCE WITH OTHER KEY STATUTES, REGULATIONS AND POLICIES …. 7-1
8. LIST OF PERSONS/AGENCIES CONSULTED 8-1
9. LIST OF PREPARERS 9-1
10. REFERENCES 10-1
APPENDIX A - PUBLIC COMMENT RESPONSIVENESS SUMMARY ON THE DRAFT RP/EA FOR THE AMERICAN CYANAMID CO. SUPERFUND SITE A-1

LIST OF FIGURES

Figure 1. Location of the American Cyanamid Company Superfund Site. 1-2
Figure 2. Raritan River and its Tributaries. 2-2
Figure 3. Approximate Location of the Weston Mill Dam and Island Farm Weir. 4-8
Figure 4. NOAA Priority Migratory Fish Passage in the Raritan Watershed. 4-10
Figure 5. Aerial View of Weston Mill Dam. 4-12
Figure 6. Ground View of Weston Mill Dam. 4-12
Figure 7. Observable Fissures and Cracks in the Face of the Weston Mill Dam. 4-13
Figure 8. Remnant Historic Mill Structure at Weston Mill Dam. 4-13
Figure 9. Vertical Datum NAVD 88. 4-14

LIST OF TABLES

Table 1. State-Listed Species Occurring in the Project Area..... 2-4
Table 2. Criteria for Development of Restoration Opportunities. 4-2
Table 3. Evaluation Criteria for Analyzing Potential Environmental Impacts. 5-2
Table 4. Summary of Impacts from the Preferred and No Action Alternative. 5-7
Table 5. Federal and State Agency Permits, Approvals, and Consultation Required for the Project. 7-1
Table 6. List of Preparers. 9-1

EXECUTIVE SUMMARY

This Final In-River Restoration Plan/Environmental Assessment (RP/EA) has been prepared by the National Oceanic and Atmospheric Administration (NOAA) in accordance with requirements of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Environmental Policy Act (NEPA), as well as other applicable Federal and state environmental laws. NOAA has prepared this document in coordination with other natural resource trustees for the Site (the "Trustees") – the United States Fish & Wildlife Service (USFWS), on behalf of the United States Department of the Interior, and the New Jersey Department of Environmental Protection (NJDEP).

The RP/EA identifies the restoration actions the Trustees plan to implement to compensate for potential injuries to the in-river resources impacted by releases of hazardous substances from the 435-acre American Cyanamid Co. Superfund Site (the "Site"), located adjacent to the Raritan River in Bridgewater Township, New Jersey. The property was used for coal tar distillation and production of various pharmaceuticals, rubber chemicals, dyes, resins, and acids from 1915 through 1999. An estimated 800,000 tons of chemical wastes were buried at the Site. In-river resources are those natural resources that occur within the surface waters and underlying sediments of the Raritan River, Cuckold's Brook, and related tributaries and do not include floodwaters, floodplains, uplands, wetlands, and riparian areas.

Releases of hazardous substances from the Site are likely to have caused past and present in-river injuries to surface water and sediment, as well as biological resources that use those habitats. Based on the type and extent of contaminant releases, it is likely that the Site has also contributed to general contamination of surface waters and sediments of the Raritan River and/or its tributaries. The Raritan River adjacent to the Site provides spawning and migratory habitat for numerous anadromous species and migratory and adult habitat for catadromous fish. Downstream estuarine areas provide critical spawning and nursery grounds for numerous marine organisms. Natural resource injuries are expected to continue until remedial actions and habitat recovery are complete.

The Preferred Alternative is removal of the Weston Mill Dam and feasibility analysis and design of improved fish passage at the Island Farm Weir ("Weston Mill Dam Removal and IFW Fish Passage Re-Design"). The Trustees also considered a "No Action Alternative" as required by NEPA, in which the Trustees would take no direct action to compensate for lost services. Removal of the Weston Mill Dam will achieve the restoration goals of restoring stream channel bathymetry and hydrology and improving water quality and habitat for fish and wildlife, with a particular emphasis on providing passage for migratory fish. The State of New Jersey lists the Weston Mill Dam as one of eight highest priority sites for possible removal. Removal of this dam will bring the base-flow of the river and feeder streams to near natural flow regime.

The Trustees have examined potential impacts of the Preferred Alternative, which are outlined in greater detail within this document. An analysis of impacts associated with project planning, engineering and design studies, impacts on the physical environment (*e.g.*, water quality, geological resources, and sediment quality), and impacts to the biological environment from field surveys and investigations and dam removal activities was included in the *NOAA Habitat Restoration Programmatic Environmental Impact Statement (PEIS*) which is incorporated by

reference into this RP/EA. No long-term adverse impacts on any State threatened or endangered species are expected from the dam removal. Likewise, no short- or long-term adverse impacts on cultural, sociological, or archaeological resources are expected.

Short-term, minor, adverse impacts are expected, but should be quite limited. For example, for a short period of time, increased noise from the project area could be expected. Minor turbidity and sedimentation in the river could be expected from the use of light machinery and equipment, stream walking, and small craft launches. In addition, short-term impacts on fish and mussels would be expected during dam removal because of the increases in turbidity, physical disturbance of aquatic habitats, temporary displacement or disturbance of fish, and indirect changes in habitat. Such short-term impacts will be addressed through the incorporation of best management practices and permitting requirements into the project design.

Conversely, long-term, beneficial impacts are expected. For example, migratory fish in the Raritan River, such as striped bass, American shad, American eel, blueback herring, and alewife, would greatly benefit from barrier removal as a result of increased mobility in the river system. While recreational benefits are not the focus of the project, the dam removal is expected to increase the public availability of recreational opportunities including fishing, birding, and boating.

The Trustees made a draft of this RP/EA available for public review and comment for a period of 30 days, beginning on May 10, 2016, and ending on June 10, 2016. A notice announcing the availability of the draft RP/EA and the public comment period was published in the Home News Tribune on May 5, 2016, the Courier News on May 10, 2016, and the Princeton Packet on May 6, 2016. Notice was also posted on the NOAA and USFWS websites. Copies of the document were available in the Franklin Township Public Library and the Manville Public Library. In addition, copies of the document were sent directly via electronic mail to 25 interested parties. Comments received on the draft RP/EA are available at https://darrp.noaa.gov/hazardous-waste/american-cyanamid and https://www.fws.gov/northeast/njfieldoffice/pdf/AmCy_draft_RP_EA_response.pdf. A summary of these comments and the Trustees' responses are appended to this RP/EA.

1. INTRODUCTION: PURPOSE OF AND NEED FOR RESTORATION

This Final In-River Restoration Plan/Environmental Assessment (RP/EA) has been prepared by the National Oceanic and Atmospheric Administration (NOAA) to present restoration actions to compensate for potential injuries to the in-river resources impacted by releases of hazardous substances from the American Cyanamid Co. Superfund Site (the "Site") located adjacent to the Raritan River in Bridgewater Township, New Jersey. In-river resources are those natural resources that occur within the surface waters and underlying sediments of the Raritan River, Cuckold's Brook (also known as "Cuckels Brook"), and related tributaries and do not include floodwaters, floodplains, uplands, wetlands, and riparian areas. NOAA has prepared this document in coordination with the other natural resource trustees (the "Trustees") – the United States Fish & Wildlife Service (USFWS) on behalf of the United States Department of the Interior (DOI) and the New Jersey Department of Environmental Protection (NJDEP).

The Natural Resource Damage Assessment (NRDA) restoration planning process can involve two components: primary restoration and compensatory restoration. Primary restoration actions are designed to assist or accelerate the return of resources and services to their pre-injury or baseline levels. In contrast, compensatory restoration actions are taken to compensate for interim losses of natural resources and services, from the time of the initial injury through return of the resources and their services to baseline levels (*i.e.*, the condition of the natural resources within the subject area prior to contamination). This document describes incident and response activities at the Site, the purpose and need for compensatory restoration, and an analysis of the affected environment. It also describes the process by which the Trustees identified compensatory restoration alternatives, and the rationale for selecting the preferred action as compensation for natural resources injuries in accordance with requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and other applicable Federal and State environmental laws. This document further describes the histories and existing conditions of the proposed project sites and identifies design and engineering techniques the Trustees considered for accomplishing the desired compensatory restoration. When identifying the Preferred Alternative, the Trustees focused on those actions that could improve water quality and habitat, while supporting populations of diadromous fish species and providing passage to historical spawning grounds in the Raritan River Watershed.

The Preferred Alternative for compensatory restoration identified by the Trustees is removal of the Weston Mill Dam and feasibility analysis and design of improved fish passage at the Island Farm Weir ("Weston Mill Dam Removal and IFW Fish Passage Re-Design"). This Alternative is the Proposed Action subject to Federal review requirements under the National Environmental Policy Act (NEPA). As such, this RP/EA also evaluates the potential environmental impacts of the Preferred Alternative, any reasonable alternatives that might satisfy the purpose and need of the project, and the No Action alternative, as required under NEPA.

1.1 DESCRIPTION OF RESPONSE ACTIVITIES AT THE SITE

The 435-acre American Cyanamid Company Superfund Site (the "Site") is located along the Raritan River in Bridgewater Township, Somerset County, New Jersey. The Site is located

approximately 14 miles upstream of the confluence of the South River at Sayreville, New Jersey (Figure 1).

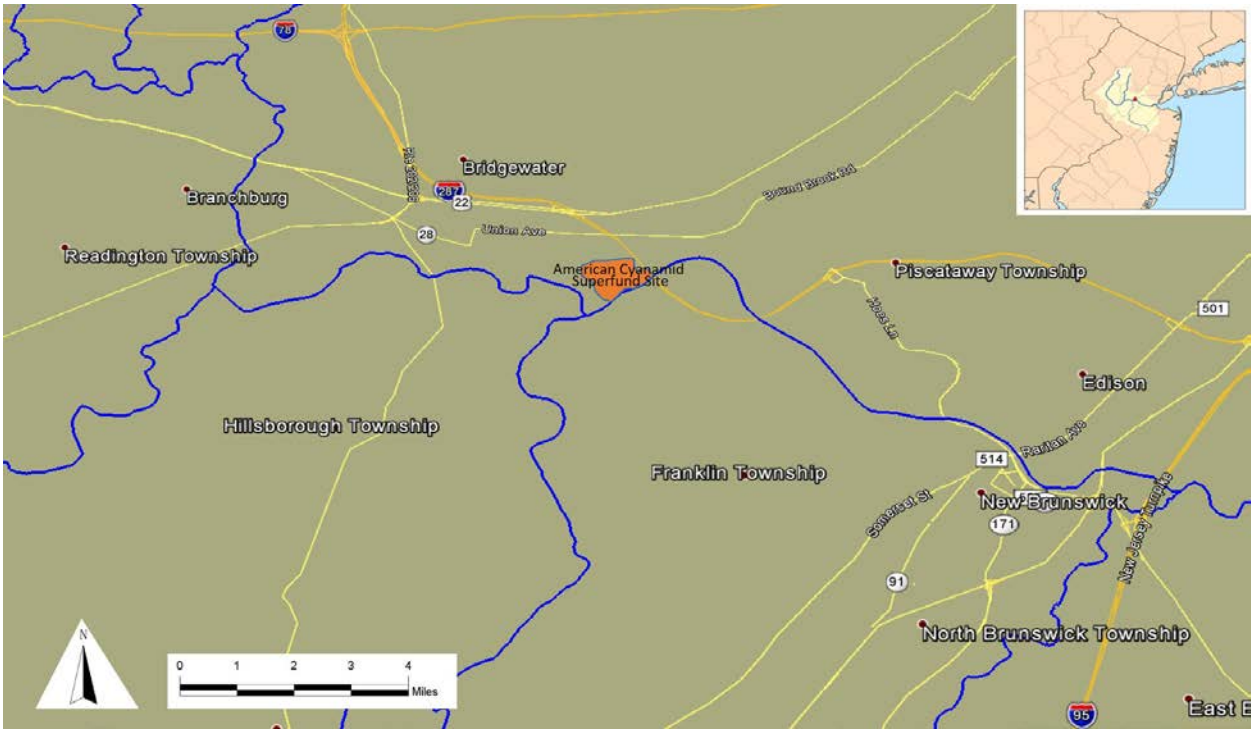


Figure 1. Location of the American Cyanamid Company Superfund Site.

From 1915 through 1999, the Site was used for coal tar distillation and manufacturing of various products including pharmaceuticals, rubber chemicals, dyes, resins, and acids. An estimated 800,000 tons of chemical wastes were buried at the Site. Unlined impoundments were used for treatment and storage of waste and wastewater until 1979, when an incinerator was put into operation for disposal of newly produced sludge. Some of the impoundments located in the floodplain may have released contaminants to the Raritan River during extreme flood stages. Groundwater under the area has been contaminated with volatile organic compounds, semi-volatile organic compounds (SVOCs), and metals. Cuckold's Brook, which traverses the Site and flows into the Raritan River, was used as a conduit for untreated liquid waste from the early 1900s through the 1930s. A dispersant weir was constructed adjacent to the facility in the late 1930s to increase the mixing of the plant's untreated effluent into the Raritan River. A liquid waste treatment system, which included neutralization and settling prior to discharge to Cuckold's Brook and the Raritan River, began operation in 1940. In response to complaints regarding odor, color, and impacts to fish, several enhancements to the waste treatment system were implemented from the 1950s through the 1970s. Dye manufacture ceased in 1982, and the Site was placed on the National Priority List in 1983. Direct discharge to the Raritan River ended in 1985 and all manufacturing at the facility ceased in 1999.

The primary contaminants of concern are metals and SVOCs including polycyclic aromatic hydrocarbons and polychlorinated biphenyls (PCBs). A 2005 Baseline Ecological Risk

Assessment for the Site summarized previous data and evaluated ecological exposure to, and risk of ecological effects from, Site-related contaminants. Concentrations of metals in Raritan River sediment and water exceeded levels considered protective of ecological receptors. Concentrations of mercury, chromium, arsenic, lead, PCBs, and benzyl 2-ethylhexyl phthalate in Cuckold's Brook sediment exceeded screening levels. Portions of Cuckold's Brook were considered impaired based on benthic macroinvertebrate survey data. Chronic effects were observed in Cuckold's Brook sediment bioassays, but not in Raritan River bioassays. Contamination from the Site also has likely contributed to the general degradation of the Raritan River.

The in-river habitats of concern include the surface waters and sediments of the Raritan River, Cuckold's Brook, and related tributaries adjacent to, and downstream of, the Site. The Raritan River adjacent to the Site provides spawning and migratory habitat for anadromous species such as alewife, blueback herring, striped bass, rainbow smelt, and American shad; and migratory and adult habitat for catadromous fish such as the American eel. Downstream estuarine areas provide critical spawning and nursery grounds for numerous marine organisms.

The U.S. Environmental Protection Agency (EPA) issued a Record of Decision (ROD) in September 2012 (referred to as the "Site-wide remedy"), which addresses Site-wide soils, groundwater, and all but four of the impoundments. The Site-wide remedy includes *in-situ* solidification/stabilization and/or the installation of engineered capping systems to address several impoundments and Site soils, as well as the collection and treatment of Site-related contaminated groundwater. A groundwater removal system, including a collection trench, containment wall, and treatment system, has been constructed to address benzene seeps along the banks of the Raritan River.

1.2 PROPOSED ACTION

The Proposed Action for compensatory restoration identified by the Trustees is removal of the Weston Mill Dam and a feasibility analysis and design of improved fish passage at the Island Farm Weir ("Weston Mill Dam Removal and IFW Fish Passage Re-Design").

1.3 PURPOSE AND NEED

Purpose: The purpose of the proposed restoration action is to compensate the public for injury and losses to natural resources in the Raritan River caused by the release of hazardous substances from the Site.

Need: In order to meet this purpose, the Federal Trustees need to evaluate restoration actions that will compensate for losses of natural resources, and the services provided by those resources, that have both occurred in the past and that will occur in the future.

1.4 NATURAL RESOURCE TRUSTEES AND AUTHORITIES

This RP/EA was prepared jointly by the Trustees pursuant to their respective authority and responsibilities under CERCLA, 42 U.S.C. §9601, *et seq*.; the Federal Water Pollution Control Act, 33 U.S.C. §1251, *et seq*. (also known as the Clean Water Act [CWA]), and other applicable Federal or State laws, including Subpart G of the National Oil and Hazardous Substances Contingency Plan (NCP), at 40 C.F.R. §§300.600 through 300.615, and DOI's CERCLA NRDA regulations at 43 C.F.R. Part 11. NJDEP also acts pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 *et seq*. and the Water Pollution Control Act, N.J.S.A. 58:10A-1 *et seq*. and pursuant to the authority vested in the Commissioner of the Department by N.J.S.A.13:1D-1 *et seq*. and the Spill Compensation and Control Act, and duly delegated to the Assistant Commissioner, Natural and Historic Resources and the Administrator pursuant to N.J.S.A.13:1B-4.

1.5 DETERMINATIONS SUPPORTING DEVELOPMENT OF THIS RESTORATION PLAN

The Trustees have determined that the requisite conditions were met to justify proceeding with NRDA and restoration planning. Natural resource injuries have likely resulted from releases related to the Site; remedial cleanup response actions are not expected to completely address natural resource injuries and losses; and feasible restoration actions exist to compensate for the lost use of trust resources. Thus, the Trustees acted appropriately in proceeding with the damage assessment and restoration planning process.

1.6 NATIONAL ENVIRONMENTAL POLICY ACT

Actions undertaken by the Trustees to restore natural resources or services under CERCLA and other Federal laws are subject to the National Environmental Policy Act (NEPA), 42 U.S.C. §4321 *et seq.*, and the regulations at 40 C.F.R. Parts 1500 through 1517 guiding its implementation. 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 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.

Council on Environmental Quality (CEQ) Regulations (40 C.F.R. 1502.4) encourage agencies to prepare broad EISs that encompass program areas. These evaluations are referred to as Programmatic EISs. CEQ also encourages agencies to incorporate the information and analyses included in programmatic documents into project specific analysis by reference. This is referred to as "tiering off" of the programmatic document (40 C.F.R. 1502.20). In June 2015, the NOAA Restoration Center prepared a *Final Programmatic Environmental Impact Statement for habitat restoration activities implemented throughout the coastal United States* (PEIS) (National

Oceanic and Atmospheric Administration, 2015) for the project types that it routinely undertakes. Projects that enhance or restore passage for migratory fish, such as the projects selected for this RP/EA have been evaluated and are included in the PEIS.

This RP/EA summarizes the current environmental setting, describes the purpose and need for restoration actions, and identifies the selected actions. Prior to drafting the RP/EA, the selected project was screened through the PEIS evaluation process to determine if the anticipated impacts of the proposed projects were consistent with the impacts that have been determined under the PEIS. The PEIS assessed dam removal projects for their applicability and potential impacts on the quality of the physical, biological and cultural environment.

The PEIS was noticed in the Federal Register and was reviewed with public participation in the decision-making process leading up to agency adoption. Information used to make a threshold determination as to whether preparation of an EIS or EA is required is included in the PEIS. The PEIS can be found at: *http://www.habitat.noaa.gov/pdf/NOAA_Restoration_Center_Final_PEIS.pdf*. The relevant parts of the PEIS are incorporated by reference into this RP/EA.

Following the opportunity that the Trustees provided for public input on their analyses, a FONSI was issued and concludes all requirements for compliance with NEPA by the Trustees.

1.7 PUBLIC PARTICIPATION

The Trustees prepared this RP/EA to provide the public with information on the in-river natural resource injuries and service losses assessed in connection with the Site, the restoration objectives that have guided the Trustees in developing this plan, the restoration alternatives that were considered, the process used by the Trustees to identify Preferred Alternative, and the rationale for its selection. Public review of the 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.

The Trustees made a draft of this RP/EA available for public review and comment for a period of 30 days, beginning on May 10, 2016, and ending on June 10, 2016. A 7-day extension of this comment period was granted and written comments were accepted through June 17, 2016. A notice announcing the availability of the Draft RP/EA and the public comment period was published in the Home News Tribune on May 5, 2016, the Courier News on May 10, 2016, and the Princeton Packet on May 6, 2016. Notice was also posted on the NOAA and USFWS websites (on May 5 and May 6, 2016, respectively). Copies of the document were available in the Franklin Township Public Library and the Manville Public Library. In addition, copies of the document were sent directly via electronic mail to 25 interested parties on May 6, 2016.

The Trustees carefully considered all comments received during the public comment period while preparing this final RP/EA. All written comments received on the draft RP/EA are available at https://darrp.noaa.gov/hazardous-waste/american-cyanamid and https://www.fws.gov/northeast/njfieldoffice/pdf/AmCy_draft_RP_EA_response.pdf. The comments received are summarized and the Trustees' responses to those comments are provided in an appendix to this RP/EA.

1.8 ADMINISTRATIVE RECORD

The Trustees have maintained records documenting the information considered and actions taken by the Trustees during this restoration planning process. These records collectively comprise the Trustees' administrative record supporting the RP/EA. These records are available for review at the office of:

Ms. Reyhan Mehran
Regional Resource Coordinator
NOAA Assessment Restoration Division
290 Broadway, 20th Floor
NY, NY 10007
212-637-3257 voice
Reyhan.Mehran@noaa.gov

Arrangements must be made in advance to review or to obtain 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.

2. AFFECTED ENVIRONMENT

This chapter presents a brief description of the physical, biological, and cultural environment for the waterways and ecosystems adjacent to and in the vicinity of the Site, as required by NEPA (42 U.S.C. Section 4321, *et seq.*). The information in this section, together with other information in this document, provides the basis for the evaluation of the potential environmental impacts of the alternative restoration actions described in Section 6 of this RP/EA. Resource areas described in this section correspond to the range of resource areas addressed in Section 4 of this RP/EA.

2.1 PHYSICAL ENVIRONMENT

Proposed restoration activities will occur in the Raritan River Basin, which drains approximately 1,100 square miles (699,542 acres) and includes parts of seven counties (Hunterdon, Mercer, Middlesex, Monmouth, Morris, Somerset and Union) and all or part of 100 municipalities in north-central New Jersey, approximately midway between New York City and Philadelphia. The Raritan flows generally eastward into Raritan Bay (Figure 2). The Raritan River Watershed is the largest river basin located entirely within the State of New Jersey. The north and south branches of the Raritan River originate at more than 700 feet above sea level in the NJ Highlands and join to form the main stem of the Raritan River at elevation 48 feet above sea level at the juncture of the Somerset County Piedmont communities of Bridgewater, Hillsborough, and Branchburg Townships. From there the Raritan River travels another 30 miles to the coastal plain and drops to sea level to meet Raritan Bay. A third major tributary, the Millstone River, emerges from the coastal plain in Mercer and Monmouth Counties and travels north into the Piedmont region to join the Raritan River at Raritan River Mile 22.0. The three major watersheds contained in the Raritan River Watershed are the Upper Raritan, Lower Raritan, and Millstone which together contain approximately 225 miles of stream tributaries – most notably the Black River, Lamington River, Neshanic Creek, Rockaway River, Stony Brook, Bound Brook, Lawrence Brook, and South River.

The lower portion of the Raritan River, between the towns of Bridgewater and Bound Brook, have historically been heavily impounded by a series of dams – the uppermost at Head Gates, followed by Robert Street, Nevius Street, Manville Weir, Island Farm Weir (IFW), and Calco. The Robert Street, Nevius Street and Calco dams were removed by the NJDEP between 2011 and 2013 under a State NRDA compensation agreement. The Manville Weir was removed by a coalition of non-profit organizations in partnership with the USFWS. This portion of the river is still impounded by the Head Gates Dam and IFW.

The lower Millstone River has been impounded by a series of dams from Princeton to Manville NJ – the uppermost at Carnegie Lake, followed by Kingston Mill, Blackwells Mills and Weston Mill. A series of studies conducted by the Stony Brook-Millstone Watershed Association assessed the feasibility of removing the Blackwells Mills and Weston Mill dams. All four dams in the lower Millstone remain in place to date.



Figure 2. Raritan River and its Tributaries.

2.2 BIOLOGICAL ENVIRONMENT

Downstream of the IFW, the Raritan River contains numerous migratory fish species. Upstream of the IFW to the Head Gates Dam on the Raritan River and the Weston Mill Dam on the Millstone River, smaller numbers of migratory fish species are found, including American shad (*Alosa sapidissima*), blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), sea lamprey (*Petromyzon marinus*), gizzard shad (*Dorosoma cepedianum)*, American eel (*Anguilla rostrata*), and striped bass (*Morone saxatilis*).

The NOAA Habitat Conservation Division (HCD), in its role as the designated resource agency under the Magnuson Stevens Act of 1996, has designated the tidally influenced lower Raritan River and Raritan Bay as areas of Essential Fish Habitat (EFH) for a variety of NOAA Trust Resources. The HCD, in consultation with the Trustees, has determined that waters impounded by the IFW and the Weston Mill Dam, both located in non-tidal portions of the Raritan River, are not considered EFH under the law.

Five freshwater mussel species have been identified in the Raritan and Millstone Rivers and their tributaries, including Eastern elliptio (*Elliptio complanata*), Eastern floater (*Pyganodon cataracta*), alewife floater (*Anodonta implicata*), Eastern pond mussel (*Ligumia nasuta*), triangle floater (*Alasmidonta undulata*), and the non-native Asian clam (*Corbicula fluminea*). None are considered threatened or endangered or State-listed species of special concern. The Asian clam is an invasive introduced species (Conserve Wildlife Foundation of New Jersey 2015).

Large numbers of birds use and migrate along the Raritan River, including raptors such as red tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperii*), broad-winged hawk (*Buteo platypterus*), sharp-shinned hawk (*Accipiter striatus)*, osprey (*Pandion haliaetus*), and bald eagle (*Haliaeetus leucocephalus*). Songbirds such as warblers, orioles, and blackbirds, as well as waterfowl (ducks and geese) and shorebirds also utilize the Raritan and Millstone River corridor. Suburban and rural shrubby areas and riparian marshes and meadows in the vicinity of Hillsborough, Bridgewater, and Manville provide nesting habitat for a variety of species, including flycatchers, swallows, thrushes, woodpeckers, and warblers. Shallow water wetlands, shoals and flats provide foraging habitat for wading birds such as great egret (*Ardea alba*), snowy egret (*Egretta thula*), great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), black-crowned night heron (*Nycticorax nycticorax*), and yellow-crowned night heron (*Nyctanassa violacea*). Other wildlife utilizing habitat adjacent to the Millstone and Raritan Rivers include species such as white-tailed deer (*Odocoileus virginianus*), turkey (*Meleagris gallopavo*), beaver *(Castor canadensis)*, opossum (*Didelphis virginiana*), and coyote (*Canis latrans*).

The Raritan River watershed includes the Delaware and Raritan (D&R) Canal State Park, which contains a ribbon of riparian forests and meadows, and Duke Farms, a 2000-acre managed wildlife sanctuary and green infrastructure education center. The D&R Canal State Park contains and protects 3,037 acres within the watershed. Many of the protected areas are located near the Site and include wetlands, riparian forest, and minor tributaries such as Royce Brook and Cuckold's Brook.

Federal Threatened and Endangered Species

The Trustees have coordinated with NJDEP's Natural Heritage Program (NHP), USFWS, and NOAA's National Marine Fisheries Service (NMFS) to request information on any known occurrences of Federal endangered, threatened, proposed, or candidate species of flora or fauna or any critical habitats known to support those species within the vicinity of the proposed restoration project area surrounding the Weston Mill Dam ("project area"). The USFWS New Jersey Field Office (NJFO) website was reviewed to determine whether any Federally-listed species may occur in the project area.

Through coordination with the USFWS, the Trustees identified one Federally-listed (threatened) species in Somerset County, New Jersey, the northern long-eared bat (*Myotis septentrionalis*). A maternity colony of the northern long-eared bat has been documented within Franklin Township and Manville Borough. However, there are no known occurrences of northern long-eared bat roosts in the vicinity of the identified restoration project sites so no further coordination with USFWS was required.

Correspondence with NOAA NMFS confirmed that no threatened or endangered species under its jurisdiction are expected to occur within the proposed project area. In accordance with the Fish and Wildlife Coordination Act, NMFS lists the estuarine portion of the Raritan River as an important migratory pathway for anadromous alewife and blueback herring. These species are listed by NOAA as species of concern.

State Listed Species

The Trustees also coordinated with NJDEP's NHP regarding the presence of State threatened or endangered Species in the vicinity of the proposed restoration projects. The consultation indicated that little blue heron (*Egretta caerulea*), snowy egret, bald eagle, and peregrine falcon are known to occur within the proposed restoration area (Table 1). The little blue heron and snowy egret are considered State species of special concern. Species of special concern warrant attention because of evidence of decline, inherent vulnerability to environmental deterioration, or habitat modification that could result in their becoming a State-listed threatened species. The bald eagle and peregrine falcon have been removed from the Federal Endangered Species List.[1]

Table 1. State-Listed Species Occurring in the Project Area.

Common Name	Scientific Name	State Status
Great Heron	*Ardea herodias*	SC
Glossy Ibis	*Plegadis falcinellus*	SC/S
Little Blue Heron	*Egretta caerulea*	SC
Bald Eagle	*Haliaeetus leucocephalus*	E
Peregrine Falcon	*Falco peregrinus*	E
Snowy Egret	*Egretta thula*	SC/S

Source: New Jersey Natural Heritage Program, 2009

Notes:

E= Endangered Species - those species whose prospects for survival in New Jersey are in immediate danger because of a loss of or change in habitat, over-exploitation, predation, competition, disease, disturbance, or contamination.

SC= Special Concern - those species that warrant special attention because of some evidence of decline, inherent vulnerability to environmental deterioration, or habitat modification that would result in their becoming a Threatened species. This category would also be applied to species that meet the foregoing criteria and for which there is little understanding of their current population status in the state.

S= Stable Species - those species whose population is not undergoing any long-term increase/decrease within its natural cycle.

/= Dual Status - the first status refers to the state breeding population and the second status refers to the migratory or winter population.

Although the State-listed (endangered) least tern (*Sterna antillarum*) and the State-listed (threatened) yellow-crowned night heron and black-crowned night heron (breeding populations only) were not identified by NJDEP as inhabiting the project area, these species have been observed foraging within the nearby Raritan watershed. Black-crowned night heron forage in rivers and marshes and along the edges of ponds and creeks. Within riverine environments,

[1] This decision was based on USFWS data that indicate these species have recovered in sufficient numbers throughout most of the country. The bald eagle and the peregrine falcon are still listed as endangered species by the State of New Jersey due to the concerns of human disturbance and the threat of contaminants in the environment.

black-crowned night heron will roost in nearby trees and forage in shallow stream beds, small tributary channels, flats, and vegetated marsh.

Likewise, great blue heron is a known visitor to the project area and is listed as a NJ State species of special concern with respect to the breeding population. Other State species of special concern that may occur in the vicinity of the project area are Fowler's toad (*Bufo woodhousii fowleri*), American kestrel (*Falco sparverius*), least bittern (*Ixobrychus exilis*), least flycatcher (*Empidonax minimus*), and sharp-shinned hawk. No State threatened or endangered plant species are known to occur within the project vicinity (New Jersey Department of Environmental Protection, 2012; 2013; 2014; New Jersey Division of Fish and Wildlife 2015a; b).

2.3 CULTURAL AND HUMAN USE ENVIRONMENT

The Weston Mill Dam is visible or accessible to some extent from the D&R Canal State Park. The Weston Mill Dam has not been incorporated into the park boundary, although it is anticipated that the Weston Mill location will be incorporated at some point in time, having been purchased by the NJ Green Acres Program for designation as open space.

The prominent public cultural and recreational feature of the project site is the D&R Canal State Park and towpath. It is used by scores of bikers, hikers, joggers, fishermen, and passive recreational users everyday throughout the year. The Weston Causeway (Wilhousky Street) Bridge ("Wilhousky Bridge") is located upstream of, and over-looks, the dam. It was refurbished in 2014. There is a narrow secondary channel on the upstream side of the Wilhousky Bridge on the northwestern side of the river in Manville that contains a second dam with an adjustable stop log spillway currently set at a vertical elevation slightly higher than the Weston Mill Dam. Its spillway is designed to accept and capture water during higher stream flows. The bridge provides a scenic overlook of all structures, including the foundational elements of the original mill. The dam can be accessed from the bridge using one of several paths created by fishermen and other recreational users.

The D&R Canal State Park towpath lies to the southeast out of view of the dam and the Millstone River. It is not utilized to access the dam as it is separated by riparian forest and bottom land. The route along the towpath is undeveloped except for the path itself.

2.3.1 Prehistoric

Pre-historic sites have been identified in the Weston Mills Phase 1A Cultural Resource Assessment (Hunter Research, 2011) and confirmed by the State Historic Preservation Office (SHPO). The first of three nearby sites is approximately one-half mile downstream of the project area, approximately 800 feet west of the river. This site was investigated as part of sanitary sewer improvements in the Borough of Manville. Shovel testing yielded lithic debitage, mostly from the plowzone, with a low artifact density that was considered non-diagnostic. An additional site located approximately one-half mile east of the project area was surface collected in 1990, yielding a single black chert triangular projectile point and one fragment of thermally fractured rock that was considered non-diagnostic. A third site is located in agricultural fields approximately one mile east of the project area and was surface collected in 1978 yielding unspecified prehistoric artifacts in the plowzone. Only the first of these three sites is located in a

topographic situation that is similar to those present within the project area (*i.e.*, river terraces along the Millstone River). Because of this similarity of setting, the probability is considered moderate that there could be prehistoric archaeological resources identified within the project area representing activity similar in character to those previously identified.

2.3.2 Historic

Historic maps consistently show the area as undeveloped until 17th century cultivation by European settlers. In early colonial times, the lands in the vicinity of the project sites were farmed, fished, and hunted. It was not until the early 18th century that dams began to be built and water power was harnessed for agricultural grain processing. Later in the 18th and 19th centuries, mill power was used with other kinds of pre-industrial revolution activities. There are no other active structures on the property associated with the Weston Mill Dam. The D&R Canal is the most significant cultural resource in the area. The D&R Canal was added to the National Register of Historic Places (NRHP) in 1973. When the canal was used for transportation, New Jersey's landscape was mostly rural and its primary business was agriculture.

The remnant foundation of the Weston Mill, constructed around 1740, is an inactive structure. Subsurface investigations were requested by the SHPO to identify significant cultural resources within the project area to determine whether there might be a remnant timber crib dam from an earlier time period. Coring did not reveal an underlying feature below the 1930s era concrete dam.

The following is excerpted from the Cultural Resource Assessment of the Weston Mill Dam, completed in March 2011 (Hunter Research, 2011):

> *The Weston Mill site includes the archaeological remains of a gristmill, sawmill, dam, and associated waterpower features. The mill seat was established circa 1740 and remained in operation until the mid-20th century. The mill is particularly well known in local history as the site of a Revolutionary War skirmish between British and American forces on January 21, 1777. The American forces drove off a British foraging party and captured a large quantity of supplies.*
>
> *The mill site retains a strong above-ground expression. The dam although repaired with concrete in the early 20th century, appears to retain earlier masonry elements underneath the concrete. Remnants of the mill's foundation, turbine pit, metal turbine, and stone walls survive at the east end of the dam. The mill site is judged to have a high potential of yielding archaeological data significant to our understanding of milling practices, the evolution of the mill site, and the landscape at the time of the Revolutionary War skirmish. It has the potential to be eligible under Criterion D, and possibly Criterion A.*
>
> *Based on local environmental characteristics and documented patterns of prehistoric sites in the Lower Millstone Valley, the project site is judged to have a moderate potential for yielding significant prehistoric archaeological resources in the terraces and floodplain to either side of the dam if in-ground work is required in those locations.*

2.4 SOCIOECONOMIC RESOURCES

2.4.1 Population

As of the 2010 United States Census, Somerset County's population was 323,444, increasing by 25,954 (+8.7%) from 297,490 in the 2000 Census and retaining its position as the State's 13th-most populous county. As of the 2014 Census estimate, the county's population was 332,568 (an increase of 2.8%). Somerset County is part of the New York Metropolitan Area. The county seat is Somerville. The most populous municipality was Franklin Township, with 62,300 residents at the time of the 2010 Census. Hillsborough Township, covering 55.00 square miles (142.4 km^2), is the largest land area of any municipality in the county (U.S. Census Bureau, 2015).

2.4.2 Economy, Income and Employment

By median household income, Somerset County, as of the 2000 Census, was the seventh wealthiest county in the United States with a median household income of $76,933 and third in New Jersey behind Hunterdon County at $79,888 and Morris County at $77,340. By median family income, Somerset County was the fourth wealthiest county in the United State at $90,655 and second in New Jersey behind Hunterdon County at $91,050. By per capita income, Somerset County ranked seventh at $37,970 and highest in New Jersey. The Bureau of Economic Analysis ranked the county as having the 11th highest per capita income of all 3,113 counties in the United States (and the highest in New Jersey) as of 2009. In 2012, 49.8 percent of Somerset County residents were college graduates – the highest percentage in the State (U. S. Census Bureau, 2015).

2.4.3 Environmental Justice

Executive Order 12898, entitled “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, disproportionately 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 are no potentially sensitive EJ communities within Somerset County (U.S. Environmental Protection Agency, 2015).

3. ASSESSMENT OF ENVIRONMENTAL INJURIES

This section describes the Trustees' assessment strategy, the approach used to estimate the in-river ecological service losses related to the Site, and the results of these assessments. These assessments were restricted to areas within the Raritan River, Cuckold's Brook, and related tributaries adjacent to and downstream of the Site and do not include potential ecological service losses related to the Site that may have occurred, or may still be occurring, elsewhere. The term ecological services means the "physical and biological functions performed by the resource including the human uses of those functions. These services are the result of the physical, chemical, or biological quality of the resource" (43 C.F.R. §11.14[nn]).

3.1 DELINEATION OF INJURED "SITE"

Site-related contamination has likely caused past injury to habitat in the Raritan River and Cuckold's Brook adjacent to and downstream of the Site, based on sediment concentrations of Site-related contaminants, primarily metals and SVOCs, exceeding concentrations considered protective of ecological receptors. Only in-river injuries were delineated for this RP/EA; potential injuries to all other natural resources were not evaluated. The extent of injuries within the Raritan River was estimated based on the spatial extent of depositional areas located adjacent to and downstream of the Site, the type and nature of the contaminants of concern, and the length of time over which contaminants were released to habitats of concern.

Approximately 49 acres of depositional sediment is located proximate to the Site. These areas are likely to have accumulated contaminants until the facility ceased discharging untreated and treated wastes to the Raritan River in 1985 and until releases of contaminated groundwater were controlled in 2012. These parameters were used to conduct an analysis of a reasonable worst case scenario of in-river injury.

3.2 LOST RESOURCES

The NRDA was directed at identifying the type and degree of injuries sustained by natural resources within the Raritan River and Cuckold's Brook as a result of the releases of hazardous substances from the Site. This was done both to support development of a proposed settlement relating to in-river natural resource damages and to guide and direct the Trustees in choosing, and then implementing, appropriate restoration. The injury assessment process can involve both injury evaluation and resource and service loss quantification.

To evaluate potential injury to in-river resources, the Trustees reviewed existing information, including Site remedial investigation data and published scientific literature. The Trustees evaluated injury to in-river natural resources based on information from these sources with an understanding of the ecological functions of the aquatic ecosystems at and near the Site. The Trustees considered multiple factors when making this evaluation, including, but not limited to:

- Specific natural resources and ecological services of concern;
- Evidence indicating contaminant exposure, pathway and injury;
- Mechanisms by which injury occurred;

- Probable type, degree, and spatial and temporal extent of the injuries; and
- Types of restoration actions that are appropriate and feasible.

For each potentially affected resource category, the Trustees determined whether an injury has occurred or is likely to occur, identified the nature of the injury, and identified a pathway linking the injury to releases at or from the Site.

The injury assessment and restoration planning occurred simultaneously, utilizing a restoration-based approach. Under such an approach, the focus of the assessment is on quantifying the injuries and/or losses in natural resources and ecological services in ways that facilitate the identification of restoration projects that will compensate the public with the same level, type, and quality of resources and ecological services that were lost. This restoration-based assessment approach is consistent with the CERCLA NRDA regulations, which allow restoration planning to be included as part of the Assessment Plan Phase, where sufficient data are available to support their concurrent development (43 C.F.R. §11.31).

3.3 DIRECT BIOLOGICAL LOSS

Releases are likely to have caused past and present injuries to surface water and biological resources, as defined in the CERCLA NRDA regulations (43 CFR §11.14). Natural resource injuries also include the habitats of those biological resources. Concentrations of Site-related contaminants, including metals, in Raritan River sediment and surface water adjacent to the Site, have been documented to exceed levels considered protective of ecological receptors. Concentrations of mercury, chromium, arsenic, lead, PCBs, and benzyl 2-ethylhexyl phthalate in Cuckold's Brook sediment exceeded screening levels. Portions of Cuckold's Brook were considered impaired based on benthic macroinvertebrate survey data. Chronic effects were observed in Cuckold's Brook sediment bioassays.

Based on the type and extent of contaminant releases from the Site, it is likely that the Site has contributed to general contamination of surface waters and sediments of the Raritan River and/or its tributaries. The Raritan River adjacent to the Site provides spawning and migratory habitat for anadromous species, such as alewife, blueback herring, striped bass, rainbow smelt, and American shad; and migratory and adult habitat for catadromous fish, such as American eel. Downstream estuarine areas provide critical spawning and nursery grounds for numerous marine organisms. Natural resource injuries are expected to continue until remedial actions and habitat recovery are completed.

3.4 SITE RECOVERY MONITORING AND OUTLOOK

An EPA ROD, referred to as the "Site-wide remedy," was issued in September 2012, and addresses Site-wide soils, groundwater, and all un-remediated impoundments with the exception of Impoundments 1, 2, 15, and 16. Impoundments 1 and 2 are currently being evaluated as part of a focused feasibility study. Off-site recycling of iron oxide material in Impoundments 15 and 16 was completed in early 2015 and closure activities for those impoundments are ongoing. The Site-wide remedy includes *in-situ* solidification/stabilization and/or the installation of engineered capping systems to address three contaminated impoundments and all Site soils as well as the collection and treatment of Site-related contaminated groundwater. A groundwater removal

system, including a collection trench, containment wall, and treatment system was completed in May 2012 to address benzene seeps along the banks of the Raritan River. The control of contaminated groundwater discharging to the Raritan River and the remediation of Site-wide soils and impoundments are expected to protect in-river trust resources from future injury, if the remedy is properly implemented and monitored.

4. RESTORATION PLAN - ALTERNATIVES CONSIDERED & PREFERRED ACTIONS

4.1 OVERVIEW OF RESTORATION PLANNING PROCESS

The strategy of the restoration planning process is to identify restoration alternatives that are appropriate to restore, rehabilitate, replace or acquire the equivalent of the in-river natural resources and their services injured or lost as a result of releases of hazardous substances from the Site to the river. For this case, the Trustees determined that cleanup actions undertaken at the Site will be sufficient to protect in-river natural resources in the vicinity of the Site from further or future harm and to allow in-river natural resources to return to pre-injury or baseline conditions within a reasonable period of time. Under these circumstances, it was unnecessary for the Trustees to consider or plan for in-river primary restoration actions. Accordingly, this RP/EA only addresses the need for compensatory restoration.

4.2 OBJECTIVES OF COMPENSATORY RESTORATION PLANNING FOR THE SITE

Project opportunities near the Site boundaries are limited, due to the availability of undeveloped land tracts within close proximity to the injured resources in the rural and suburban corridor. However, priority was given to nearby projects that could enhance or restore habitat and compensate the public for past injuries to natural resources protected by the Trustees. In accordance with NRDA regulations, the Trustees identified and evaluated project alternatives to compensate for in-river natural resource injuries, including a "No Action Alternative." The Trustees visited these project sites and consulted with individuals who suggested or were familiar with potential projects. The restoration project alternatives identified by the Trustees are restoration projects that aim to compensate for injuries to in-river natural resources at the Site. The restoration project alternatives were evaluated utilizing the criteria outlined below (Section 4.3). The Trustees assessed project alternatives intended to compensate for impacts to natural resources located in the Raritan River, including Federal species of concern, such as American shad, alewife, blueback herring, American eel, and other biological resources. The assessment incorporated the results of a thorough, multi-year investigation - the Raritan River Fish Passage Initiative (RRFPI) - that identified and classified potential habitat restoration projects that would target these resources. American shad, alewife, blueback herring, and American eel preferentially use larger river systems with specific benthic condition and structure. Populations of these species have been declining in the Raritan River, as determined by NJDEP surveys.

The Trustees identified feasible, cost-effective projects with a high likelihood of success that would directly benefit these species and their habitat.

4.3 CRITERIA FOR IDENTIFICATION AND EVALUATION OF ALTERNATIVES

Criteria for restoration opportunities that were originally developed by the RRFPI – a joint State, Federal, and public stakeholder initiative – were adopted and amended for use by the Trustees

(Table 2). The criteria for the RRFPI were developed to prioritize potential actions having benefits to in-river resources within the Raritan River watershed, specifically focusing on benefits to fish species for spawning and rearing and access to critical food resources in the first year of life. Project evaluation consisted of a two-step process incorporating Threshold Criteria and Evaluation Criteria. Additional criteria were developed that are specific to the stated goals and objectives of the Trustees.

Table 2. Criteria for Development of Restoration Opportunities.

Threshold Criteria

Criteria	Description
Legality: Compliance with applicable Federal and State Laws	Complies with applicable/relevant Federal, State, local laws and regulations. Project must be legal and must not endanger public health and safety. Is this work potentially permitable based on the current regulatory framework, policies, rules, and requirements?
Not Otherwise Required	Projects that are otherwise required by an existing government program, Federal or State law, regulation, court mandate, *etc.* (*e.g.*, mitigation under CWA Section 404, pollution control required by CWA) would be excluded from consideration.

Evaluation Criteria

Criteria	Description	Evaluation
Scope of Benefits/ Ecological Leverage	Consider how accurately the benefits can be quantified. Examples of some questions which will be considered are: Will successful completion of the project result in a significant benefit to a broad spectrum of the river's ecology? Will failure to implement preclude any specific meaningful improvement to the river's ecology? Will the benefits be local or regional? Will the restoration project promote other environmental benefits? What is the scope of the potential human benefit?	High priority should be given to projects which will benefit a broad spectrum of the river's ecology and/or will enable other environmental or human use benefits. Special consideration should be given to projects which would benefit rare, threatened or endangered species or communities. Projects for which ecological or human-use benefits are speculative should be rejected or given very low priority.

Criteria	Description	Evaluation
Design and Engineering Technical Capabilities and Efficacy	Consider the likely efficacy of a project. Examples of some questions which will be considered are: How certain is the planned project to succeed? Are there ways to measure success? Do the elements of the project have a reasonable chance of successful completion in an acceptable period of time? Are the technology or management skills necessary for implementing the project well known? Are there known biological, physical, or chemical limitations and uncertainties that may require actions beyond technical engineering capabilities?	Projects which have a low probability of success should be rejected or given very low priority. Projects that propose using an unproved, yet promising, technique should be implemented on a pilot basis and fully evaluated prior to full-scale implementation. Similarly, high priority should be given to those projects which must be accomplished as the first in a sequence of projects.
Restoration is Self-Sustaining	Consider the degree to which further human intervention or support is necessary to achieve success or to sustain the function of a restoration action over time.	A preference will be given to projects that are self-sustaining.
Cost Effectiveness	Consider the cost-effectiveness of proposed projects. Examples of some questions which will be considered are: Is the project long-lived? Will maintenance be required? What are transaction costs? These questions are most critical for high-cost projects.	Projects with a high cost-to-benefit ratio will be given low priority or implemented in a phased approach.
Consistency with Community Objectives & Existing Plans	Consider whether the restoration project is consistent with existing Federal, State, or local management plans. Consider the degree to which a given restoration alternative is consistent with known or anticipated community objectives, particularly with respect to the use and enjoyment of natural resources. Community objectives are derived from relevant community goals or planning documents as well as from information provided by county and local governments and the public.	A preference will be given to projects that are consistent with community objectives and existing Federal, State, or local management policies, goals and objectives and plans.

Criteria	Description	Evaluation
Competing Uses for the Resource	Consider whether the goal of fish passage and habitat enhancement meets with competing uses that are in the public realm. Will the restoration project interfere with operations of public and private utilities, or other uses for the resource that rely upon the existing dam structure? Consider the degree to which a given restoration alternative is compatible with existing uses and can be conformed so as not to interfere with those uses. To what extent can a removal action provide a reasonable alternative to the competing use demand?	A preference will be given to projects which offer no impact to competing uses in the public interest or can mitigate successfully for the loss of other competing uses of the resource connected with dam operations.
Consistency with State, Federal, Local and non-governmental land holding resource management goals	Consider the degree to which restoration projects promote their resource management priorities, goals, and objectives.	A preference will be given to support achievement of resource management goals.
Site Availability	Consider the extent to which the site is available to a restoration action. Consider the ability to control the action at the site by land owner consent and agreement Consider the ability to physically access site and technical limitations of site access (*e.g.*, safety considerations where site is remote, or where a network of road, rail or river transport makes access unavailable or hazardous).	A preference will be given to sites which are readily available and accessible.

NRDA Specific Criteria, Additional Criteria Relevant to the NRDA Process

Criteria	Description	Evaluation
Relevance to NRDA Process: Nexus to Injured Resources	Projects to be undertaken through a NRDA action must have an identified nexus to specific injuries, and address resources injured by an unspecified contaminant or services lost because of injuries, in the Raritan River environment. The project must meet the requirement of CERCLA and its implementing regulations that all sums recovered shall be used only to restore, replace or acquire the equivalent of the injured natural resources and the services the resources provide.	Highest priority will be given to projects with greatest nexus to injured resources. Proximity to injury shall be a contributing factor.
Relevance to NRDA Process: Location	Evaluation of projects to be undertaken through a NRDA action must consider the geographic proximity to the injured resources. Nevertheless, consideration will be given to factors, such as the life cycle requirements of migratory species that may support undertaking restoration outside of the Raritan-Millstone River basin. Similarly, habitat manipulation or other types of projects may be desirable in tributaries or portions of the River upstream of contaminant sources.	Generally, highest priority should be given to those projects which are in, on, or near the injured resources.
Potential for Additional Natural Resource Injury	Consideration of projects to be undertaken through a NRDA action must consider the extent to which implementation may adversely affect other natural resources.	Projects that may adversely affect other natural resources may be rejected or given a lower priority.

Criteria	Description	Evaluation
Environmental justice and environmental equity	Evaluation of projects to be undertaken through a NRDA action must consider the relative benefits to low-income populations and racial or ethnic minorities, as stated in Executive Order 12898. Further, when losses resulting from resource injuries occur disproportionately to these populations, as for example may be the case with subsistence fishing losses, restoration programs should target benefits to these populations.	A preference may be given to projects that target benefits to low-income populations and racial or ethnic minorities that have suffered losses from natural resource injuries.
Natural Recovery	Evaluations of projects to be undertaken through a NRDA action must consider rates of natural recovery. Natural recovery is the amount of time needed for injured resources to recover if no restoration, rehabilitation or acquisition of equivalent resources is undertaken beyond response actions.	Restoration actions that address injuries associated with a slower rate of natural recovery should be given higher priority. Higher priority will also be given to projects that address stressors that slow or preclude natural recovery.

Notes: Adopted March 2009, last amended May 15, 2015. Project selection criteria have been developed by the RRFPI prior to project screening.

4.4 RESTORATION ALTERNATIVES IDENTIFIED UNDER NEPA AND RELATED LAWS

NEPA requires that any Federal agency proposing a major action consider reasonable alternatives to the proposed action. This Section provides a summary of the alternatives considered by the Trustees. This description of restoration alternatives considered is also provided in accordance with CERCLA and the NCP, to provide information on how proposed restoration will compensate the public for environmental service and human use losses.

To warrant detailed evaluation by the Trustees under NEPA, an alternative must be reasonable and meet the identified purpose and need. Screening criteria are used to determine whether an alternative is reasonable. The following discussion identifies the screening criteria used in this RP/EA to evaluate whether an alternative is reasonable; evaluates various alternatives (including the Preferred Alternative) against the screening criteria and identifies those alternatives found to be reasonable; and identifies those alternatives found not to be reasonable and the basis for that finding. Alternatives considered, but found not to be reasonable, are not evaluated in detail in this RP/EA.

The Trustees considered two alternatives for detailed analysis: 1) the Proposed Action (Preferred Alternative); and 2) No Action (or maintaining existing municipal management with no project implementation). Additional project alternatives that were considered, but rejected, are outlined in Section 4.4.3.

In developing project alternatives, the Trustees examined the findings of the RRFPI Database and Criteria Development and Selection[2]. (For more information on the criteria considered, see Table 2). The Trustees determined that two barriers within the RRFPI presented ideal opportunities for evaluation under this RP/EA. The RRFPI's highest priority (first tier) and priority (second tier) dams focus on the major contributing rivers to the watershed having the greatest locational nexus to the injury described in Section 1 of this Restoration Plan.[3]

When considering project alternatives, the Trustees also evaluated possible impacts -- so that unnecessary adverse impacts would be avoided, while achieving the underlying purpose of planned restoration. A complete discussion of the ecological, economic, and social impacts of the alternatives are discussed in Section 5.

Screening Criteria – To be considered "reasonable" for purposes of this RP/EA, the Trustees considered the benefits likely to result from the implemented project. The Selected Alternative would:

- Directly enhance fish passage in the Raritan River, which will directly compensate for the losses of natural biological functions in the Raritan River.

- Increase public availability of recreational opportunities -- including fishing, birding, and boating.

- Provide or enhance ecological services in the following ways:

[2] Potential fish passage enhancement and restoration opportunities were first presented to the public by NOAA and NJDEP at the RRFPI Stakeholders Workshop Agenda held in Trenton, NJ in October 2008. At that initial stakeholders meeting, NOAA and NJDEP presented an agenda of potential actions to mitigate for the dwindling numbers of migratory fish in the Raritan River. One of the chief reasons given for this loss was access to historic spawning habitat, primarily in the non-tidal freshwater mid- to upper-reaches of the Raritan River and its major tributaries. The techniques for supplying passage to these waters discussed and considered at that meeting were dam removal, dam notching, partial removal, and technical fish pass (ladders, rock ramps, bypass channels [aka natural-like fishways]). Dam removal projects additionally restore, enhance or rehabilitate river system functionality (enhance water quality and benthic communities; re-establish normal river hydrology and sediment flow). Potential projects were presented in a draft document referred to as the RRFPI Database and Criteria Development and Selection. The RRFPI identified goals and objectives of the initiative and developed criteria for determining the level of priority for barriers within the watershed that present obstacles to residential and migratory fish passage. 3Three of the highest priority dams identified by the RRFPI have already been removed from the Raritan River based on the recommendations issued and amended since the October 2008 initiation. Under an NRDA Consent Order the NJDEP worked with a Potentially Responsible Party to remove the Calco Dam (2011), Robert Street Dam (2012) and Nevius Street Dam (2013) as compensation for in-river and ground water injuries.

[3] Three of the highest priority dams identified by the RRFPI have already been removed from the Raritan River based on the recommendations issued and amended since the October 2008 initiation. Under an NRDA Consent Order the NJDEP worked with a Potentially Responsible Party to remove the Calco Dam (2011), Robert Street Dam (2012) and Nevius Street Dam (2013) as compensation for in-river and ground water injuries.

- Dam removal typically increases water flow, mixing of the water column, and sediment transport, which in turn decrease summer water temperatures, increase dissolved oxygen concentrations, and create riffle fields, bars, and deep pools.

- Improved water quality and increased heterogeneity of bottom topography benefit riverine benthic invertebrates -- including fresh water clams, mussels, and aquatic insects. These organisms improve the health of the river and are important food resources for wildlife, including shorebirds and waterfowl (which are enjoyed by birders), as well as bottom feeding fish such as quillbacks, yellow perch, and catfish (which are favorites of anglers).

- Improved habitat and access for forage fish is expected to improve the health of fish that consume them, such as largemouth bass, striped bass and hybrid bass. Forage fish also are an important component of the diet of fish-eating birds such as bald eagles, osprey, cormorants, and long-legged wading birds.

After considering project alternatives and their impacts, the Trustees determined that the removal of the Weston Mill Dam and technical fish passage alternatives analysis and design at IFW were reasonable actions that have an appropriate nexus to in-river injury.

4.4.1 Proposed (Preferred Project) Alternative

The proposed Preferred Alternative consists of actions that would contribute to improvement of fish passage in the Raritan River. As noted, the Trustees considered restoration of fish passage to directly compensate for the losses of natural biological functions in the Raritan River. Fish passage restoration would best be accomplished by removal of the Weston Mill Dam combined with design and feasibility analysis of fish passage improvement at the IFW ("Weston Dam Removal and IFW Fish Passage Re-Design"; Figure 3).



Figure 3. Approximate Location of the Weston Mill Dam and Island Farm Weir.

The IFW Fish Passage Re-Design component of the Preferred Alternative is not evaluated within this RP/EA because there is no plan to implement improved fish passage at the IFW at this time. As a result, this document does not analyze the creation of the fish passage; that action will be assessed in the future under an additional NEPA analysis once design studies are completed.

However, the Preferred Alternative includes an evaluation of alternatives to the existing fish passage structure followed by feasibility analysis and design of a preferred alternative. The technical surveys and assessments performed for the feasibility study and design will characterize the environment, determine the best restoration approach from an engineering standpoint, and predict and compare expected results and conditions with the project and without it. Such activities are a mixture of research into historic conditions, modeling of hydrologic response to the project, and creating maps and scale drawings of the project site. This may also include minimally intrusive field activities such as drilling into the soil or sediment with a soil auger, vibra-core, or hand probe to remove core samples for grain size or chemical analysis; determining existing and predicted groundwater levels and elevations; and performing geotechnical evaluation. These activities may also include archaeological studies at and around the project site, which often involve digging test pits, and collecting and documenting historic features.

Weston Mill Dam

Weston Mill Dam (also known as, Weston Causeway Dam) is located on the Millstone River at Lat/Long 40.5303°/ '-74.5883°. The Weston Mill Dam is listed as one of twelve highest priority or priority sites (first and second tier) for fish passage restoration based on the RRFPI Criteria for Selection of priority actions (Figure 4). The recommended action under the RRFPI is removal. The Trustees evaluated this action and found that the project may contribute to satisfactory compensation for in-river injuries related to hazardous substance releases.

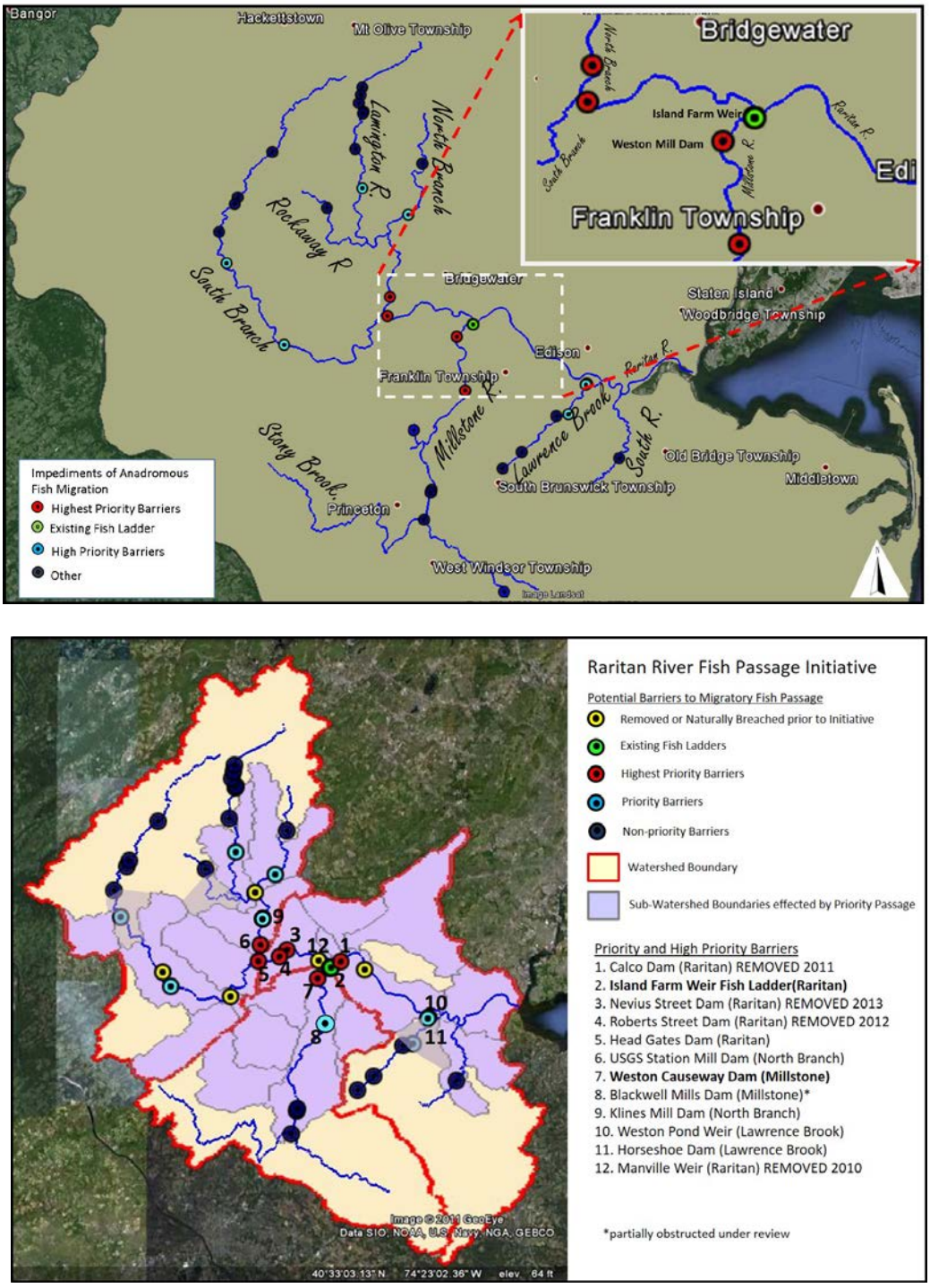


Figure 4. NOAA Priority Migratory Fish Passage in the Raritan Watershed. Top: Location of Preferred Alternative Project Areas in relation to other fish barriers. Bottom: Raritan River Fish Passage Initiative Priority Barriers in the Raritan River Watershed.

Potential impacts of the dam removal must be addressed through technical engineering and design, including studies prior to removal to evaluate feasibility of the proposed project in accordance with the goals and objectives of this RP/EA. Analysis and design will be completed as required to obtain all applicable permits and to support evaluation under NEPA. The Trustees will evaluate the potential impacts of removal when the technical analysis and studies are completed. If, during this time, any important environmental issues are found that were not analyzed in this EA, supplemental NEPA will be prepared to address these issues.

Weston Mill Dam – Present-Day Observable Condition

Prior to developing this RP/EA, the owner of the Weston Mill Dam, NJDEP, permitted direct field investigations related to the dam construction and structural conditions. Construction materials, current condition, the presence of historic materials, and hydrological conditions affecting the dam structure were assessed. Some preliminary data presented in MWH Global (2015) are summarized below.

The Weston Mill Dam is located approximately 1.5 miles upstream of the Millstone River's confluence with the Raritan River. The nearest downstream dam is the IFW, located at the confluence. The IFW is the first dam on the Raritan/Millstone and is a partial barrier to passage, due to an inefficient fish ladder present there. The Weston Mill Dam is the second, and a full, barrier to fish passage, except during extreme high river flows. The next barrier, the Blackwell Mills Dam, is located 6.0 miles upstream.

The Weston Mill Dam is located 70 feet directly downstream of Wilhousky Bridge on the Millstone River in Manville. It is a run-of-the-river dam, believed to have been built circa 1740 when the original Weston Mill was constructed. The Weston Mill property includes the ruins of a gristmill, a sawmill, and associated waterpower features. The mill remained in operation until the mid-20th century. The dam is thought to have been replaced or rebuilt on various occasions, most recently in the 1930's when substantial concrete repairs were made to both the mill foundation and the dam structure. The materials and manner of construction of the dam are consistent with the technology available at that time.

The dam is approximately 112.5 feet long and has a concrete apron, ranging in thickness from 5 to 6.75 inches, which extends from 19.5 to 21.5 feet upriver of the dam crest. The apron is partially detached from the dam at the present time and is extensively undermined by underflow currents. The dam currently spans the River and during typical flows impounds between two and three feet of water. In addition to obstructing fish passage, the dam has accelerated the degradation of the mill ruins, particularly when large trees float down river and impact the riverward mill wall. The dam also presents a safety hazard for recreational boaters. Recent photographs of the Weston Mill Dam are shown in Figures 5-8.

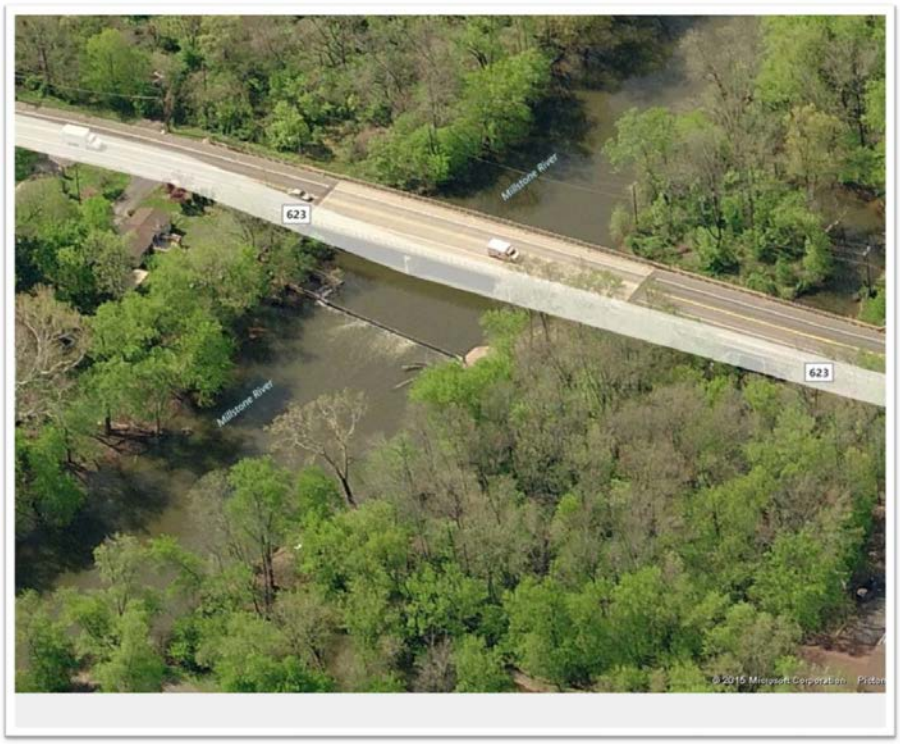


Figure 5. Aerial View of Weston Mill Dam.
Photo was taken on an above average river flow and river banks are not visible.



Figure 6. Ground View of Weston Mill Dam.



Figure 7. Observable Fissures and Cracks in the Face of the Weston Mill Dam.



Figure 8. Remnant Historic Mill Structure at Weston Mill Dam.

The dam has undergone a significant subsidence in its middle section. Near the western edge of the dam, a large fissure is evident (Figure 7). Both the eastern and the western dam spillway heights are now noticeably elevated relative to the center of the structure; under typical summer and early autumn flow conditions (<100 cubic feet per second), water only flows over the eastern-middle section of the dam. The probable cause and physical evidence of this subsidence is clearly evident.

On the eastern edge of the dam, a large breach is evident, and the dam's subsidence has pulled the structure apart and away from the riverward wall of the former Weston Mills foundation (Figure 8).

Lastly, several notable whirlpools have developed at the contact between the dam crest and apron, and one can observe through cracks in the dam apron that water is rushing under the apron at a high velocity. This underflow is occurring about 12-inches below the top of the apron. Subsequent coring work has revealed that there are notable void spaces under the apron where the bedding support material (rocks and gravel) has been completely scoured out.

According to the recently completed survey of the dam crest, the effect of the structural fissure, the breach between the dam and the former Weston Mill foundation, and underflow of the dam has lowered the dam's spillway elevation by approximately 2.15 feet to date (Figure 9; Station 90 elevation).

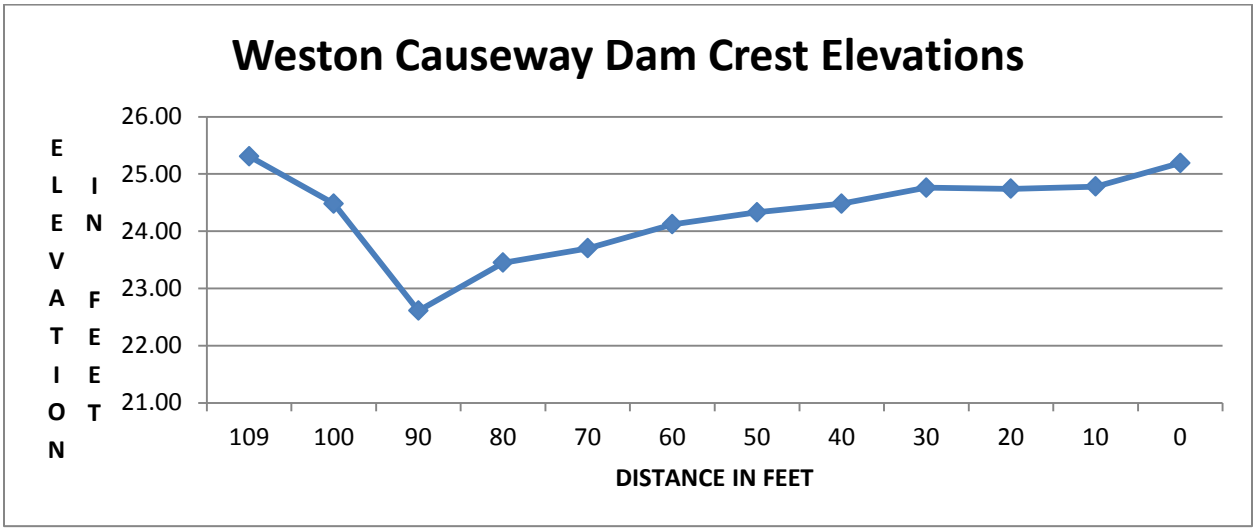


Figure 9. Vertical Datum NAVD 88.

Weston Causeway Dam – Concrete Coring Results

The final evaluation conducted on the Weston Causeway Dam that would inform the methodology of deconstruction and SHPO considerations was a coring effort that was completed on August 18-19, 2015. The effort had several objectives, including determining the thickness of the concrete apron behind the dam crest and identifying what materials underlie that apron; however, it was also useful in ascertaining whether any of the timber cribbing that was presumably used to construct the original dam was present underneath. A total of five locations were cored across the entire length of the dam.

At all locations, it was evident that the concrete was poured onto a black angular gravel substrate bedding material. There was no discernable pattern across the cores; welded wire was present primarily at very shallow depths (between ⅝ and 2-inches below the top of the apron) and it appears that the wire was not laid completely horizontal prior to the concrete pour. The presence of the welded wire is an indication the angular aggregate concrete is less than 90 years old because this welded wire application was first applied in road pavements in the 1920s and didn't become general practice for building highways and other concrete foundations until thereafter.

In terms of the RRFPI experience in dam construction in the Raritan River watershed, such welded wire was not present in the aprons of the Nevius Street Dam (*circa* 1902) or the original Robert Street Dam (*circa* 1915) but was present in the Calco Dam (1938) and the reconstructed Robert Street Dam (1964). As such, the 1935 construction date of the present-day concrete Weston Causeway Dam would be consistent with the expanded use of welded wire in concrete.

In several of the core holes at a depth of approximately 12-13 inches beneath the top of the apron, a high velocity current was present. In all the core holes and as mentioned above, loosely-consolidated black angular gravel fill was present. This type of gravel, along with concrete and rock rubble, was encountered down to a depth of 25 to 34 inches from the top of the apron (the deepest that exploratory holes could be advanced). Historical timber cribbing or boulders were not encountered in the upper three feet of any of the core holes.

Cultural and Historic Preservation

Historic ruins of the Weston Mill lie adjacent to the project site. A key part of the project involves the various technical approaches that could be applied to carefully separate the portion of the dam that is pulling down the riverward wall of the mill. The concrete dam and the I-beams that are encased in the dam crest that tie back into the mill wall are part of the 1935 reconstruction of the dam and it appears fairly straightforward to sever the I-beams to detach the dam crest from the mill. This effort, in addition to saw-cutting the dam apron to detach it from the riverward wall of the mill upstream of the dam crest, would also serve to terminate the outward stresses on the mill wall. The visible and ongoing degradation of the dam is having deleterious effects on the mill ruins. The dam's removal is essential to preserving what is left of the mill ruins.

Activities Associated with Dam Removal

The Weston Mill Dam Removal will first undergo technical analysis, study and design during the initial phase of the project. Project planning, feasibility studies, engineering and design studies, and permitting activities will be conducted before implementing this restoration project. The technical surveys and studies will characterize the environment, determine the best restoration approach from an engineering standpoint, and predict and compare results and conditions with the project and without it. Activities include research into historic conditions, modeling of hydrologic response to the project, and creating maps and scale drawings of the project site. This may also include minimally intrusive field activities such as drilling into the soil or sediment with a soil auger, vibra-core, or hand probe to remove core samples for grain size or chemical analysis; determining existing and predicted groundwater levels and elevations; and performing a geotechnical evaluation. These activities may also include archaeological studies at and around the project site, which often involve digging test pits, and collecting and documenting historic features. Some data collection may also require permits, for example when collecting data related to threatened and endangered species. If, during this time, any important environmental issues are found that were not analyzed in this EA, supplemental NEPA will be prepared to address these issues.

Once the studies are conducted and the data are analyzed engineering and design will be completed and all applicable permit applications will be submitted. We anticipate that technical

studies and design engineering will be conducted throughout the fall and winter of 2016 and spring of 2017.

Removal of the Weston Mill Dam would likely follow a similar process to that used for several prior dam removals throughout the eastern United States. The removal of the Weston Mill Dam will almost certainly consist of construction activities that will temporarily transform the area into a safe and secure construction zone with minimal impacts to the existing environmental conditions. The likely activities that can be anticipated during construction are as follows:

- Placement of temporary fill into the river and surrounding areas for equipment access, isolating the work area, and dewatering the stream channel. Precautionary water control, dewatering, and passive sediment removal could be necessary as part of the dam removal to reduce sediment resuspension and transport downstream during construction and removal activities.

- Implementation procedures that reduce scour and time the slow release of sediments so as to protect existing infrastructure (*i.e.*, Wilhousky Bridge) while allowing for fish passage, sediment transport, and improved water quality.

- Physical removal and disposal of the barrier materials themselves, using heavy machinery to remove the dam in a piecemeal fashion so as to prevent rapid sediment release. The entire dam would be removed with heavy equipment (*e.g.*, an excavator equipped with a hydraulic hammer).

- Bank Restoration and Erosion Reduction. Once the removal is complete, any temporary water control structures would be removed and the natural flow of the river would be restored using aquatic habitat restoration techniques including stream bank restoration and stream bed re-contouring (if necessary).

- Reconstruction of the channel to match the existing channel upstream and downstream of the former barrier site.

- Restoration of surrounding habitat on both sides of the barrier, including planting of native wetland plants and seeding of vegetation cover to stabilize banks and monitoring and removing growth of invasive species, if needed.

- Installing public educational signage to address cultural and historic events and architectural structures that are associated with a dam or areas in the vicinity.

- Protecting historic and cultural resources in river (foundation structure of the former Weston Mill).

- Ensuring that existing licenses for use of the Millstone River as a water supply can be sufficiently maintained under the new condition.

The following describes the likely dam removal sequencing. First, the dam will be notched to allow incremental release of impounded water and passive release of sediment from behind the dam. With the impoundment lowered, the dam would be removed in stages so as to continue the slow timed release of the impounded water. With the dam removed entirely down to its below-grade footing, the upstream and downstream channel would be realigned and regraded to achieve channel alignment. Natural rocks and cobbles will be re-distributed in the river to achieve this re-alignment as needed. Sediment, rock and cobbles that are not needed for bank stabilization, channel realignment and stream grading will be staged for carting and disposal. The demolition waste would be taken to nearby recycling facilities or landfills that have capacity and capability of handling the materials.

It is estimated that it would take 100-200 hours to remove the dam with an excavator with a jackhammer attachment, or a hydraulic hammer and another excavator with a bucket attachment. Additional equipment needed for dam removal would include standard highway dump trucks, articulated dumpers for in-river work and handheld power tools. The Trustees do not anticipate the use of explosives.

Based on two rounds of sediment sampling and analysis, no contaminated sediment removal will be associated with these dam removal restoration actions. Upon completion of the dam removal, the access road (if used) would be deconstructed and riprap soft-engineering techniques would be used along the channel to provide stability. Following dam removal, in-stream, stream bank, and riparian restoration would be conducted to restore the natural channel design and promote channel stability. To minimize water pollution threat caused by potential leaks during construction, zinc-free anti-wear oil would be used to minimize the consequences of a potential leak. This oil is non-toxic and is biodegradable, posing no serious threat to fish or aquatic species (Bennink, 2013).

A second pollution concern during construction is that of air pollution, primarily the emissions of $PM_{2.5}$, PM_{10}, SO_2, NOx, and CO (California Department of Fish and Game and U.S. Department of the Interior, 2012).In order to limit the amount of pollution, construction equipment will be required to meet respective model year emission standards, depending on the type of equipment (*i.e.* off-road construction equipment will meet model year 2015 standards for diesel engines, on-road equipment will meet model year 2000 standards, and trucks will meet model year 2010 or later standards) (CDFG and U.S. DOI, 2012). Many mitigation options could be used to decrease noise levels during the project. To the extent practical, construction would be restricted to occur during daylight hours, newer machinery would be used, and noisy operations would take place concurrently so as to limit the amount of time of high noise levels (U.S. Department of Transportation, 2006). Lastly, the construction would be timed to occur during low-flow periods so that water velocities are not too great and downstream impacts avoided (American Rivers and Trout Unlimited, 2002).

Prior to dam removal, all required Federal and State permits would be obtained. In NJ, the State assumes the role of issuing and administering all Federal permits. New Jersey must issue a CWA Section 401 Water Quality Certification, stating that the proposed dam removal will not violate any water quality standards. There are numerous Federal permits and consultations required for dam removal. Compliance with CWA, Section 404 Permit is determined by NJDEP Division of Land Use Regulation for all activities involving the discharge of dredged or fill materials. State

regulatory authorities will determine if a Rivers and Harbors Act, Section 10 permit is applicable, since the Raritan River has both navigable and non-navigable waters under the CWA.

The NOAA Habitat Restoration PEIS describes activities of barrier removal (in Section 2.2.2.3.1). The actions proposed for the Weston Mill Dam removal are consistent with those described in the PEIS.

4.4.2 No Action

Under the No Action Alternative the Trustees would not undertake compensatory restoration actions. Dam removal would not be completed. The Raritan River would remain blocked to fish passage at Weston Mill Dam. If no maintenance or repair activities were undertaken to maintain the Weston Mill Dam, it is conceivable that eventually natural processes of erosion would breach the structures and allow fish passage. However, it could be several years before that might happen. If the barriers were breached by natural processes, there would be no controls to the release of ponded water or sediment.

Under the No Action Alternative, no restoration, rehabilitation, replacement, or acquisition actions would occur. If the No Action Alternative is selected, there would be no restoration or replacement of the lost resources and their services and the public would not be made whole for past injuries from releases from the Site. The No Action Alternative would not meet the Eligibility Criteria (Section 4.3; Table 2).

- Relationship to Injured Resources and Services – The No Action Alternative would not provide for restoration, replacement, enhancement or acquisition of resources.
- Consistency with the Trustee Restoration Goals – The No Action Alternative would not provide for restoration of injured biological resources.
- Compliance with Laws – The No Action Alternative would not be in compliance with CERCLA NRDA regulations.

The No Action Alternative is retained, as required by NEPA, to present a comparison of the impacts of the other alternatives to the status quo.

4.4.3 Alternatives Considered, but Rejected

In addition to the projects included in the Preferred Alternative, the Trustees considered several other projects that had been listed by RRFPI and evaluated in the RRFPI Database. Of the projects identified as Tier 1 (highest priority), in addition to the Weston Mill Dam Removal and the IFW Fish Passage Re-Design, seven blockages have already been removed by either natural processes or planned removal (Fieldville Dam, Calco Dam, Manville Weir, Nevius Street Dam, Robert St Dam, Neshanick Weir, and Darts Mill Weir). The remaining Tier 1 projects either were not feasible (*e.g.* unwilling owners) or provided fewer benefits to target resources than the project selected. These include the Rockafellow Dam, the Mill Street USGS Station Dam, and the Klines Mill Dam. Because the remaining Tier 1 projects were not feasible or provided less environmental benefit to target resources than the selected alternative, it was determined that

these alternatives did not meet the Screening Criteria laid out in Section 4.4.--- Therefore, these alternatives were not carried forward for additional analysis.

The alternatives outlined above were selected for evaluation in order to compensate for in-river injuries with nexus to in-river habitats and resources. Other types of projects that could have been considered as compensation for in-river injuries are those that restore services and use to impaired rivers. Such projects may include, but are not limited to, riparian floodplain forests and grassland restoration or protection, hydrological reconnection (*i.e.*, stream channel re-alignment or tide gate/culvert repair or replacement), stream bank stabilization, or establishment of access points with small craft launch areas. The Trustees examined the recent and historic restoration projects that have been accomplished on the Raritan and Millstone Rivers and concluded that fish passage best meets the required nexus to the injury.

The IFW is listed as one of eight highest priority sites (first tier) for enhancement or restoration of fish passage based on the RRFPI Criteria for Selection of priority actions. The Trustees have determined that feasibility analysis and design studies would be required prior to making a determination on feasibility of fish passage improvements at IFW. This would require an evaluation of alternatives to the existing fish passage structure followed by feasibility analysis and design. The Trustees have determined that a complete technical analysis must be performed to identify feasible alternatives to the existing fish passage structure at the IFW. Therefore, fish passage improvement at the IFW is not an action to be considered at this time and therefore was not carried forward for detailed evaluation. However, the Preferred Alternative (Section 4.4.1) includes the IFW Fish Passage Re-Design.

5. ENVIRONMENTAL CONSEQUENCES

In this chapter, the Trustees describe the reasonably foreseeable consequences of implementing the alternatives proposed in Section 4 on the physical, biological, and human environment described in Section 2. The following sections discuss the potential environmental impacts from the compensatory restoration projects anticipated under the Preferred Alternative and the No Action Alternative. However, potential impacts will also be re-examined during the design of the dam removal and related work, though the Trustees do not foresee significant issues. If new information becomes available to indicate a need for further analysis, the public will be informed as warranted.

Potential impacts would be reduced in several ways. First, the Trustees' project evaluation criteria (Table 2) encourage the selection of projects that do not negatively impact the environment. The criteria for the RRFPI were developed to prioritize potential actions that could be taken within the Raritan River watersheds and that benefit in-river resources, specifically focusing on benefits to fish for spawning and rearing, and access to critical food resources in the first year of life.

The Trustees would employ a variety of mitigation measures to reduce the minor short-term environmental impacts of the proposed restoration action. Mitigation measures include avoiding impacts by not undertaking a certain action or parts of an action, limiting the degree or magnitude of the action, reducing or eliminating the impact over time by preservation and maintenance actions, and rectifying or compensating for the impact by repairing, rehabilitating, restoring, or replacing the affected environment (40 C.F.R. §1508.20). The Trustees would use adaptive management and mitigation techniques to minimize impacts and will conduct monitoring and rectify problems as they arise.

Impact Assessment Methodology

The evaluation criteria for potential impacts to physical, biological, socioeconomic, and cultural resources from the implementation of the Preferred Alternative are described in Table 3. These criteria include the type, intensity, and duration of potential impacts. Additionally, impacts are described in terms of whether they are a direct or indirect result of the Preferred Alternative. *Direct impacts* would be an immediate result of project-related activities (*e.g.*, direct mortality of species or removal of vegetation and habitat) and may be temporary (reversible) or permanent (irreversible). Most direct effects are confined to the project footprint, but some (*e.g.*, noise) may extend beyond the project boundary. Indirect impacts would be spatially removed from project-related activities, or occur later in time, but are reasonably certain to occur. Indirect effects tend to be diffuse, resource-specific, and less amenable to quantification or mapping than direct effects.

Table 3. Evaluation Criteria for Analyzing Potential Environmental Impacts.

Type	
Beneficial	The impact would result in some level of environmental improvement.
Adverse	The impact would result in some level of environmental degradation.
Intensity	
Negligible	No impact to resources or the impact would be at or below levels of detection.
Minor	A detectable change to resources; however, the impact would be small, localized, and of little consequence.
Moderate	A readily apparent change to the human environment which would not be major.
Major	A substantial change to the character of the resource over a large area.
Duration	
Short-term	Occurs only during the period dam removal or fish passage installation activities.
Long-term	Continues after the period of dam removal or fish passage installation activities.

5.1 PREFERRED ALTERNATIVE

5.1.1 Weston Mill Dam Removal and IFW Fish Passage Re-Design

A full analysis of impacts associated with project planning, engineering, and design studies was included in the PEIS and is incorporated by reference into this RP/EA. The PEIS describes the actions associated with Feasibility Study, Engineering and Design under Section 2.2.1.1, *Planning, Feasibility Studies, Design, Engineering, and Permitting***.** Section 2.2.2.3.1 of the PEIS, *Dam and Culvert Removal, Modification, or Replacement*, directly addresses the impacts of physical barrier removal from rivers and is applicable to the removal of the Weston Mill Dam. Fish passage improvement at the IFW is not an action to be considered at this time and therefore the IFW Fish Passage Re-Design component of the Preferred Alternative is not carried forward for detailed evaluation in this section.

5.1.1.1 Physical Environment

A full analysis of impacts to the physical environment from environmental analysis and preparation of design and engineering plans was included in the PEIS and is incorporated by reference into this RP/EA. Short-term, minor, adverse impacts on the physical environment (*e.g.*, water quality, geological resources, and sediment quality) would be expected from the use of light machinery and equipment during surveys and field investigations of the Weston Mill Dam.

Minor turbidity and sedimentation in the Millstone River would be expected during minimally invasive field investigations that involve stream walking and small craft launches. No long-term, moderate, beneficial impacts on the physical environment would be expected from the field surveys and investigations.

Short-term, minor to moderate adverse impacts on sediments, water quality, and water resources would be expected from the removal of the dam from sedimentation and erosion. These impacts would occur only during the dam removal activities as the result of using heavy machinery and construction equipment. A full analysis of impacts to the physical environment from dam removal activities was included in the *NOAA Habitat Restoration PEIS* and is incorporated by reference into this RP/EA.

Long-term, major, beneficial impacts on the physical environment would be expected from the removal of the Weston Mill Dam. Dams can cause rivers to form large pools and change the natural flow of the river. Barriers can cause sediments to deposit into deep pools and then release large amounts of sediment downstream, which inundate habitats during extreme events such as torrential rain or barrier failure. Removal of barriers would eliminate this particular sediment bank and would result in a net decrease of total sediment load available in the river. Barrier removal would also eliminate the stilling basin effect and continue to allow the water to scour sediment and allow the establishment of cobble or gravelly sediment substrates, which are preferred habitats for most native organisms.

Long-term, moderate, beneficial impacts to water resources would be expected from the removal of the Weston Mill Dam. Impoundments cause water temperatures to increase and due to evaporation are a major source of water loss in the environment. Removal of the dam would restore the river and feeder streams to a nearly natural flow regime.

5.1.1.2 Biological Environment

A full analysis of impacts to the biological environment from field surveys and investigations and dam removal activities was included in the PEIS and is incorporated by reference into this RP/EA. Short-term, minor, adverse impacts from field surveys and investigations are expected to the biological environment. Short-term, minor, adverse impacts on fish would be expected during dam removal because of the increases in turbidity, physical disturbance of aquatic habitats, temporary displacement or disturbance of fish, and indirect changes in habitat. Mussels might be adversely affected by the physical impacts of dam removal in the short-term. However, this short-term impact could be mitigated by relocating mussels away from the impoundment prior to construction and returning mussels to the site after the site has been stabilized.

In general, the movement of anadromous fish, riparian species, and plant seeds would be restricted during barrier removal activities. The natural meandering and flow of streams and rivers is often compromised by barrier removal efforts, directly impacting the spawning and migratory patterns of some fish species. As a result of the possible changes in variable flow rate and the changes in temperature, some fish downstream may not be able to adapt or survive.

Short-term, minor, adverse impacts on wildlife and vegetation would be expected from the use of construction equipment and access roads by blocking migration corridors for species traveling

along the river shore, impeding access to nesting sites, or trampling vegetation. Direct mortalities of wildlife could occur from interaction with construction activities and/or materials; indirect mortalities could occur from stress, reproductive failure, or avoidance of feeding due to increased human activity and noise. In some cases, dam removal may cause plant species that prefer river-like conditions to outcompete those plants that prefer lake-like conditions. This change in vegetation diversity would have indirect impacts on wildlife that relied on lake-plants for habitat.

Long-term, moderate, beneficial impacts on fish would be expected from the removal of barrier. Migratory fish in the Raritan River, such as striped bass, American Shad, American eel, blueback herring and alewife, would greatly benefit from barrier removal as a result of increased mobility in the river system. Species richness, diversity and the density of fish has been demonstrated to recover over time upstream of the area of barrier removal.

Long-term, minor, adverse impacts on aquatic invertebrates would be expected during barrier removal through the spread of invasive species. Invasive species, such as the Asian clams, have been documented throughout the Raritan and Millstone Rivers. Barrier removal has the possibility of spreading invasive bivalves to areas of the river and tributaries that are currently not inhabited by these species. Given the ubiquitous presence of Asian clams throughout the watershed, upstream and downstream of the proposed dam projects, however, it appears dam removal activities would have very little effect on their spread. The Raritan River and Millstone River are not currently host to any other known introduced species of freshwater mussel or clam (Conserve Wildlife Foundation of New Jersey, 2015). It is important to note that the Raritan and Millstone Rivers have two possible points of entry for aquatic organisms, having connections to both the Atlantic Ocean at the mouth and the Delaware River through a series of connecting canals. Entry by introduced and possibly invasive species could be achieved from both upstream and downstream points of entry.

Long-term, minor to moderate, beneficial impacts on wildlife and vegetation would be expected from removal of the Weston Mill Dam. The spread of native mussel species is likely to occur. The absence of the dam will re-introduce fish species such as alewife that act as host to the larval form of native mussels, thus allowing for possible re-introduction of native mussel species now absent or with limited presence.

To minimize potential impacts from soil compaction and erosion, a buffer zone around sensitive vegetation would be established, mulch and geotextile mats would be used, topsoil and drainage patterns would be restored to preconstruction conditions, existing access roads would be used wherever possible, and best management practices (BMPs) would be implemented to minimize and mitigate impacts to native plant communities that would be difficult to restore.

5.1.1.3 Cultural and Human Use Environment

Representatives of the project team have coordinated efforts with the SHPO and formal consultation by the lead Federal agency has been completed in accordance with the requirements of the National Historic Preservation Act (Sect 106). Through formal consultation (letter to the SHPO dated Sept 2015) and discussions with the SHPO, the Trustees described how the dam removal would proceed and how the work would be conducted to ensure that the historic mill

ruins adjacent to the project site would not be further compromised. A key part of the consultation involved the various technical approaches that could be applied to carefully separate the portion of the dam that is pulling down the riverward wall of the mill. In a letter dated October 22, 2015, the SHPO concurred with the Trustees' proposal.

Short-term adverse impacts from the Preferred Alternative to cultural or archaeological resources would not be expected. The SHPO and the Trustees agree that the visible and ongoing degradation of the dam due to natural causes such as weathering is having deleterious effects on the mill ruins, and that the dam's removal is essential to preserving what is left of those ruins. The Trustees, in coordination with the SHPO, have adopted strategies for mitigating those impacts during construction. The remains of the historic Weston Mill building foundation and associated structural remnants will be protected by severing of the I-beams that attach the dam crest to the mill. This effort, in addition to saw-cutting the dam apron to detach it from the riverward wall of the mill upstream of the dam crest, would also serve to terminate the outward stresses on the mill wall. No long-term impacts are anticipated to the historic mill structure as a result of the dam removal. In response to the Trustees' formal consultation letter, SHPO concurrence with the planned approach was received by the Trustees on October 22, 2015. However, if a cultural or archaeological resource is identified during construction activities, the SHPO and appropriate stakeholders would be notified and consulted with to determine the necessary course of action.

Short-term, moderate, adverse impacts on the human use environment would be expected during dam removal activities from the temporary closure of a portion of the D&R State Park at the staging area near the dam and mill foundation. Access to a popular fishing location at the dam will be temporarily closed to the public. The D&R Canal Towpath and Canal system are popular destinations for bikers, joggers and strollers and are far enough away not to experience closure, noise or air quality impacts from the operation of machinery. River navigation, which is limited to small man-powered craft, will temporarily be diverted to temporary portage points.

Long-term, moderate, beneficial impacts to recreational fishing, birding and boating from the restored natural environment and increased recreational opportunities would be expected following the completion of the Weston Mill Dam removal. Boating in particular will benefit from the removal of the dam hazard. At certain flow rates and stages (heights) the dam is known to form an especially dangerous and strong current reversal from which it is difficult for trapped swimmers or capsized boaters to escape unharmed.

5.1.1.4 Socioeconomic Resources

No long-term impacts to population levels would be expected. Construction workers from local areas would be available for restoration actions and heavy equipment would most likely be procured from local suppliers. No new residents would relocate to the area as a direct result of the Preferred Alternative. Short-term, direct, minor, beneficial impacts to the local economy would be expected from the purchase of goods and materials by the contractor completing the restoration activities. Additional beneficial impacts from the construction workers' wages and taxes and expenditures for building materials would be expected. Short-term, direct, moderate, beneficial impacts from the increase of demand on the local workforce and industry would also be expected.

5.1.1.5 Threatened and Endangered Species

Federal Threatened and Endangered Species

No known threatened or endangered species under the jurisdiction of NMFS are expected to occur within the proposed project area; therefore no impacts would be expected. The northern long-eared bat (Federally-listed as threatened) was identified as occurring near the proposed project area during coordination with USFWS. However, there are no known roosting or foraging areas within the proposed project site; therefore no impacts to the northern long-eared bat would be expected and no further coordination with USFWS is required.

State Threatened and Endangered Species

During consultation with the NJDEP, the little blue heron, snowy egret, bald eagle and peregrine falcon were identified as potentially occurring in the project area. The little blue heron and snowy egret are species of special concern. The bald eagle and peregrine falcon have been removed from the Federal endangered species list. Other State-listed species that have been observed in the Raritan River watershed include: the least tern (*Sterna antillarum;* endangered), the yellow-crowned night heron (*Nyctanassa violacea*; threatened), and the black-crowned night heron (*Nycticoraz nycticorax;* threatened - breeding population only).

No long-term adverse impacts on any threatened or endangered species would be expected from dam removal. Short-term, minor, adverse impacts from increased noise could occur if species are in the area during removal activities. Avian species typically leave the area and return when the habitat is suitable and the noise has decreased. Appropriate BMPs and mitigation measures as identified in the PEIS would be implemented to eliminate or decrease any potential impacts to these species. The habitat typically required for these species to successfully breed does not occur in the project area, and no breeding or nesting occurrences have been reported at this location, so the likelihood of a breeding occurrence is extremely low.

5.2 NO ACTION ALTERNATIVE

The NEPA requires the Trustees to evaluate a "No Action Alternative." The No Action Alternative would mean that the Trustees would take no direct action to compensate for lost services. Instead, the Trustees would rely solely on natural recovery to achieve restoration goals. While the Trustees recognize that natural recovery could occur for the resources exposed to and/or injured by CERCLA releases, the interim losses suffered would not be compensated under a No Action Alternative. CERCLA establishes the Trustees' responsibility to seek compensation, when appropriate, for interim losses pending recovery of natural resources injured by releases of hazardous substances. This responsibility cannot be addressed through the No Action Alternative. Additionally, if the No Action Alternative is selected, none of the long-term beneficial impacts identified in Section 5.1 would be expected.

5.3 SUMMARY OF ENVIRONMENTAL IMPACTS

Potential environmental impacts associated with the Preferred Alternative are identified in Table 4.

Table 4. Summary of Impacts from the Preferred and No Action Alternative.

Resource Topics	Preferred Alternative Weston Mill Dam Removal	No Action Alternative
Physical Environment	Short-term, minor to moderate, adverse impacts Long term, major, beneficial impacts	No effect
Biological Environment	Short-term, minor, adverse impacts Long-term, moderate, beneficial impacts	No effect
Cultural Resources	Short-term, moderate, adverse impacts Long-term, moderate, beneficial impacts	No effect
Socioeconomics	Short-term, direct, minor, beneficial impacts	No effect
Threatened or Endangered Species	Short-term, minor, adverse impacts	No effect

6. CUMMULATIVE EFFECTS

The CEQ regulations stipulate that the cumulative effects analysis should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). The first step in assessing cumulative effects involves identifying and defining the scope of other actions and their interrelationship with the preferred alternative or alternatives (Council on Environmental Quality 1997). The scope must consider other projects that coincide with the location and timetable of the preferred alternative and other actions. Cumulative effects analyses evaluate the interactions of multiple actions.

6.1 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Three municipalities are located in the immediate vicinity of the project area. Bridgewater Township is to the north, Manville Borough is to the west, and Franklin Township is to the south. For the cumulative effects analysis, a study area was defined as 5-mile radius of the Weston Mill Dam. A variety of construction and renovation activities are proposed within the study area, such as home construction and remodel, restaurant renovations (interior), cell tower expansion and renovation, solar panel array construction, cemetery expansion, and street resurfacing activities. However these activities are anticipated to have negligible to no impact on the study area.

There are two proposed projects that are included in this cumulative effects analysis: the Rustic Mall redevelopment (Manville, NJ) and a major subdivision construction of single family homes and townhomes in Franklin Township, less than one mile from the Weston Mill Dam.

Rustic Mall Redevelopment. The Rustic Mall Redevelopment is a 15-acre parcel on the former Federal Creosote Superfund Site, off of Main Street in Manville, NJ. The original redevelopment plan, adopted in 2006, was to rebuild the former property into a mixed-use apartment complex with retail shopping on the ground floor. However, plans from the developer, Garden Homes Development, did not include items that were agreed upon with the city (*i.e.*, senior housing and a community center). The proposal has met opposition since early 2014 and plans are currently in the approval process (Hutchinson, 2015).

Subdivision Development. There are two major subdivisions currently under construction approximately a mile southeast of the Weston Mill Dam. Canal Walk, which contains approximately 900 units of 55+ adult homes, townhomes, and single family residences, is located south of School House Road. Summerfields, a second subdivision, will contain 250 single family residences and townhomes (Premier Development, 2015a; b).

6.2 CUMULATIVE EFFECTS

6.2.2 Physical Environment

Short-term, minor, adverse, impacts on air quality and geologic resources would be expected from construction activities associated with the potential cumulative projects and Preferred Alternative. Impacts on air quality would result from increased dust and vehicle emissions from the use construction vehicles and disturbance of particulates. Ground disturbance would be expected in the short term, affecting topography and soils. All activities would be completed in accordance with applicable Federal, State, and local laws.

Due to the varying construction schedules of the potential cumulative projects and the Preferred Alternative, short-term, negligible, adverse cumulative impacts would be expected from increased noise due to additional construction equipment being used.

Long-term, minor, adverse impacts to land use, noise environment, geological resources, and water resources would be anticipated. Impacts on land use would result from the conversion of farmland to residential properties resulting in loss of open space for the subdivision developments. Noise would be increased due to the addition of residential and commercial properties in the subdivision developments, and the rustic mall redevelopment and would be expected to impact the surrounding recreational area including the river. Construction activities, such as digging and trenching, associated with these projects and the Preferred Alternative would be expected to have local impacts to topography, geology, and soils.

Long-term, minor, adverse impacts to water resources would be expected due to runoff from additional impervious surfaces, such as roads and homes, within the subdivision developments and rustic mall redevelopment. Use of BMPs for dust suppression, sediment control, and the prevention of construction-related discharge and runoff into the river is anticipated for all construction activities. All activities would be completed in accordance with applicable Federal, State, and local laws.

Long-term, minor, beneficial impacts would be expected from the development of the former vacant superfund site to a residential and commercial area.

6.2.3 Biological Environment

Short-term, minor, adverse impacts would be expected on vegetation and wildlife from ground clearing activities during the subdivision construction and Rustic Mall redevelopment. Construction activities would be expected to adversely affect wildlife in the immediate area, interfering with possible nesting locations and the removal of habitat for development. Most birds and mammals would flee during construction activities of the Rustic Mall redevelopment, subdivision development, and the Preferred Alternative and could return once construction activities had ceased. All activities would be completed in accordance with applicable Federal, State, and local laws.

Long-term, negligible, adverse, impacts on vegetation and wildlife would be expected from the subdivision developments, the Rustic Mall redevelopment, and the Preferred Alternative from increased noise and foot traffic from an increased population in the area.

Long-term, minor, adverse impacts on vegetation and wildlife would be expected from the subdivision development due to the reduction of habitat when converting farmland to residential properties.

6.2.4 Cultural and Human Use Environment

Impacts on cultural and historically important locations and items would not be anticipated from any potential projects. No additional historic sites have been identified on or near the potential projects. Beneficial impacts from the Preferred Alternative to the historic mill were previously discussed.

Short-term, minor, adverse impacts on the human use environment would be expected during projects where roads and public access locations are closed. These projects include road resurfacing, and road construction from the subdivision developments, Rustic Mall redevelopment and city projects throughout the area. Construction equipment would use current roadways, adding to traffic in the area; however, this increase would be negligible.

6.2.5 Socioeconomic Resources

It is expected that construction workers from local areas would be available and construction equipment and materials would be procured from local suppliers. Therefore, short-term, negligible to minor, beneficial impacts from the increased demand on the local workforce and resources supplies would be expected. Additional beneficial impacts from the construction workers' wages and taxes and expenditures for building materials would be expected from the subdivision developments, Rustic Mall development, and the Preferred Alternative.

Long-term, minor, beneficial impacts on population levels and the economy are expected from the subdivision developments increasing the local population and the Rustic Mall redevelopment. The increase in population would bring additional money and resources into the area benefiting the local economy.

6.3 CLIMATE CHANGE

In November 2013, President Obama issued an Executive Order 13653, 78 F.R. 66817, which discussed the need to manage U.S. lands and waters for climate preparedness and resilience (the capacity to respond to change), promote climate resilience and carbon sequestration, and reduce the sources of climate change. Federal agencies are responsible for identifying and assessing climate change-related impacts on and risks to their missions, operations, and programs. Additionally, in January 2015, President Obama issued an Executive Order requiring that all Federally funded construction projects take into account the flood risks linked to climate change (Executive Order 13690, 80 F.R. 6425).

There is reasonable evidence that climate variability and change will cause impacts that merit consideration in environmental planning decision-making. Climate related impacts have already been observed and include increases in annual temperatures, increases in extreme heat and cold events, changes in climatic patterns, increases in extreme weather events such as hurricanes, changes in freshwater flow, and changes in water temperature.

Global average temperatures began a warming trend in the 1970s that has been attributed to anthropogenic greenhouse gas emissions (Hansen *et al.*, 2001), and numerous trends in climatic and hydrologic variables indicative of a warming climate have been documented in the northeastern United States over the last 100 years--many are especially pronounced since the 1970s (Huntington *et al.*, 2009). For example, there have been documented increases in annual precipitation in the eastern United States (Karl and Knight, 1998) and particularly large increases in extreme precipitation events (Douglas and Fairbank, 2011; Walsh *et al.*, 2014). Changes in precipitation are coincident with widespread increases in low and moderate streamflows in the eastern United States (McCabe and Wolock, 2002) and hydroclimatic increases in flood magnitudes and frequencies in the Northeast United States (Collins, 2009; Armstrong *et al.*, 2012; 2014).

Climate change may have varied secondary adverse impacts on biological, physical, and cultural resources in the central New Jersey area. Higher flow rates and more rapid rises and falls in water levels are likely to result in greater erosion rates. Increased water temperatures may result in more frequent algal blooms. Reduced summer water levels may result in reductions of wet habitat, including small streams and wetland areas. Food supplies may be available earlier in the year, but diminished in the hotter months of summer, affecting the ability of species to find food. The distributions of fish and other aquatic species will likely also change, and invasions by non-native species that prefer warmer temperatures may become more likely. Increased extreme weather leading to increased erosion rates could irreversibly damage cultural resources.

Human uses of the environment will also be affected by climate change. There will likely be greater uncertainty about water supply, and therefore more need for water storage. This may also lead to an increase in the use of groundwater for agricultural irrigation. A variety of changes that affect agriculture are also likely, including the increased variability of rainfall, longer growing seasons, and the introduction of new pests and diseases. Recreational and tourism uses of the environment will also change: there are likely to be fewer winter recreational activities, but the season for warm-weather recreation will likely lengthen.

Given documented hydroclimatic increases in flood magnitude and frequency in the project region, it is important to evaluate what effect the removal of the Weston Mill Dam will have on upstream flood heights and spatial extent. The study will rely on bathymetric and topographic data gathered directly from the surroundings of the project site, long-term USGS stream gage data that include the most recent decades (U.S. Department of Commerce, 2011), and hydraulic modeling. The results of the study will be used to support decision making in the regulatory permitting phase.

NOAA reviewed the August 1, 2016, guidance from the Council on Environmental Quality titled "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews” to determine if it should be addressed or applied in this RP/EA. Section V, "Conclusion and

Effective Date," states that agencies should apply this guidance to all new proposed agency actions when a NEPA review is initiated and should use judgment to consider whether or how to apply it to an on-going process. The RP/EA considered and described (above) how the impacts of climate change could potentially relate to various resources in the project area and the Trustees prepared the Final RP/EA based on public input prior to the release of the new guidance. Since this Final RP/EA is part of an on-going Trustee restoration planning process, NOAA believes it does not necessarily trigger inclusion of the new guidance.

6.4 RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Impacts related to construction activities that take place over a period of less than 5 years are considered short-term uses of biophysical components of the human environment. Those impacts that occur over 5 years or more, including permanent resource loss, are long-term uses of the human environment.

Soil erosion, storm water runoff, and removal of vegetation and wildlife habitat are potential short-term adverse impacts that were considered. Land use change is considered a long-term adverse impact.

6.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The Preferred Alternative and the potential cumulative impact projects would use materials associated with demolishing and construction of buildings and infrastructure such as wood, steel, concrete, and asphalt, construction workers, construction machinery, fuel, and time. The use of these resources would be minor and would not deplete resource availability.

7. COMPLIANCE WITH OTHER KEY STATUTES, REGULATIONS AND POLICIES

The Federal and State agency permits, approvals, and consultation required for the proposed project are identified in Table 5.

Table 5. Federal and State Agency Permits, Approvals, and Consultation Required for the Project.

Permits and Approvals[1]	Status	Agency	Action
Federal Statutes administered by the State of NJ.			
Clean Water Act of 1977, as amended (404 Permit)	Application pending.	NJDEP	State assumed Waters. Permit application to be filed with the State.
Coastal Zone Management Act of 1972, as amended	Application pending.	NJDEP	State assumed Waters. Permit application to be filed with the State.
Endangered Species Act of 1973, as amended	Completed.	USFWS, NMFS	Required coordination with USFWS and NMFS determined no presence of Federally-listed threatened and endangered species.
Marine Mammal Protection Act of 1972, as amended	Not applicable	USFWS, NMFS	Not applicable.
Fish and Wildlife Coordination Act, as amended	Required action pending.	USFWS	Will require coordination with USFWS and National Marine Fisheries Service.
National Historic Preservation Act of 1966, as amended	Completed.	NJHPO (NJDEP)	Per Section 106, SHPO reviewed and commented on the project to determine effects on cultural resources that are listed in, or eligible for listing in, the NRHP.
Executive Order 11988, Floodplain Management as amended 2015	Addressed through State permit application process.	NJDEP	Compliance with NJDEP Flood Hazard Program office. Evaluation of the potential effects of the project with regard to floodplains.

Executive Order 11990, Protection of Wetlands	Addressed through State permit application process.	NJDEP	State permit application pending. Compliance with NJDEP Permit Office. Evaluate the potential effects of the project with regard to wetlands.
Farmland Protection Policy Act of 1981, as amended	Not applicable.	NRCS	Not applicable.
Water Resources Planning Act of 1965, as amended	Not applicable.	USACE	Not applicable.
Wild and Scenic Rivers Act, as amended	Not applicable.	DOI (NPS), USDA (USFS)	Not applicable.
Estuary Protection Act, as amended	Not applicable.	EPA, NMFS	Not applicable.
Archeological and Historic Preservation Act of 1974, as amended	Consultation complete.	NJHPO (NJDEP)	In a letter dated October 22, 2015, the SHPO concurred with the Trustees' proposal.
Rivers and Harbors Appropriation Act of 1899, as amended (Sect 10)	Applicability to be determined.	USACE	Action to be determined. Evaluate the impacts of the project on navigable waters.
National Environmental Policy Act of 1969, as amended	Impacts determined under RP/EA	NOAA (Lead Agency)	RP/EA has evaluated the impacts of the project on a broad range of environmental resources.
Coastal Barrier Resources Act (CBRA), Public Law 97-348 (96 Stat. 1653; 16 U.S.C. 3501 et seq.), enacted October 18, 1982	Not Applicable.	USFWS	Not Applicable.
Magnuson-Stevens Fishery Conservation and Management Act of 1990	Not Applicable.	NOAA NMFS	Not Applicable in riverine environment.
Safe Drinking Water Act	Addressed through State permit application process.	NJDEP	Evaluate compliance of the project on public drinking water supplies. Permit application to be filed with the State.

State and Local			
NJDEP Rules and Regulations – Threatened, and Endangered Species	Addressed through State permit application process.	NJDEP	Consult on State and Federally-listed threatened and endangered species. Permit application to be filed with the State.
NJDEP Rules and Regulations – Freshwater Wetland Protection Act Rules	Addressed through State permit application process.	NJDEP	Evaluation of the effects of the project on existing freshwater wetlands and associated transition areas. Permit application to be filed with the State.
NJDEP Rules and Regulations – Flood Hazard Area Act	Addressed through State permit application process.	NJDEP	Evaluation of the effects of the project on streams. Permit application to be filed with the State.
NJDEP Rules and Regulations – Waterfront Development Permit	Addressed through State permit application process.	NJDEP	Evaluation of the effects of the project on waterfront areas. Permit application to be filed with the State.
Review under State Historic Preservation Act (SHPA)	Consultation complete.	NJHPO (NJDEP)	In a letter dated October 22, 2015, the SHPO concurred with the Trustees' proposal.
Permit under the State Pollutant Discharge Elimination System (SPDES)	Not Applicable.	NJDEP	Not Applicable.
Permit for Coastal Erosion Hazard Areas	Not Applicable.	NJDEP	Not Applicable.
Water Quality Certification	Addressed through State permit application process.	NJDEP	Evaluation of the effects of the project on water quality. Permit application to be filed with the State.

Soil Erosion and Sediment Control Plan	Consultation required with SCS District	Somerset County	Plan for the control of soil erosion and sediments. Permit application to be filed with the State triggers SCS consultation.
Transportation Permit	Required	Manville	Permit from planning board for truck routing.
City Easements	Required	Jersey City	Temporary easement for construction access and activities.

Notes: [1] Review of the project's RP/EA and NEPA documentation is required before the issuance of permits.
NJHPO: New Jersey Historic Preservation Office.
NRCS: National Resource Conservation Service
USACE: United States Army Corps of Engineers
NPS: National Park Service
USDA: United States Department of Agriculture
USFS: United States Forest Service

8. LIST OF PERSONS/AGENCIES CONSULTED

NOAA NOS Assessment Restoration Division for Injury Assessment
NOAA NMFS Office of Habitat Conservation, Habitat Conservation Division Program Officer
NOAA NEPA Program Office
NOAA Restoration Center Damage Assessment Remediation and Restoration Program NEPA Coordinator
NOAA Office of General Counsel
USFWS U. S. DOI Office of the Solicitor
USFWS Natural Resources Damage Assessment and Restoration Program
USFWS ESA Consultation Program Officer
USFWS Fish and Wildlife Coordination Act Program Officer
American Cyanamid Natural Resources Damage Assessment Trustees (NOAA, USFWS, NJDEP)
NJDEP State Historic Preservation Office Program Officer
NJDEP Division of Land Use Regulation
NJDEP Department of Fish and Wildlife
NJDEP Office of Natural Resource Restoration
US Department of Justice
Somerset County Soil Conservation District

9. LIST OF PREPARERS

The preparers of this document, entitled Final In-River Restoration Plan/Environmental Assessment (RP/EA) for the American Cyanamid Co. Superfund Site, Bridgewater Township, Somerset County, New Jersey, are identified in Table 6.

Table 6. List of Preparers.

Name	Position	Role in RP/EA Preparation and NEPA Documentation
National Oceanic and Atmospheric Administration		
Carl Alderson	NMFS Habitat Restoration Center, Marine Habitat Restoration Specialist	Document Preparation
Reyhan Mehran	NOS Assessment and Restoration Division, Regional Resource Coordinator	Document Preparation
John Catena	NMFS Habitat Restoration Center, Northeast and Great Lakes Regional Supervisor	Review and Comment
Kate Barfield	Office of the General Counsel, Attorney Advisor General	Document Preparation, Legal Review, and Comment
Jeff Shenot	NMFS Habitat Restoration Center, Marine Habitat Resource Specialist/NEPA Coordinator	Document Preparation, Review, and Comment
Steve Leathery	NMFS National NEPA Coordinator	Review and Comment
Donald Beckham	Contractor, LMI	Document Preparation
New Jersey Department of Environmental Protection		
John Sacco	Office of Natural Resource Restoration, Director	Review and Comment
Mark Walters	Office of Natural Resource Restoration, Research Scientist	Review and Comment
U.S. Department of the Interior		
Melissa Foster	USFWS, NJFO, Natural Resources Damage Assessment and Restoration Program, Senior Fish and Wildlife Biologist	Review and Comment
Mark Barash	Office of the Solicitor, Senior Attorney	Legal Review and Comment
U.S. Department of Justice		
David Gordon	Environment and Natural Resources Division, Senior Counsel	Legal Review and Comment

10. REFERENCES

American Rivers and Trout Unlimited. 2002. Exploring Dam Removal: A Decision-Making Guide. August. *http://www.americanrivers.org/assets/pdfs/dam-removal-docs/Exploring_Dam_Removal-A_Decision-Making_Guide6fdc.pdf.* Accessed June 3, 2015.

Armstrong, W.H., Collins, M.J., and Snyder, N.P. 2012. Increased frequency of low-magnitude floods in New England. Journal of the American Water Resources Association, 48 (2), 306–320. doi:10.1111/j.1752-1688.2011.00613.x.

Armstrong, W.H., Collins, M.J., and Snyder, N.P. 2014. Hydroclimatic flood trends in the northeastern United States and linkages with large-scale atmospheric circulation patterns, Hydrological Sciences Journal, 59:9, 1636-1655, DOI: 10.1080/02626667.2013.862339.

Bing Images. 2015. Weston Canal Rd, Somerset, NJ 08873. October.

California Department of Fish and Game and U.S. Department of the Interior. 2012. Klamath Facilities Removal Final EIS/EIR. State Clearinghouse #2010062060.

Collins, M.J. 2009. Evidence for changing flood risk in New England since the late 20th century. Journal of the American Water Resources Association (JAWRA), 45, 279–290. doi:10.1111/j.1752-1688.2008.00277.x.

Conserve Wildlife Foundation of New Jersey. 2015. *Freshwater Mussels of New Jersey*. December. *http://conservewildlife.maps.arcgis.com/apps/MapJournal/index.html?appid=093a625e6fa044e191595e57dceee027&webmap=7fc0d5a9cd0f419a8fdd3d254b316752.*

Council on Environmental Quality. 1997. *Environmental Justice Guidance under the National Environmental Policy Act*. Executive Office of the President, Washington, D.C.

Douglas, E.M. and Fairbank, C.A. 2011. Is precipitation in northern New England becoming more extreme? A statistical analysis of extreme rainfall in Massachusetts, New Hampshire and Maine and updated estimates of the 100-year storm. Journal of Hydrologic Engineering, 16, 203–217. doi:10.1061/(ASCE) HE.1943-5584.0000303

Google Earth Maps.

Hansen, J.E., R. Ruedy, Mki. Sato, M. Imhoff, W. Lawrence, D. Easterling, T. Peterson, and T. Karl. 2001. A closer look at United States and global surface temperature change. Journal of Geophysical Research 106: 23947-23963, doi:10.1029/2001JD000354.

Hunter Research. 2011. Phase 1A Cultural Resource Assessment Weston Mill Dam, Franklin and Hillsborough Townships, Somerset County, New Jersey. *Prepared For:* Stony Brook-

Millstone Watershed Association *Prepared By:* Alison Haley, Historian, Patrick Harshbarger, Historian/Architectural Historian, Richard Hunter, Principal. March.

Huntington, T.G., A.D. Richardson, K.J. McGuire, and K. Hayhoe. 2009. Climate and hydrological changes in the northeastern United States: recent trends and implications for forested and aquatic ecosystems. Canadian Journal of Forest Research 39:199- 212, doi:10.1139/X08-116.

Hutchinson, D. 2015. *Manville major optimistic about long delayed Rustic Mall redevelopment plan.*
http://www.nj.com/somerset/index.ssf/2015/01/manvilles_rustic_mall_developer_given_another_exte.html. January 22.(Accessed January 13, 2016).

Karl, T.R. and Knight, R.W. 1998. Secular trends of precipitation amount, frequency, and intensity in the United States. Bulletin of the American Meteorological Society, 79 (2), 231–241.doi:10.1175/1520-0477(1998)0790231:STOPAF2.0.CO;2.

McCabe, G.J. and Wolock, D.M. 2002. A step increase in streamflow in the conterminous United States. Geophysical Research Letters, 29 (24), 2185. doi:10.1029/2002GL015999.

MWH Global. 2015. Weston Causeway Dam Coring Report and Weston Causeway Dam/Weston Mills Condition Assessment for SHPO Considerations. Memorandum to Carl Alderson, NOAA from John W. Jengo, Dated September 1.

New Jersey Department of Environmental Protection . 2012. NJ Endangered and Nongame Species Program Special Concern – Species Status Listing. February 21, 2012. *http://www.nj.gov/dep/fgw/ensp/pdf/spclspp.pdf* (Accessed December 9, 2015).

_____. 2013. List of Endangered Plant Species and Plant Species of Concern. September 2013. *http://www.nj.gov/dep/parksandforests/natural/heritage/njplantlist.pdf* (Accessed December 9, 2015).

_____. 2014. Rare Plant Species and Ecological Communities Presently Recorded in the NJ Natural Heritage Database. March 13, 2014. *http://www.nj.gov/dep/parksandforests/natural/heritage/textfiles/somerset.pdf* (Accessed December 9, 2015).

New Jersey Division of Fish and Wildlife. 2015a. Raptors of New Jersey. *http://www.nj.gov/dep/fgw/ensp/pdf/spclspp.pdf* Last updated June 23, 2015 (Accessed December 9, 2015).

_____. 2015b. New Jersey's Endangered and Threatened Wildlife. *http://www.nj.gov/dep/fgw/tandespp.htm* Last updated January 5, 2015 (Accessed December 9, 2015).

National Oceanic and Atmospheric Administration. 2015. Final Programmatic Environmental Impact Statement for habitat restoration activities implemented throughout the coastal United States. Restoration Center, Office of Habitat Conservation, Silver Spring MD. June.

Premier Development. 2015a. *Summerfields. http://www.premierdevelopment.com/central-nj/homes-for-sale/Summerfields.php* (Accessed January 13, 2016).

_____. 2015b. *Canal Walk. http://www.premierdevelopment.com/central-nj/homes-for-sale/Canal-Walk.php*.(Accessed January 13, 2016).

Stony Brook Millstone Watershed Association. Watershed Monitoring Data Archive. *http://web.archive.org/web/20061001194001/http://www.thewatershed.org/water_monitoring.php*.

U.S. Census Bureau. 2015. QuickFacts, Somerset County, New Jersey. U.S. Department of Commerce. *http://quickfacts.census.gov/qfd/states/34/34035.html*.

U.S. Department of Commerce. 2011. Flood Frequency Estimates for New England River Restoration Projects: Considering Climate Change in Project Design. FS-2011-01. NOAA: National Marine Fisheries Service. *http://www.habitat.noaa.gov/pdf/flood_frequency_estimates.pdf.*

U.S. Department of Transportation. 2006. Construction Noise Handbook. Chapter 7: Mitigation of Construction Noise. *http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook07.cfm.* Accessed June 9, 2015.

U.S. Environmental Protection Agency. 2015. EJSCREEN: Environmental Justice Screening and Mapping Tool. *http://ejscreen.epa.gov/mapper/.* Accessed December 12, 2015.

Walsh, J., Wuebbles, D., Hayhoe, K., Kossin, J., Kunkel, K., Stephens, G., Thorne, P., Vose, R., Wehner, M., Willis, J., Anderson, D., Doney, S., Feely, R., Hennon, P., Kharin, V., Knutson, T., Landerer, F., Lenton, T., Kennedy, J., and Somerville, R. 2014. “Ch. 2: Our Changing Climate”. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 19-67. doi:10.7930/J0KW5CXT.

APPENDIX A - PUBLIC COMMENT RESPONSIVENESS SUMMARY ON THE DRAFT RP/EA FOR THE AMERICAN CYANAMID CO. SUPERFUND SITE

On May 10, 2016, the Natural Resource Trustees for the American Cyanamid Co. Superfund Site in Bridgewater Township, New Jersey, published and invited public comment on the draft Restoration Plan and Environmental Assessment (RP/EA) to restore injured habitat for fish and other in-river trust resources. Comments on the draft RP/EA can be found at: https://darrp.noaa.gov/hazardous-waste/american-cyanamid and https://www.fws.gov/northeast/njfieldoffice/pdf/AmCy_draft_RP_EA_response.pdf

Comments were received from a total of 37 respondents, including the following:

- 22 members of the general public
- Assemblyman Jack M. Ciaterelli
- Assemblyman Andrew Zwicker
- Millstone Township Environmental Commission
- Franklin Township Environmental Commission
- Lower Raritan Watershed Partnership
- Rutgers University Foundation at the State University of New Jersey
- Andlinger Center for Energy and the Environment at Princeton University
- Central Jersey Stream Team
- Duke Farms
- NY/NJ Baykeeper
- Stony Brook-Millstone Watershed Association
- Jersey coast Anglers Association
- Hopewell Valley Citizens Group, Inc.
- Edison Wetlands Association
- Anglers Conservation Network

This document summarizes the comments and provides the Trustees' responses. All comments were carefully considered in completing the final RP/EA.

Thirty commenters wrote in support of the proposed project.

Response: The Trustees note the support of 2 elected officials, 2 local public environmental commissions, 10 organizations, and 16 members of the general public.

Three commenters stated that the Trustees provided insufficient notice of the availability of the draft RP/EA for public comment.

Response: Public notice of the availability of the draft RP/EA for comment was issued in three local newspapers (published in the Home News Tribune on May 6, 2016; the Courier News on May 10, 2016; and the Princeton Packet on May 6, 2016) and on two government websites (NOAA on May 5, 2016 and USFWS on May 6, 2016). Copies of the document were available in two local public libraries (Franklin Township Public Library and Manville Public Library) and on two government websites (NOAA and USFWS). In addition, copies of the document were sent directly via electronic mail on May 6, 2016, to 25 interested parties.

One commenter raised a concern that the proposed project does not solve the pollutant problems at the American Cyanamid Co. Superfund Site and questioned its utility in remediation.

Response: The remediation of contamination associated with the American Cyanamid Co. Superfund Site is outside the Trustee's authority and scope of the natural resource damage assessment. The U.S. Environmental Protection Agency (USEPA) is currently addressing both the investigation and cleanup of hazardous substance releases on or from this Superfund Site in coordination with the State of New Jersey. Documents related to the remedial process at the site are available on the USEPA website for the American Cyanamid Co. Superfund Site.

One commenter recommended clarifying the scope of the injuries for which the proposed project is intended to compensate in the text of both the Restoration Plan and in the Environmental Assessment.

Response: The proposed project is intended to compensate only for injuries resulting from site-related contamination released to the Raritan River and Cuckold's Brook – identified as "in-river" injuries in the RP/EA. Potential injuries to other natural resources such as groundwater, riparian areas, and wetlands, resulting from site-related contamination, would not be compensated for by the proposed project. This language has been clarified in both sections of the final RP/EA.

One commenter proposed notching the Weston Mill Dam in lieu of removal in an effort to preserve parts of a Revolutionary War-era structure while another commenter proposed restoring the dam to its condition during the Revolutionary war and placing a commemorative plaque at the site. A third commenter recommended preserving both the dam and the mill site due to their historical significance.

Response: The Trustees considered a variety of ways in which the history of the mill and its surroundings could be preserved and protected. Dam notching was not a viable option given the considerable deterioration of the dam. Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires the lead agency on a Federal action to work in consultation with the State Historic Preservation Office (SHPO). The consultation with the SHPO determines how to proceed when actions may affect structures and/or artifacts deemed "eligible for historic designation" under the NHPA. The Trustees determined that the original Weston Mill Dam was likely constructed circa 1740, that the original structure is no longer present, and that the dam has been replaced more than once. The current concrete dam is thought to have been constructed in the mid-1930s and is ineligible for historic listing due to its age, its construction materials, and the absence of any remnant older structure. The original, historic dam structure is no longer present and cannot be preserved or restored.

The remnant mill foundation is eligible for listing under the NHPA. The RP/EA includes preservation of the remnant historic mill foundation. The Trustees coordinated with the SHPO to ensure that the dam removal would not compromise the remnant historic mill foundation. Removal of the collapsing concrete dam from the mill foundation will help to preserve the historic structure by reducing stress on it. In a letter dated October 22, 2015, the SHPO concurred with the Trustees' proposal. The addition of a plaque or other interpretive signage is under consideration. Additional restoration or reconstruction of any structures to their Revolutionary War-era condition would not provide natural resource services and is thus outside the scope of the Trustees' authorities.

One commenter suggested giving greater consideration to using the existing bypass channel adjacent to the Weston Mill Dam as a natural fishway.

Response: The Trustees have considered a variety of alternatives, including natural fishway bypasses, where applicable, as part of a broader initiative to improve fish passage throughout the Raritan River watershed. The depth and flow of the existing side channel located adjacent to the Weston Mill Dam are inadequate to attract fish and provide passage and potential modifications would not result in substantial ecological or recreational benefit when compared with full dam removal at this location.

One commenter raised concern with introducing migratory fish to potentially contaminated areas of the Millstone River and also with the possibility of contaminated migratory fish introducing new contaminants to this section of the Millstone River.

Response: The Trustees carefully considered contaminant issues in evaluating the benefit of improving migratory fish passage in the Raritan River watershed. Federal and State

environmental regulations prohibiting and/or regulating pollution discharges to surface water have greatly improved surface water and sediment quality of the Millstone and Raritan Rivers over the past two decades. In addition, migratory fish do not spend substantial portions of their life histories in the lower portions of the watershed. These adult fish migrate from open ocean areas and feed minimally while passing through the lower river. As a result, migratory fish typically contain lower concentrations of contaminants than freshwater fish and are not expected to accumulate significant concentrations of contaminants while feeding within the lower portions of the river or to transport contaminants to newly opened upriver spawning and nursery habitats.

One commenter questioned how removal of the Weston Mill Dam would enhance recreational birding, fishing, and boating opportunities.

Response: Although the RP/EA discusses ancillary recreational benefits associated with the proposed project, the in-river injuries did not include lost recreational use and the proposed project is not being implemented to provide recreational benefits. However, as noted in the RP/EA, restoration of this section of the Millstone River through removal of the Weston Mill Dam will result in morphological, hydrological, biological, and water quality changes that are likely to benefit recreational users.

Dam removal typically increases water flow, mixing of the water column, and sediment transport, which in turn decrease summer water temperatures, increase dissolved oxygen concentrations, and create riffle fields, bars, and deep pools. Improved water quality and increased heterogeneity of bottom topography benefit riverine benthic invertebrates including fresh water clams, mussels, and aquatic insects. These organisms improve the health of the river and are important food resources for wildlife including, shorebirds and waterfowl (which are enjoyed by birders), as well as bottom feeding fish such as quillbacks, yellow perch, and catfish (which are favorites of anglers). Improving habitat and access for forage fish in the Millstone River is expected to improve the health of fish that consume them, such as largemouth bass, striped bass and hybrid bass. Forage fish also are an important component of the diet of fish-eating birds such as bald eagle, osprey, cormorants, and long-legged wading birds.

Dam removal should also increase the safety of kayakers and canoers by removing a navigational hazard that presents a substantial drowning risk. Taken together, the expected improvements to water quality, river substrate topography, the benthic invertebrate community, the fish community, the bird community, and public safety are expected to enhance recreational opportunities for fishing, birdwatching, and boating in the area.

One commenter questioned whether there is any evidence that removal of the dam would meaningfully impact water temperature or dissolved oxygen concentrations.

Response: There is a large volume of literature supporting improvements in water temperature and dissolved oxygen concentrations in rivers and streams subsequent to small dam removal. The Trustees considered this information when estimating benefits associated with removal of the Weston Mill Dam. Water quality monitoring will be conducted as part of the proposed project – both before and after dam removal – and these data will add to the information available for the watershed on water quality changes associated with small dam removal.

Three commenters raised concerns that the proposed project provides marginal benefits resulting in inadequate compensation for "in-river" injuries in general, particularly given the short distance between the Weston Mill Dam and the next obstruction to fish passage. Two of these three commenters were concerned about the lack of a nexus to downriver injury and the lower income communities present in the lower portion of the river. One of these three commenters raised concerns regarding the considerable historical alteration of habitat structure and quality in the portion of the Millstone River upstream of the Weston Mill Dam and whether that area would now be suitable for migratory fish. One of these three commenters questioned whether ongoing and future "in-river" injuries were fully considered given the current absence of a site-wide remedy.

Response: The Trustees carefully reviewed and evaluated all available chemical, biological, and physical data and information during the "in-river" injury assessment and compensatory restoration scaling. The status of remedial activities at the American Cyanamid Co. Superfund Site and associated data were a critical component of the injury assessment, which fully considered past, current, and future in-river injury. In considering available opportunities for compensating for in-river losses, preference was given to "in-kind" and "in-place" projects rather than projects located in downriver areas or projects that would provide primarily floodplain or wetland services. However, restoration of this section of the Millstone River will provide ecological service benefits in areas both upriver and downriver of the project - meeting or exceeding calculated in-river losses associated with releases from the American Cyanamid Co. Superfund Site.

One commenter recommended that the Trustees require relocation of any freshwater mussels present in the vicinity of the Weston Mill Dam prior to construction until after the site has been stabilized.

Response: The Trustees agree that temporary relocation of any freshwater mussels is a viable option and included the potential for implementing these efforts in the RP/EA. Final

determinations on the need for any freshwater mussel relocation will be made during pre-removal benthic macroinvertebrate monitoring.

One commenter suggested including, in the RP/EA, the preliminary results of studies that have been conducted to date on the effectiveness of the current fish ladder located at Island Farm Weir.

Response: The Trustees agree that these data would help inform the desirability of conducting a feasibility study for alternative passage at Island Farm Weir. However, the study remains ongoing and the final findings of the research are not available at this time.

Two commenters suggested including full removal of the Island Farm Weir in the feasibility study to improve fish passage at that structure.

Response: Alternatives for improving fish passage at the Island Farm Weir will be evaluated during development of the feasibility study. Full removal is not a viable alternative at this time due to the need to provide water for public use. A range of other alternatives to improve fish passage efficiency will be studied as a part of the proposed study.