Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study

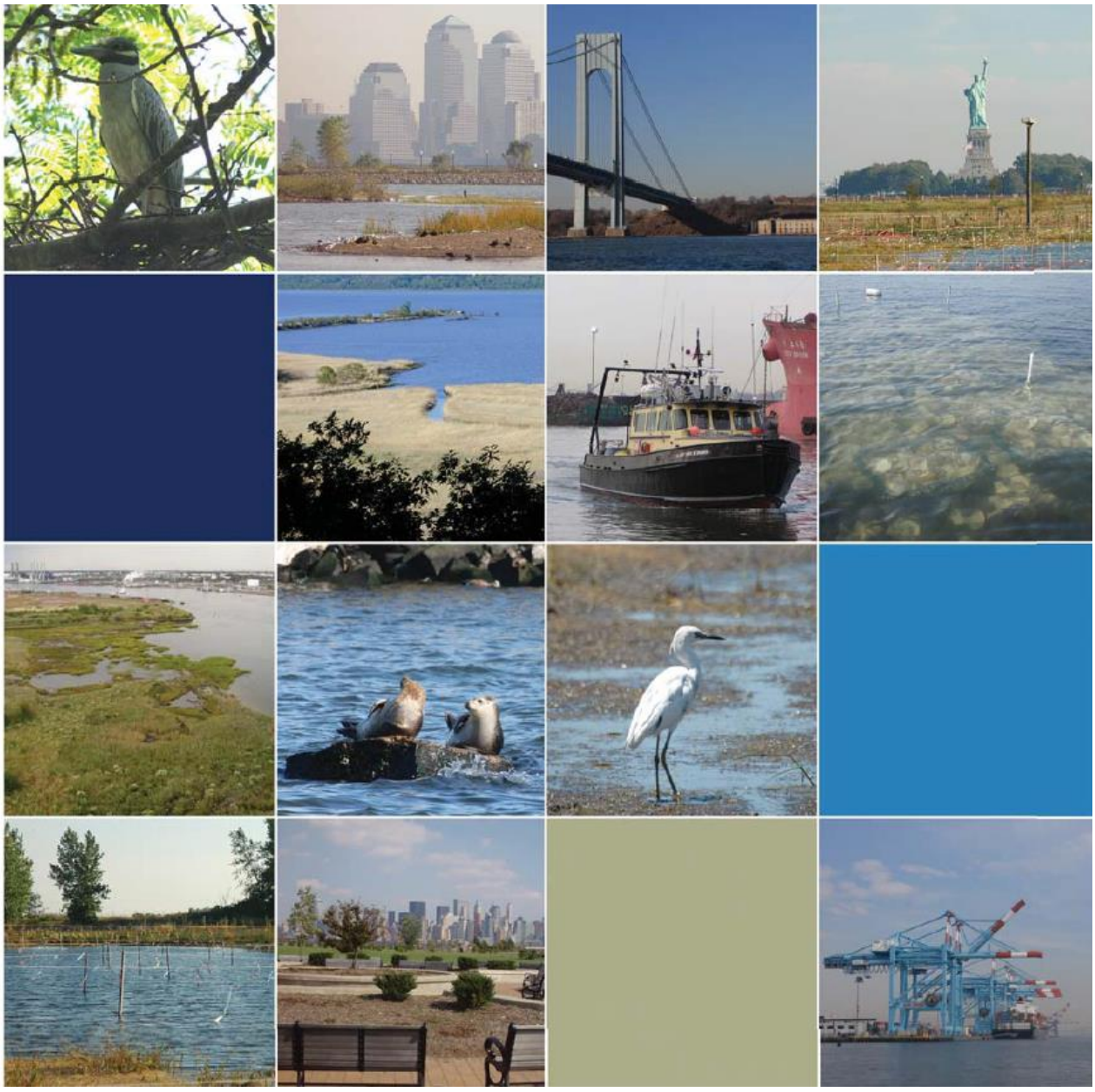
Appendix B
Ongoing Restoration Efforts

Final Integrated Feasibility Report
& Environmental Assessment

March 2020

Prepared by the New York District
U.S. Army Corps of Engineers

THE PORT AUTHORITY OF NY & NJ



1. Introduction

The HRE Study Area is home to remarkable restoration and planning efforts. This appendix covers existing/prior reports (B-1), ongoing (B-2) and completed (B-3) restoration and resilience projects conducted by the USACE and regional partners. These reports and restoration efforts serve as the foundation for the recommendations of this draft Feasibility Report/Environmental Assessment (FR/EA). Together with the actions recommended in this draft report, the ongoing and future restoration efforts will represent both a significant investment in several Hudson Raritan Estuary (HRE) Planning Regions and a tremendous step toward restoring lost ecological values and achieving the regional goals of the HRE Comprehensive Restoration Plan (USACE, 2016).

2. Prior Reports (B-1)

Highlighted prior reports considered during the development of this Draft FR/EA are provided in the following sections for the HRE region, each planning region, and/or "source" study. Additional reports can be found in Chapter 10, References.

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Municipality Surveys

Bayonne/Hudson County (RM 0): James Monkowski, City of Bayonne, Municipal building, 630 Ave C., Bayonne, NJ 07002.

Belleville Township/Essex County (RM 8-10): Thomas Herits, 429 Stephens St. Belleville, NJ 07109. (11/10/06)

Borough of East Newark/Hudson County (RM 5.6-6.1): Robert B. Knapp, Acting Burough Clerk, 34 Sherman Avenue, East Newark, NJ 07029

City of Clifton, Passaic County: (RM 11-13 and RM 17): Ms. Macil Homza, Secretary, Clifton Environmental Protective Commission, City Hall, 900 Clifton Avenue, Clifton, NJ 07013. (10/13/06)

Elizabeth (south of RM0): Oscar Ocasio, Department of Planning & Community Development, 50 Winfield Scott Plaza, Elizabeth. (10/11/06)

East Rutherford/Bergen (RM 13): James Cassella, Mayor, 1 Everett Place, East Rutherford, NJ 07073 (10/20/06).

Essex (Third River): Lawrence Ferchak, Essex County Division of Mosquito Control, 99 W. Bradford Avenue, Cedar Grove, NJ 07009.

Passaic County (Clifton/Nutley line to Dundee Dam): Anthony DeNova, County of Passaic, 401 Grand Street, Paterson, NJ 07505. (10/26/06)

Rutherford Borough/Bergen County (RM12&13): Timothy Stafford, Borough Administrator, 176 Park Avenue, Rutherford, NJ 07070. (10/25/06)

Town of Harrison/Hudson County (RM 3.5 to 5.6): Peter Higgins, Harrison Redevelopment Agency, 600 Essex Street, Harrison, NJ 07029. (2/13/07)

Town of Kearny (RM 0.0-8.0): Michael J. Martello, Construction Code, 402 Kearny Avenue, Kearny NJ 07032. (1/26/07)

Township of Nutley Essex (RM 8-11): Dominic Ferry, 1 Kennedy Dr. Nutley, NJ 07110.

Township of Bloomfield, Essex County (Third River): Paul D. Lasek, P.E., Township Engineer, 1 Municipal Plaza, Bloomfield, NJ 07003
(10/25/06)

Master Plans

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See Summary of Site Investigations conducted by governmental partnership agencies (USEPA, USACE, NOAA, USFWS, NJDOT and NJDEP) used for remedial action decisions and restoration planning outlined in Table 1 below.

Table B-1. List of Investigations Utilized to inform the remedy selection and restoration planning during the Lower Passaic River Restoration Project

Source: USEPA Remedial Investigation Report for the Focused Feasibility Study – Lower Eight Miles of the Lower Passaic River (Updated- Table 2-1 List of Investigations)

Investigation	Year	Study Name	Surveying Agency	Surveying Entity	Survey Extent (River Mile [RM])	Governing Work Plan
Sediment	2005	2005 Sedflume Testing	USEPA	USACE	RM0 to RM15	Malcolm Pirnie, Inc. August 2005a and January 2006b
	2005	2005 Gust Microcosm Testing	USEPA	Chesapeake Biogeochemical Associates	RM0 to RM15	Malcolm Pirnie, Inc. August 2005a and January 2006b
	2005	2005 USEPA High Resolution Sediment Coring	USEPA	Malcolm Pirnie, Inc.	RM0 to RM15	Malcolm Pirnie, Inc. August 2005a and January 2006b
	2005	Polytechnic Institute (RPI) and Lamont-Doherty Earth Observatory (L-DEO) Upper Passaic High Resolution Sediment Cores	RPI & L-DEO	RPI & L-DEO	Upper Passaic, above Dundee Dam	Malcolm Pirnie, Inc. August 2005a and January 2006b, Field Modification Form, March 23, 2007
	2006	2006 USEPA Low Resolution Sediment Coring	USEPA	Malcolm Pirnie, Inc.	RM0 to RM7	Malcolm Pirnie, Inc. August 2005a and January 2006b
	2007	2007 USEPA Upper Passaic High Resolution Sediment Coring	USEPA	Malcolm Pirnie, Inc.	Upper Passaic	Malcolm Pirnie, Inc. August 2005a and January 2006b
	2007-2008	2007-2008 USEPA Supplemental Sediment Programs	USEPA	Malcolm Pirnie, Inc.	RM0 to RM17	Malcolm Pirnie, Inc. December 2007
	2008	2008 USEPA Suspended-Phase High Flow Storm Event Sampling	USEPA	Malcolm Pirnie, Inc.	RM0 to RM17, tributaries and CSOs/SWOs	Malcolm Pirnie, Inc. December 2007
	2008	2008 Sedflume	USEPA	USACE	RM2.2	Malcolm Pirnie, Inc.

Investigation	Year	Study Name	Surveying Agency	Surveying Entity	Survey Extent (River Mile [RM])	Governing Work Plan
		Consolidation Testing				August 2005a and January 2006b
	2008	2008 CPG Low Resolution Sediment Coring	USEPA	CPG	RM0 to RM17	ENSR, 2008
	2009-2010	2009-2010 CPG Benthic and Surface Sediment Program	USEPA	CPG	RM0 to RM17	AECOM, 2009
	2012	2012 CPG Low Resolution Supplemental Sampling Program	USEPA	CPG	RM0 to RM17	AECOM, 2011
	2013	2013 Low Resolution Second Supplemental Sampling Program	USEPA	CPG	RM 7.2 to RM 14.6	AECOM, 2012
Hydrodynamics	Nov - 2004 to Sep - 2005	November 2004 to September 2005 Malcolm Pirnie, Inc. Survey	USEPA	Malcolm Pirnie, Inc.	Upper 11 miles of Passaic	Malcolm Pirnie, Inc. August 2005a and January 2006b
	Aug - Oct 2004	August to October 2004 Rutgers University Survey First Deployment	USACE & NJDOT	Rutgers University	RM0 to RM6	Malcolm Pirnie, Inc., *et al.* , 2005a
	Nov - 2004 to Jan 2005	November 2004 to January 2005 Rutgers University Survey Second Deployment	USACE & NJDOT	Rutgers University	RM 0 to RM6	
	Jul - Sep 2005	July to September 2005 Rutgers University Survey Third Deployment	USACE & NJDOT	Rutgers University	RM 0 to RM6	
	2005	NJDOT Environmental Dredging Pilot Study	USACE & NJDOT	TAMS/EarthTech & Malcolm Pirnie	Between RM2.6 and RM3	TAMS/EarthTech & Malcolm Pirnie, 2005
	2008-2009	Rutgers University and University of Delaware ADCP Study	Rutgers University	Rutgers University and University of Delaware	Arthur Kill, Kill van Kull, Newark Bay, Passaic River and Hudson River near Newark Bay	Not Available
	2009	TSI ADCP Moorings Study	USEPA	TSI	RMs 2.1, 3.2 and 4.1	Tierra Solutions, Inc., 2009, Revision 2

Investigation	Year	Study Name	Surveying Agency	Surveying Entity	Survey Extent (River Mile [RM])	Governing Work Plan
	2010	CPG Physical Water Column Monitoring Program	USEPA	CPG	RMs 1.4, 4.2, 6.7, 10.2 and 13.5	AECOM, 2010
Water Column	2005	2005 Large Volume Water Column Sampling Study	USEPA	Malcolm Pirnie, Inc.	Passaic	Malcolm Pirnie, Inc. August 2005a and January 2006b
	2005	2005 Small Volume Water Column Sampling Study	USEPA	Malcolm Pirnie, Inc.	Passaic	
	2005	2005 Semi-Permeable Membrane Device Study	USEPA	Malcolm Pirnie, Inc.	Passaic	
	2005	2005 USEPA High-Flow Water Column Suspended Solids Sampling	USEPA	Malcolm Pirnie, Inc.	Passaic	
	2005	NJDOT Environmental Dredging Pilot Study	NJDOT & USACE	TAMS/EarthTech & Malcolm Pirnie	Between RM 2.6 and RM3	TAMS/EarthTech & Malcolm Pirnie, 2005
	2009-2010	2009-2010 CPG Physical Water Column Monitoring	USEPA	CPG	Passaic	AECOM, 2010
	2010	CPG High-Flow Water Column Suspended Solids Sampling	USEPA	CPG	Passaic	AECOM, 2010
	2011-2013	CPG RI Water Column Monitoring/Small Volume Chemical Data Collection	USEPA	CPG	Passaic, Newark Bay, Second River, Third River, Saddle River, Hackensack River, Arthur Kill and Kill van Kull	AECOM, 2012
Ecological	1999	1999 Late Summer/Early Fall Environmental Sampling Program	USEPA	TSI	RM1 to RM7	TSI, 1999
	2000	2000 Spring Environmental Sampling Program	USEPA	TSI	RM1 to RM7	TSI, 1999
	2005	2005 Sediment Profile Imaging Survey of Sediment and Benthic Habitat Characteristics of the Lower Passaic River	USACE & NJDOT	Aqua Surveys, Inc.	RM0 to RM17	Aqua Survey, Inc., 2006
	2005	2005 Taxonomic Identification of Benthic	NJDOT & USACE	Aqua Surveys, Inc.	RM 0 to RM17	Aqua Survey, Inc., 2005

Investigation	Year	Study Name	Surveying Agency	Surveying Entity	Survey Extent (River Mile [RM])	Governing Work Plan
		Invertebrates				
	2009-2010	2009-2010 CPG Benthic and Surface Sediment Program	USEPA	CPG	RM0 to RM17	Windward, 2009
	2009-2010	2009-2010 Fish Community and Tissue Collection Surveys	USEPA	CPG	RM0 to RM17	Windward, 2010
	2010	2010 CPG Habitat Identification Survey	USEPA	CPG	RM0 to RM17	Windward, 2011a
	2010	2010 CPG Summer/Fall Avian Community Survey	USEPA	CPG	RM0 to RM17	Windward, 2011b
	2012	2012 background Fish Tissue Survey	USEPA	CPG	RM 17.4 to RM 21.5 (above Dundee Dam)	Windward, 2012
TSI Newark Bay	2005	TSI Newark Bay Study Phase I	USEPA	TSI	Newark Bay	Tierra, 2005
	2007	TSI Newark Bay Study Phase II	USEPA	TSI	Newark Bay	Tierra, 2007
	Nov-1989	November 1989 Topo-Metrics, Inc. for USACE	USACE	Topo-Metrics, Inc.	RM-0.5 to RM14.98	Not Available
	Mar-1995	March/April 1995 Ocean Surveys, Inc. for TSI	USEPA	TSI	RM0.87 to RM6.97	TSI, 1995
	Nov-1996	November 1996 Ocean Surveys, Inc. for TSI	USEPA	TSI	RM0.87 to RM6.95	TSI, 1995
	Apr-	April 1997 Ocean Surveys,	USEPA	TSI	RM0.87 to RM6.95	TSI, 1995

Investigation	Year	Study Name	Surveying Agency	Surveying Entity	Survey Extent (River Mile [RM])	Governing Work Plan
Bathymetry and Geophysical Surveys	1997	Inc. for TSI				
	Jun-1999	June 1999 Ocean Surveys, Inc. for TSI	USEPA	TSI	RM0.89 to RM6.97	TSI, 1995
	Aug-2001	August 2001 Ocean Surveys, Inc. for TSI	USEPA	TSI	RM0.89 to RM6.96	TSI, 1995
	Jul-2002	July 2002 TVGA Consultants for USACE	USACE	TVGA Consultants	RM-0.44 to RM8.01	Not Available
	Nov-2004	November 2004 Rogers Surveying, Inc. for USACE	USACE	Rogers Surveying, Inc.	RM-0.54 to RM17.42	Not Available
	2005	Aqua Survey Inc. Geophysical and Side Scan Sonar Survey	NJDOT & USACE	Aqua Survey Inc.	RM0 to RM17	Malcolm Pirnie, Inc. August 2005a and January 2006b
	Sep-2007	CPG - Multi-Beam (MB) and Single-Beam (SB) Bathymetry	USEPA	CPG	RM-0.50 to RM14.45 (MB) RM0.5 to RM8.21 and RM14.38 to RM16.54 (SB)	de Maximis, Inc., 2007
	Nov-2008	CPG - Multi-Beam and Single-Beam Bathymetry	USEPA	CPG	RM-0.5 to RM14.26	CPG, 2008
	Jun-2010	CPG - Multi-Beam Bathymetry	USEPA	CPG	RM-0.5 to RM14.27	CPG, 2010
	Oct-2011	CPG - Bathymetric Survey of Lower 14 Miles of the Passaic River After Hurricane Irene	USEPA	CPG	RM-0.5 to RM14.27	CPG, 2010, Field Modification Number: FM-110921

[a]: The original vertical datum for surveys was MLW as defined by the USACE. The transect density for the surveys was approximately 52 transects per mile.

3. Ongoing Restoration (B-2)

Highlighted ongoing ecosystem and restoration efforts within the HRE planning region are provided in Table B-2.

Table B-2. Ongoing Ecosystem and Coastal Restoration within the HRE Planning Regions with Recommended Plan (Excludes Beach Nourishment)

Planning Region	Project Name	Agencies	Project Summary
Multiple	NY & NJ Harbor & Tributaries Coastal Storm Risk Management (CSRM) Study	USACE, NYSDEC, NJDEP, NYC	The NY-NJ Harbor & Tributaries is one of 9 focus areas identified in the North Atlantic Coast Comprehensive Study report (USACE, 2015). The purpose of this study is to investigate comprehensive approaches to improve community resilience and to manage risk of damages from future coastal storms and impacts of sea level rise (SLR). The project will identify and explore areas of coastal storm risk and develop the most feasible comprehensive combination of structural, non-structural, and/or natural and nature-based measures into alternatives that best manage risks from current and projected future coastal flooding in both the short and long term. Interim Feasibility Report was released on February 19, 2019 and a Draft Feasibility Study and Tier 1 Environmental Impact Statement are expected to be released in Spring 2020.
Multiple	Combined Sewer Overflow Abatement Program	NYCDEP and NYSDEC	In 2012, the NYSDEC and NYCDEP signed an agreement to reduce combined sewer overflows and improve water quality through the collection and treatment of sewerage prior to release into the HRE. Under this agreement, several long-term control plans for specific waterbodies and one for NYC were drafted to identify appropriate combined sewer overflow controls necessary to improve water quality. Overflow abatement measures include conducting environmental dredging of several tributaries within the City of New York to remove combined sewer overflow mounds that contribute to nuisance odors and dissolved oxygen deficits within affected waterbodies. These waterbodies include Paerdegat Basin, Flushing Bay, Flushing Creek, Gowanus Canal, Bergen Basin, Fresh Creek, Newtown Creek, and Thurston Basin.
Multiple	NYC Raised Shorelines	NYC	The NYC plans to raise bulkheads and build other shoreline structures in low-lying neighborhoods throughout the City, including a number of low- and moderate-income communities impacted by Hurricane Sandy, to minimize inland tidal flooding, which would worsen neighborhoods in the floodplain, threatening their economic viability and residential stability. The component planned for the Tottenville area of Staten Island will continue to be coordinated with Living Breakwaters (DB#5) and Tottenville Dunes (DB#597).

Planning Region	Project Name	Agencies	Project Summary
			Construction began August 1, 2017 and is expected to be completed by December 21, 2022.
Multiple	Billion Oyster Project	NY Harbor School	NY Harbor School with goal to bring back one billion oysters - self sustaining oyster reefs to New York Harbor. **HRE - Small Scale Oyster Restoration recommended advance the BOP program with NY Harbor School who will be construction sponsor.**
Lower Bay	South Shore of Staten Island Coastal Storm Risk Management	USACE, NYSDEC	The project is divided into two phases of study. Phase 1 (Ft. Wadsworth to Oakwood Beach) analyzed solutions and recommended levees, floodwalls and non-structural measures to reduce hurricane and storm damage: Final Feasibility Report/EIS and ROD completed in December 2016. The Design Phase for preparations of plans and specifications began in early 2017 and construction is estimated to begin late 2020. It was determined that there was no Federal interest for Phase 2 (Great Kills to Tottenville) however the State and City of New York are continuing to plan other projects for this area such as Living Breakwaters and Tottenville Shoreline Protection Project.
Multiple	Public Greenways	NYC, NYCDPR, NYCDOT, Byron and Bronx River Alliance, NYCEDC	Waterfront Greenway initiatives include: • MillionTrees NYC, a PlaNYC initiative, is a public-private program. In 2015, two (2) years ahead of schedule, MillionTrees NYC achieved the program goal of planting 1,000,000 trees in New York City. • The Manhattan Waterfront Greenway is a 32-mile multiuse trail that circumnavigates Manhattan Island, and includes over 23 miles of waterfront pathways and facilitates access to over 1,500 acres of parkland throughout the borough. The greenway builds on recent efforts to transform a long-neglected waterfront into a green attraction for recreational and commuting use. • Construction on the South Bronx Greenway and the Bronx River Greenway is underway encompassing 1.5 miles of waterfront greenway, 8.5 miles of inland green streets, and nearly 12 acres of new waterfront open space throughout the Hunts Point and Port Morris neighborhoods in the Bronx. The Bronx River Greenway extends for 23 miles along the Bronx River, from Westchester County to Soundview Park in the South Bronx. Approximately 19 miles of the greenway are currently in place with completion anticipated within the next decade. • The Brooklyn Waterfront Greenway is a 26-mile route linking neighborhood parks and open spaces from Greenpoint to Lindenwood/Howard Beach. To date 18 miles have been completed with eight (8) miles remaining. https://www.brooklyngreenway.org/ portions of the Brooklyn waterfront Greenway and the Jamaica Bay greenway overlap

Planning Region	Project Name	Agencies	Project Summary
			• The Jamaica Bay Greenway will be a 28-mile network of bicycle and pedestrian paths connecting more than 10,000 acres of parks and beaches. More than 10 miles are in place.
Multiple	Ecological Solutions to Coastal Community Hazards	NFWF, NJDEP, Sustainable Jersey, NJ Sea Grant Consortium	NJDEP will convene an experienced team of public and private stakeholders to address the need for community resiliency strategies and preventive actions for NJ's many ecologically significant coastal areas that are threatened by dense coastal development and climate change impacts. Hurricane Sandy emphasized the need for community resiliency strategies and preventative actions to minimize future impacts. Ecosystem-based infrastructure approaches can provide a cost effective solution that will protect critical habitat and people. However, there is no systematic approach for developing or providing green infrastructure nor is there a current system that can determine which communities would make good candidates for green infrastructure. The NJDEP will work with partners to systemically identify ecological resiliency strategies and develop them into successful, ready to use local actions. Twenty municipalities will receive green infrastructure viability assessments through this project. Nine pilot communities will then complete specific resiliency projects with project team assistance and be used as green infrastructure success models.
Lower Bay	Tottenville Shoreline Protection System	NYS GOSR, NYC	NYS GOSR project through NY Rising Community Reconstruction Program. The proposed project would construct resilient dune structures and plantings along a portion of the South Shore of Staten Island, which was expanded through regional coordination efforts. This on-shore project will be analyzed with the off-shore Living Breakwaters project (DB#5) in a single DEIS. Both projects are being coordinated with the area component of the NYC Raised Shorelines project (DB#695). The final designs were expected to be completed end of 2019 and construction is expected to begin end of 2020.
Jamaica Bay	Spring Creek North	USACE, NYCDPR	Continuing Authorities Program (CAP) Section 1135 Ecosystem Restoration of 7.6 acres of low marsh, 5.4 acres of high marsh, 22.1 acres of maritime upland for total of 35.1 acres of habitat. Project Partnership Agreement executed in August 2018 to initiate design and implementation phase.
Jamaica Bay	Jamaica Bay Oyster Population Restoration	NFWF, NYCDEP	DOI's Sandy Coastal Resiliency grants administered by NFWF to NYCDEP to restore oyster beds across half an acre in the northeastern end of Jamaica Bay at the Head of Bay. Models from previous studies showed that the location site has ideal conditions that will promote oyster growth, recruitment, and larvae retention potential. **The HRE small scale oyster restoration recommended in the FR/EA expands this oyster restoration project.**

Planning Region	Project Name	Agencies	Project Summary
Jamaica Bay	Sunset Cove's Salt Marsh and Upland Habitat	NFWF, NYCDPR	DOI's Sandy Coastal Resiliency grants administered by NFWF to NYC Department of Parks and Recreation to restore 4.5 acres of salt marsh and 7 acres of upland habitat on Sunset Cove, a 12.57 acre parcel located on a former abandoned and derelict marina in Broad Channel, Queens. Nearly the entire island of Broad Channel was flooded during Hurricane Sandy with inundation ranging from 3-10 feet. The restored salt marsh will connect to adjacent wetland complexes within Jamaica Bay. The existing hardened shoreline will be rehabilitated and enhanced to improve water quality and provide oyster and shellfish habitat. Phase 1 of this project was completed in June 2019.
Jamaica Bay	Atlantic Coast of NY, East Rockaway to Rockaway Inlet, & Jamaica Bay Reformulation Study	USACE, NYSDEC, NYC	In August 2019, the Chief's Report for the Atlantic Coast of New York East Rockaway Inlet to Rockaway Inlet and Jamaica Bay Hurricane Sandy Reformulation Study was signed by Lt. Gen. Todd T. Semonite, USACE Commanding General and has been transmitted to the Assistant Secretary for the Army for Civil Works for review and final approval. The preferred alternative includes a hurricane barrier from Coney Island to Breezy Point and interim risk offset measures within the Bay. Construction start of the first phase is targeted for 2020-21, but will depend on the length of reviews and approvals, and the relative complexity of design. Documents are available at: http://www.nan.usace.army.mil/Missions/Civil-Works/Projects-in-New-York/East-Rockaway-Inlet-to-Rockaway-Inlet-Rockaway-Be/. **Jamaica Bay shoreline sites recommended in this HRE FR/EA could serve as NNBFs and complement solutions from the reformulation effort.**
Jamaica Bay	Fresh Creek Coastal Protection	NYS GOSR	This NY Rising project would fund flood protection measures to capture storm surge and rising waters at the most vulnerable areas along Fresh Creek in Canarsie, Brooklyn. The target area is along Fresh Creek and E. 108th Street between Avenue J and N. **Fresh Creek Restoration recommendation wojuld complement this project.**
Jamaica Bay	Bay Park Waste Water Treatment Plant Nitrogen Removal System	NY State	NYS has pledged to develop and construct a nitrogen removal system at Bay Park. (See DB#57 and DB#334 for other components.)
Jamaica Bay	Jamaica Bay Rockaway Inlet Federal Navigation Channel - Operation & Maintenance Dredging	USACE	The existing project provides for an entrance channel 20 ft deep at mean low water, 1,000 ft wide, about 1.7 mi long and connecting two interior channels with deep water in the Atlantic Ocean, of suitable hydraulic dimensions to maintain the present tidal prism in the bay. The channel extends from Rockaway Inlet into Jamaica Bay. **Dredge material can be beneficially used at Jamaica Bay marsh islands** or along the Rockaway Peninsula.

Planning Region	Project Name	Agencies	Project Summary
Jamaica Bay	South Valley Stream Shoreline Restoration	NYS GOSR	Restore the natural shoreline in South Valley Stream along "The Path" by constructing a living shoreline to buffer tidal flow, planting trees and other vegetation, repairing outfalls, and installing green infrastructure measures with educational signage to capture stormwater runoff.
Jamaica Bay	Riis Park Shoreline and Parking Lots	NPS	Replace 1-mile seawall and repair all parking lots and shoreline structures. Project includes work that was accomplished in 2013 and 2014 on ancillary components. The seawall assessment is complete and repair of Sandy damage is in design. The seawall has a large amount of non-hurricane damage that will not be covered by Sandy funding. The Sandy work will result in a stable seawall for the next 5 years. The remaining Riis parking area repairs are in pre-design. Project location is at Gateway National Recreation Area.
Jamaica Bay	Fort Tilden Shore Access and Resiliency Project	NPS	Project will rebuild the damaged sections of Shore Road near Fort Tilden inside Gateway National Recreation Area in Jamaica Bay and Breezy Point. The EA identified the preferred alternative is Alternative D, which includes: (1) undamaged section of Shore Rd to remain, (2) pathway constructed along damaged and deconstructed roadway, (3) sand-trapping fences installed to facilitate dune accretion, (4) dunes planted with native vegetation, (5) existing bulkhead removed to -3 feet below existing ground line, (6) wooden groins removed completely, (7) demolition of buildings 15, 16, 17 and 18, and (8) Battery Kessler access secured and allowed to naturally decay. Funding will be combination of NPS Sandy Recovery funds and FHWA ERFO funds.
Jamaica Bay	Breezy Point Risk Mitigation System	NYCSBS	The proposed work concerns the protection of Breezy Point and Roxbury Beach from flooding. Both communities are located along a narrow peninsula, home to a residential community with a summer residency of 12,000 and year-round residency of 4,300. Rockaway Point Blvd., the main ingress and egress, was flooded during Sandy, preventing firefighters from combating a fire which consumed over 115 homes. Project proposes combined flood protection including double dunes, permanent PVC sheet pile walls, and additional deployable or permanent walls. Proposed designs are conceptual. FEMA's HMGP grant is phased, with FEMA phase 1 funding of $2.9 million (federal share) and $3,866,667 in total costs authorized, for analysis of cost effectiveness, technical feasibility, engineering and design, and Hydrologic and Hydraulics; as well as permits, NEPA and administrative cost recovery. NYC has submitted request to HUD to allocate $14.5 million in CDBG-DR funds as local match (25%). Construction funds are contingent on EA/FONSI and other deliverables that will be done as part of phase 1. If the phase 1 criteria are met and project passes review, it would be approved for phase 2,

Planning Region	Project Name	Agencies	Project Summary
			with FEMA then to consider remaining funds in an amount not to exceed 54,277,647.
Harlem River, East River, Western Long Island Sound	Shoelace Park Restoration	NYCDPR and NYCDEP	NYC Parks' ongoing efforts within Shoelace Park to conduct invasive species removal and native plantings and NYCDEP's CSO Abatement Program to improve water quality. **The HRE Bronx River- Shoelace Park site recommended in this FR/EA will complement and has considered these efforts in the future without project conditions (FWOP).**
Harlem River, East River, Western Long Island Sound	Garth Woods, Bronx River Restoration	Westchester County Department of Planning	Restoration of Garth Woods site that will reallign the Bronx River channel to improve hydrology; remove invasive plant species and native planting. **The HRE Bronx River - Harney Road/Garth Woods site recommended in this FR/EA will be coordinated and complement the County's efforts and was considered in the FWOP).**
Harlem River, East River, Western Long Island Sound	Flushing Creek Environmental Dredging	NYCDEP	NYCDEP plans to dredge Flushing Creek and Bay to remove the top 3-ft of sediment and place clean cap material in order to improve benthic habitat, hydrology and odor control. **The HRE - Flushing Creek restoration project recommended in this FR/EA will be closely coordinated and timed with NYCDEP environmental dredging of adjacent creek.**
Harlem River, East River, Western Long Island Sound	Flushing Creek Long Term Control Plan	NYCDEP	NYCDEP is implementing green infrastructure plans to help mitigate stormwater from entering the sewer system by installing hundreds of streetside bioswales to manage stormwater on the streets and sidewalks. By 2030, DEP intends to manage 8% of Flushing Creek's watershed and 13% of Flushing Bay's watershed impervious cover with green infrastructure. **This program is important for the sustainability of the restoration project at Flushing Creek.**
Harlem River, East River, Western Long Island Sound	Roberto Clemente State Park Shoreline and Park Improvements	NYState	Improvements to approximately 16 acres of 25-acre Roberto Clemente State Park, including replacement of existing sheet pile bulkhead, reconstruction of adjacent esplanade, creation of tidal/intertidal natural habitat for plants and storm water absorption, and upland improvements. FEMA PA grant of $1.5 million for repair to concrete bulkhead. NYS issued FONSI July 21, 2014 as HUD responsible entity, which was used by FEMA EHP to support its environmental determination.
Harlem River, East River, Western Long Island Sound	Bronx River Shoreline at Starlight Park	NFWF	One of DOI's Sandy Coastal Resiliency grants administered by NFWF. The New York City Department of Parks and Recreation will carry out shoreline restoration efforts on the Bronx River, New York City's only freshwater river, to improve the river's recovery and increase community resiliency. Since the late 1990's, there has been a collaborative community and government effort to transform the Bronx River from an abandoned dumping ground into an ecological, economic, recreational, and educational resource. The restoration

Planning Region	Project Name	Agencies	Project Summary
			area is located in the South Bronx between Westchester Avenue and 172nd Street in the tidal estuary of the river. The project will revitalize floodplain functions for 1.7 acres, re-naturalize 740 feet of armored shoreline, and restore native saltmarsh grasses on half an acre of new wetland habitat. Further, 11 acres of parkland will be enhanced using stormwater best management practices and have reduced toxic substance exposure through the removal of contaminated fill. NFWF is administering a grant totaling $4,400,000, which includes $4,350,000 in DOI funds, and $50,000 in private foundation funds. Design was completed in April 2016. Bid packages for site remediation, wetlands creation, and Bronx River shoreline re-naturalization were due in April 2016. Comments from NYSDEC and USACE on 1st permit submission are being addressed.
Harlem River, East River, Western Long Island Sound	Hunts Point Resiliency	NYCEDC	One of the winning proposals from HUD's Rebuild by Design competition. The current scope of the project includes the continued study, analysis, planning, and stakeholder engagement related to the proposal and the design and construction of a resulting pilot project at Hunts Point in the Bronx. Total HUD CDBG-DR funds for the project is $51 million, with $20 million from the Rebuild by Design allocation.
Newark Bay, Passaic River, Hackensack River	Diamond Alkali Superfund Site- Remedial Investigation/Feasibility Study	USEPA	RI/FS for lower 17-mile study area (including tributaries) from Dundee Dam to Newark Bay- Operable Unit 2 [Coordinated Restoration Program since 2003] and Newark Bay RI/FS (Operable Unit 3). **Restoration of Oak Island Yard would be implemented after remediation and additional restoration opportunities in Newark Bay and Lower Passaic would be coordinated and sequenced with the superfund program.**
Newark Bay, Passaic River, Hackensack River	RBD Meadowlands Flood Protection Project	NJDEP	One of the winning proposals from HUD's Rebuild by Design competition. Funds will support the first phase of a flood protection project in the northern New Jersey meadowlands, within the Boroughs of Little Ferry, Moonachie, Carlstadt, and Teterboro, and the Township of South Hackensack. Such measures will be designed to address the impacts of coastal and riverine (fluvial) flooding on the quality of the human environment in the Project Area due to both sea level rise and storm hazards, including heavy rainfall events and intense coastal storm events. The approximate Project Area boundaries are: Hackensack River to the east; Paterson Plank Road and the southern boundary of Carlstadt to the south; State Route 17 to the west; and Interstate 80 and the northern boundary of the Borough of Little Ferry to the north.
Newark Bay, Passaic River,	Joseph G. Minish Passaic River Waterfront Park	USACE, NJDEP	Construction of 1 mile of bulkhead (steel sheet piles with concrete cap) at Minish Passaic River Waterfront Park, Newark. Construction scheduled to start in February 2020. Phase I of the project includes 6,000 linear feet of

Planning Region	Project Name	Agencies	Project Summary
Hackensack River			bulkhead construction and 3,200 linear feet of riverbank grading and native plantings. Two bulkhead construction reaches have been completed north of Penn Station and construction is ongoing new to Jackson Street Bridge. Partners are working towards a project agreement for Phase II/III design and construction of a waterfront walkway and park.
Newark Bay, Passaic River, Hackensack River	Newark Bay Wetlands Restoration Project	NFWF	One of DOI's Sandy Coastal Resiliency grants administered by NFWF. The City of Newark, NJ will carry out restoration efforts on a 12 acre are located along the Newark Bay, a tidal bay located at the confluence of the Passaic and Hackensack Rivers, to improve wetland resiliency functions and habitat for threatened and endangered species. Due to its proximity to Newark Bay and regular tidal inundation, the restoration site provides an excellent opportunity for wetland restoration, enhancement, and preservation. Much of this site contains degraded wetlands that are being affected by invasive species or severe shoreline erosion along the Newark Bay. If left in its current state, the site will continue to erode thereby exposing itself to the effects of sea level rise and increasingly powerful Atlantic storms. Yellow and black-crowned night herons have been seen and documented within the parcel area. Unfortunately, the invasive species Phragmites australis occupies four acres of the site and continues to encroach upon many areas that would otherwise support native vegetation. Benefits from this restoration project includes the creation of desirable habitat, improvements to flood control, reduction in erosion into Newark Bay, and skilled workers who can become natural resource stewards. In October 2015, Newark's Department of Economic and Housing Development issued an RFP for "engineering design, permitting and construction oversight services for the stablization and restoration of a 12.1 acre tidal wetland located in the City of Newark on Newark Bay." **HRE-Oak Island Yard adjacent site that will result in habitat connectivity and increased benefits.**
Upper Bay	Red Hook Integrated Flood Protection System	NYCORR	This project in Red Hook, Brooklyn proposes a combination of permanent and long-term components (e.g., multi-purpose berms, deployable flood walls, street elevations, and landscape and drainage improvements). FEMA 404 HMGP advance assistance funds obligated. FEMA's Hazard Mitigation Grant Program-Advanced Assistance (HMGP-AA) program study. For subsequent project phases, the City and the State have committed $50 million in HUD CDBG-DR funds and $50 million in HMGP funds for a total of $100 million in funding to be used for environmental review, permitting, design, engineering and construction.

Planning Region	Project Name	Agencies	Project Summary
Upper Bay	Liberty State Park Restoration (HRE Project Authorized - WRDA 2007)	NJDEP (USACE IIS)	NJDEP- Office of Natural Resource Restoration has contracted with the USACE to design and construct restoration at Liberty State Park. The project will restore 234 acres including ~ 44 acres of tidal marsh, 25.6 acres of fresh water wetland features, 50 acres of grasslands, enhancement of 100 acres of urban forest. In addition, the plan includes public amenities such as restrooms, pedestrian walkways and bridges and parking lots.
Lower Bay	Oyster Restoration Project	NY/NJ Baykeeper	Oyster restoration at Naval Weapons Station Earle with testing a variety of oyster techniques (e.g., spat on shell, oyster castles, gabions). **The HRE - Oyster restoration at Naval Weapons Station Earle will expand NY/NJ Baykeeper's reef project.**
Lower Bay	Strengthening Coney Island's Resiliency Through Green Streets	NFWF, NYCDPR	DOI's Sandy Coastal Resiliency grants administered by NFWF to NYCDPR to carry out a project to improve resiliency in the Brighton Beach neighborhood on New York City's Coney Island, an area that has long been vulnerable to damage from storm surge and flooding and is expected to experience additional climate change risks from rising sea levels, increased storms, and precipitation. This community also experiences frequent localized flooding due to the area's topography and degraded road conditions. The project will install 11 green streets to mitigate localized flooding, capture and filter 2,583,482 gallons of stormwater runoff per year, and reduce pollutants from entering local waterways. Additional environmental benefits will also be provided including beautification, urban heat island effect mitigation, carbon sequestration, increased biodiversity, and improved air quality. This project will initiate Brighton Beach's transformation of the right-of-way to develop productive green space. Further, Brighton Beach will also serve as a model as New York City expands its green streets program to Coney Island and other communities in the Jamaica Bay Watershed. As of April 2016, the contract award is scheduled for Q3 2016, and construction is scheduled for Q4 of 2016. Funding includes a DOI grant of $990,000 and matching funds from NYC DPR of $333,333. Construction began September 2019 and is 5% complete as of January 27, 2020.
Lower Bay	Coney Island Creek	NYCEDC	This study would investigate hydrological management strategies that would prevent and mitigate upland flooding, improve waterfront open space, strengthen neighborhood connections, enhance infrastructure, and provide opportunity for economic development around the Creek.
Lower Bay	Monmouth Beach Marshes and Dunes	NFWF	One of DOI's Sandy Coastal Resiliency grants administered by NFWF. The borough of Monmouth Beach, NJ will restore and enhance two coastal landscapes that serve as natural barriers to the impacts of storms that were destroyed or severely weakened by Hurricane Sandy. The borough has a

Planning Region	Project Name	Agencies	Project Summary
			population of 3,200 and occupies two square miles, of which one square mile is upland. The borough lies between two bodies of water with Atlantic Ocean to the east side and Shrewsbury River to the west side. Given the proximity to both bodies of water, the borough was severely impacted by Hurricane Sandy which inflicted over $6 million of infrastructure damage to sewer systems, town buildings, a school, and waterfront structures. Additionally, streets were flooded with up to six feet of water and one third of citizens' homes were damaged or destroyed. A 5,000-foot coastal dune system along the Atlantic Ocean will be restored to help absorb and dissipate the ocean's wave energy during storms. The dune will be restored with local wildlife officials' input to provide optimum nesting habitat for endangered species including piping plovers, least terns, and black skimmers. Several marsh islands in the Shrewsbury River will also be restored and provide over 17 acres of habitat for wading and roosting birds, while reducing wave impacts to homes and infrastructure. The project is supported by $1,317,250 in DOI funds, $1,750,000 in in-kind services/materials from USACE, and $462,750 in NFWF private foundation funds.
Lower Bay	Great Kills Harbor Breakwater Study	NYC NYS	NYSDEC Hudson River Estuary Program and the New York City Mayor's Office of Recovery and Resiliency and Department of City Planning have released a study evaluating the use of offshore breakwaters to mitigate wave action and erosion at Great Kills Harbor, on the eastern shore of Staten Island. The study was funded through a partnership with the New England Interstate Water Pollution Control Commission. The report was completed last year.

4. Completed Restoration Efforts (B-3)

The completed restoration and resilience projects conducted by the USACE and regional partners are highlighted in the NY-NJ Harbor Estuary Progress Report. Included is the 2009-2014 report, the 2014-2016 update, and the 2017-2019 update.