

CWSRF ELIGIBLE ESTUARY ELEMENTS OF THE NEW NY BRIDGE PROJECT

The New York State Environmental Facilities Corporation

Infrastructure Financing for a Cleaner New York



Statutory Authority

The general authority for the CWSRF program is stated in §601(a) [33 U.S.C. 1381]:

... grants to each State for the purpose of establishing a water pollution control revolving fund for providing assistance (1) for construction of treatment works (as defined in section 212 of this Act) which are publicly owned, (2) for implementing a management program under section 319 of this Act, and (3) for developing and implementing a conservation and management plan under section 320 of this Act.

This authority is restated in §603(c) [33 U.S.C. 1383], where the uses of the fund are limited to:

...providing financial assistance (1) to any municipality, intermunicipal, interstate, or State agency for construction of publicly owned treatment works (as defined in section 212 of this Act), (2) for the implementation of a management program established under section 319 of this Act, and (3) for development and implementation of a conservation and management plan under section 320 of this Act.



CWSRF Project Eligibility

- **CWSRF Administered by EFC for the New York State Department of Environmental Conservation (DEC)**
- **Types of projects eligible for funding include:**
 - Point Source Projects (Clean Water Act Section 212)
 - Projects which assist in the implementation of the state's Non-Point Source Management Plan (Clean Water Act Section 319)
 - Projects which assist in the development and implementation of a U.S. EPA Approved National Estuary Comprehensive Conservation and Management Plan (CCMP) (Clean Water Act Section 320)



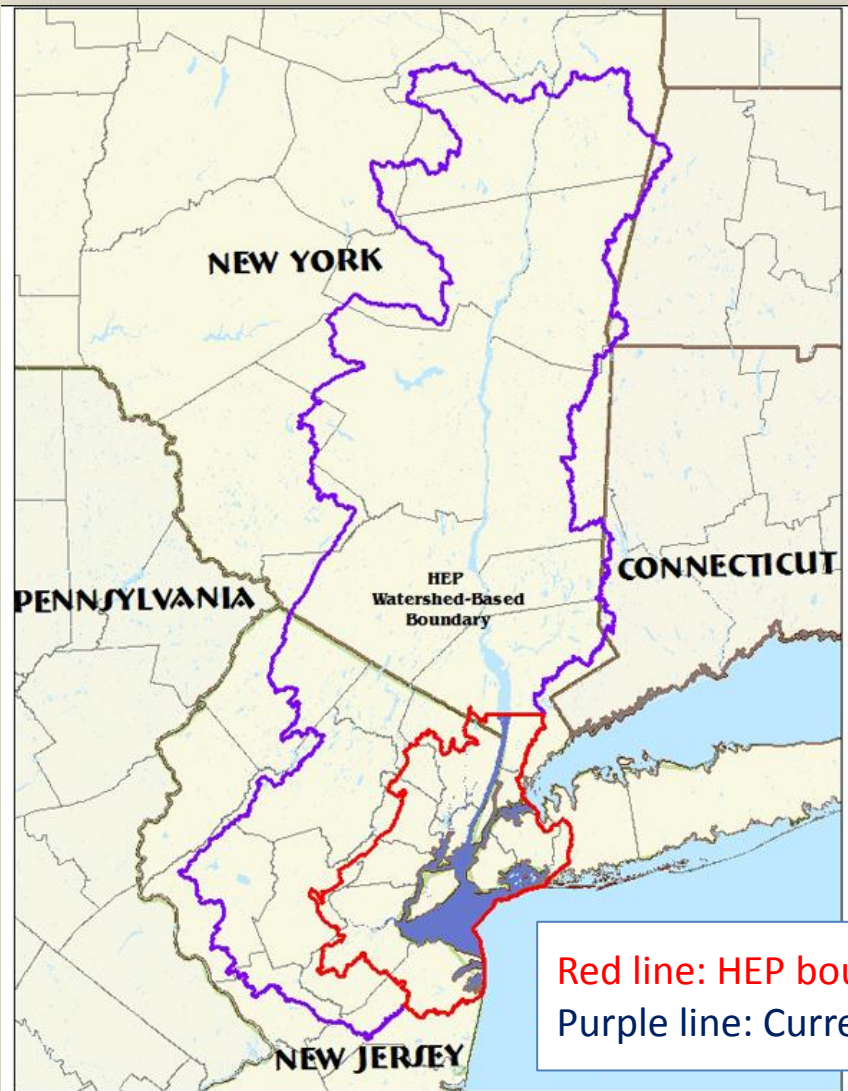
New York / New Jersey Harbor and Estuary Program (HEP) CCMP Implementation

Primary planning documents

- **Comprehensive Conservation and Management Plan (CCMP)**
Adopted in 1996, outlines a comprehensive strategy to achieve HEP's goal through eight facets management of: habitat and living resources, toxic contamination, dredged material, pathogenic contamination, floatable debris, nutrients and organic enrichment, and rainfall-induced discharges; and public involvement and education.
- **Action Plan (2011 – 2015)** Reflects new information, evolving priorities, and progress on recommended funding priorities. It incorporates several reports including the Hudson Raritan Estuary Comprehensive Restoration Plan (CRP).



The NNYB is located within the Federally-recognized New York – New Jersey Harbor and Estuary



Red line: HEP boundary pre-2011
Purple line: Current boundary

All projects within the Estuary that implement measures identified in the CCMP are eligible 320 projects for the CWSRF



CWA Section 320 Project Elements

Elements related to the Clean Water Act Section 320 – Estuary objectives included in the CCMP

- Gay's Point Restoration
- Piermont Marsh Restoration
- Oyster Bed Restoration
- River Bottom Armoring
- Stormwater Treatment at Landings
- Underwater Noise Protection
- Dredging and Mound Removal
- Dredge Material Disposal
- Falcon Nest Box Relocation
- Removal of Existing Structure
- Shared Use Path
- Net Conservation Benefit Plan (Sturgeon)



Summary of CWSRF Eligible Project Elements

1996 NY / NJ Harbor and Estuary CCMP Program Areas

New NY Bridge-Eligible Project Elements	Management of Habitat and Living Resources	Management of Toxic Contamination	Management of Dredged Material	Management of Pathogenic Contamination	Management of Floatable Debris	Management of Nutrients and Organic Enrichment	Rainfall-Induced Discharges	Public Involvement and Education
Gay's Point Restoration	X					X		X
Piermont Marsh Restoration	X	X				X		X
Oyster Bed Restoration	X					X		
River Bottom Armoring	X							
Stormwater Treatment at Landings	X				X	X	X	
Underwater Noise Protection	X							
Dredging and Mound Removal	X	X	X					
Dredge Material Disposal		X	X		X			
Falcon Nest Box Relocation	X							
Removal of Existing Structure	X	X			X			
Shared Use Path	X							X
Net Conservation Benefit Plan (Sturgeon)	X							X



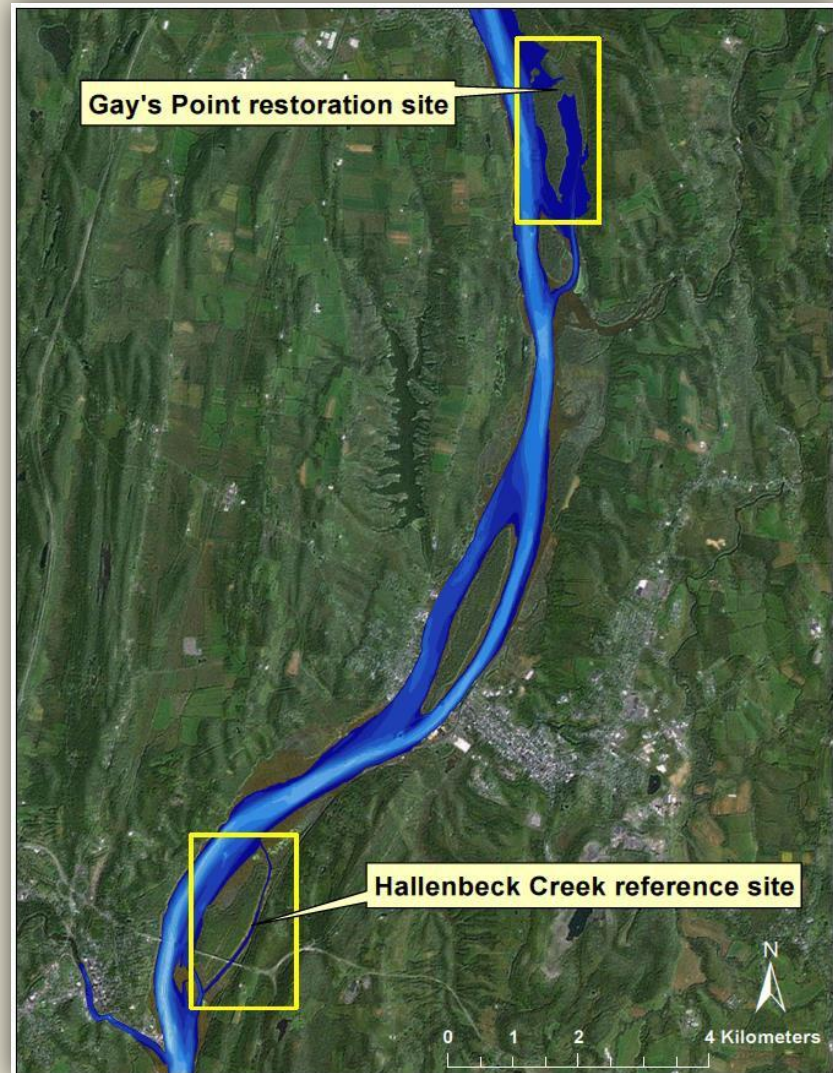
Gay's Point Restoration

Cost = \$1,400,000

Scope:

This element consists of restoring a secondary channel at Gay's Point in Columbia County and will be planned and designed in consultation with NYSDEC. Gay's Point currently consists of an artificially created tidal embayment that is separated from the main river channel by dredge fill. The purpose of this restoration would be to restore productivity, species diversity and resiliency to the ecosystem by recreating the lost physical structures and their associated ecological functions.

Schedule: Anticipated Start Summer 2017 & Complete Fall 2017



Gay's Point Restoration

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-3 Manage Coastal Development
- Goal H-4 Manage Shoreline and Aquatic Habitat Modifications
- Goal H-5 Maintain Healthy Estuarine Conditions by Managing Freshwater Inputs
- Goal H-7 Preserve and Improve Fish, Wildlife and Plant Populations and Biodiversity
- Goal H-9 Increase Public Education, Stewardship and Involvement on Issues Related to Management of Habitat and Living Resources
- Goal H-10 Complete Ongoing Research and Initial Special Studies on Habitat Issues
- Goal H-11 Identify Significant Coastal Habitats Warranting Enhanced Protection and Restoration
- Goal H-12 Develop and Implement Plans to Protect and Restore Significant Coastal Habitats and Impacted Resources

Section 4.5 – Management of Nutrients and Organic Enrichment

- Goal N-4 Develop and Implement Additional Actions Necessary to Eliminate Adverse Effects of Eutrophication, Including Hypoxia, on Marine Life in the Harbor, Bight and Long Island Sound
- Goal N-5 Conduct Additional Studies to Understand the Causes of Hypoxia, Algal Blooms, and other Eutrophication Effects.

Section 4.7 – Public Involvement and Education

- Goal E-2 Build Community Awareness, Appreciation, and Understanding of the Ecosystem and its Importance; and Encourage Action at the Community Level
- Goal E-4 Increase Communication and Foster Cooperation Among Stakeholders and Others Involved with Ecosystem Management, Protection and Stewardship Activities



Piermont Marsh Restoration

Scope:

Cost = \$800,000

This element consists of development and implementation of a restoration and marsh management plan for the restoration of Piermont Marsh, located immediately downstream of the bridge.

Schedule: TBD



Piermont Marsh Restoration

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-1 Develop a Comprehensive Regional Strategy to Protect the Harbor/Bight Watershed and to Mitigate Continuing Adverse Human-induced Effects
- Goal H-2 Control Point and Non-Point Loadings of Pollutants
- Goal H-3 Manage Coastal Development
- Goal H-4 Manage Shoreline & Aquatic Habitat Modifications
- Goal H-5 Maintain healthy estuarine conditions by managing freshwater inputs
- Goal H-7 Preserve and Improve Fish, Wildlife, & Plant Populations & Biodiversity
- Goal H-9 Increase public education, stewardship, and involvement on issues related to management of habitat and living resources
- Goal H-12 Develop and implement plans to protect and restore significant coastal habitats and impacted resources

Section 4.2 - Management of Toxic Contamination

- Goal T-3 Minimize the Discharge of Toxic Chemicals from CSOs, Storm Water & Non-point Sources



Piermont Marsh Restoration

CCMP Objectives Continued:

Section 4.5 - Management of Nutrients & Organic Enrichment

- Goal N-3 Develop and implement, as appropriate, low-cost nitrogen reduction actions
- Goal N-4 Develop and implement additional actions necessary to eliminate adverse effects of eutrophication, including hypoxia, on marine life in the Harbor, Bight, and Long Island Sound.
- Goal N-5 Conduct additional studies to understand the causes of hypoxia, algal blooms, and other eutrophication effects

Section 4.7 – Public Involvement and Education

- Goal E-2 Build community awareness, appreciation, and understanding of the ecosystem and its importance; and encourage action at the community level
- Goal E-4 Increase communication and foster cooperation among stakeholders and other involved with ecosystem management, protection, and stewardship activities



Oyster Bed Restoration

Scope:

Cost = \$1,200,000

Restoration of shell oyster habitat, including the Phase 1 handling & relocation of shell material taken from the 8-acre dredge area and Phase 2 additional future restoration work.

Schedule:

Phase 1 – Complete Summer 2013

Phase 2 - TBD



Oyster Bed Restoration

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-1 Develop a Comprehensive Regional Strategy to Protect the Harbor/Bight Watershed and to Mitigate Continuing Adverse Human-induced Effects
- Goal H-4 Manage Shoreline & Aquatic Habitat Modifications
- Goal H-6 Minimize Human Disturbance of Natural Habitats
- Goal H-7 Preserve and Improve Fish, Wildlife, & Plant Populations & Biodiversity
- Goal H-9 Increase public education, stewardship, and involvement on issues related to management of habitat and living resources
- Goal H-10 Complete ongoing research and initiate special studies on habitat issues
- Goal H-12 Develop and implement plans to protect and restore significant coastal habitats and impacted resources

Section 4.5 - Management of Nutrients & Organic Enrichment

- Goal N-4 Actions to eliminate adverse effects of eutrophication & hypoxia on marine life



River Bottom Armoring

Scope:

Cost = \$29,900,000

This element consists of armoring the dredge channel with a two foot layer of sand and gravel to prevent re-suspension of sediments caused by tug prop wash.

Schedule:

Armoring Stage 1 - Start Summer 2013 & Complete Spring 2014

Armoring Stage 2 – Anticipated Start Summer 2014 & Complete Fall/Winter 2014/2015



River Bottom Armoring

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-1 Develop a Comprehensive Regional Strategy to Protect the Harbor/Bight Watershed and to Mitigate Continuing Adverse Human-Induced Effects
- Goal H-4 Manage Shoreline and Aquatic Habitat Modifications
- Goal H-6 Minimize Human Disturbance of Natural Habitats
- Goal H-7 Preserve and Improve Fish, Wildlife, and Plant Populations and Biodiversity
- Goal H-10 Complete Ongoing Research and Initiate Special Studies on Habitat Issues
- Goal H-12 Develop and Implement Plans to Protect and Restore Significant Coastal Habitats and Impacted Resources



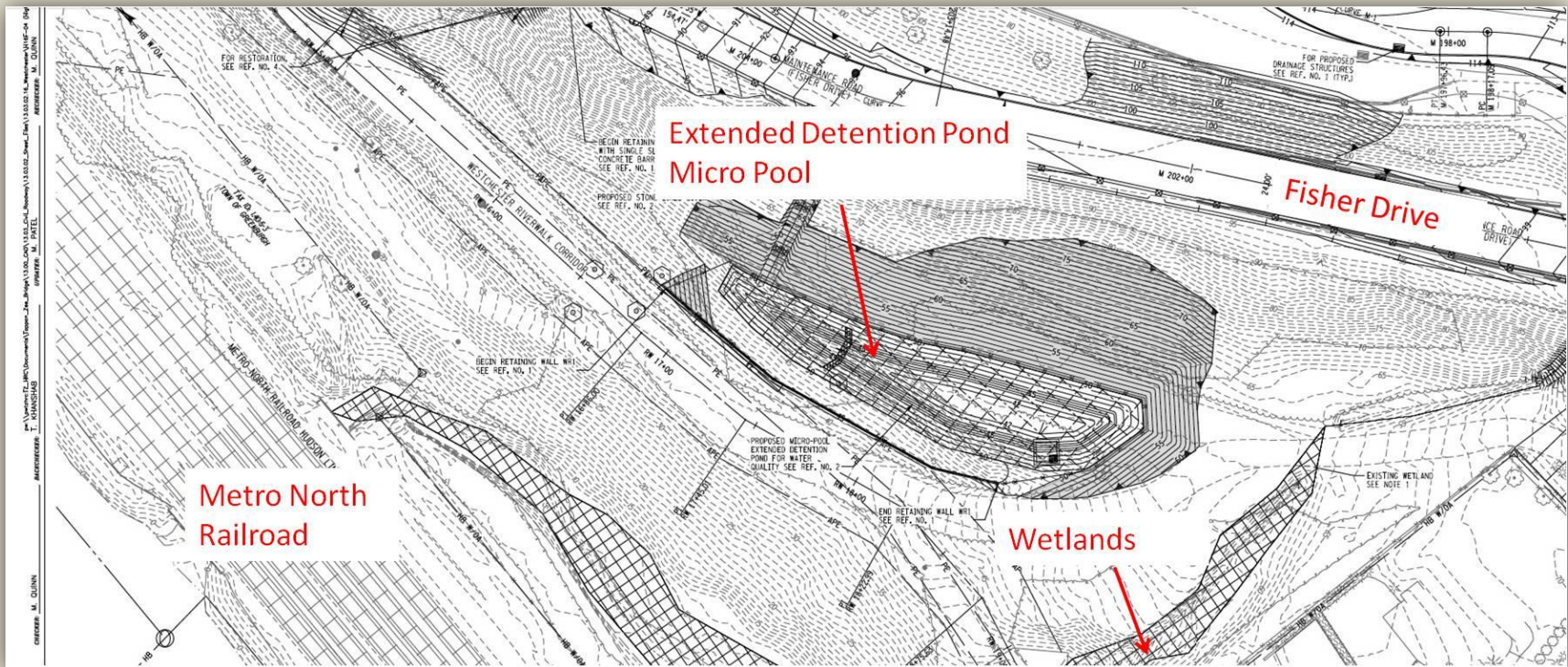
Stormwater Treatment at Landings

Scope:

Cost = \$14,400,000

This element consists of all required drainage work associated with stormwater management & treatment for runoff at both the Rockland and Westchester Landings, in accordance with NYSDEC's Stormwater Management Design Manual.

Schedule: Start Summer 2013 & Complete Spring 2018



Stormwater Treatment at Landings

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-2 Control Point and Non-Point Loadings of Pollutants

Section 4.4 - Management of Floatable Debris

- Goal F-6 Reduce Loadings of Floatables from Storm Water Discharges

Section 4.5 - Management of Nutrients & Organic Enrichment

- Goal N-3 Develop and Implement, as Appropriate, Low-Cost Nitrogen Reduction Actions

Action Plan Objectives:

Goal 1, 1B & 1C – Minimize Loads of Pollutants Entering the Harbor/Bight

Goal 4 & 4C – Implement Nitrogen Reduction Actions



Underwater Noise Protection

Cost = \$48,000,000

Scope:

This element consists of installation and use of noise protection systems such as bubble curtains to attenuate noise levels during pile installation activities that could impact fish health.

Schedule: Start Fall 2013 & Complete Spring 2015



Underwater Noise Protection

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-3 Manage Coastal Development
- Goal H-6 Minimize Human Disturbance of Natural Habitats
- Goal H-7 Preserve and Improve Fish, Wildlife, and Plant Populations and Biodiversity
- Goal H-10 Complete Ongoing Research and Initial Special Studies on Habitat Issues



Dredging and Mound Removal

Scope:**Total Cost = \$40,400,000**

This element consists of dredging approximately 950,000 cubic yards of river bottom sediment. Sediment samples collected within the dredge channel indicated contamination (DDT, DDE, DDD, lead, copper). Permit conditions restrict dredging operations to a window between August 1 to November 1. This element also consists of mound removal which will remove the top 3 feet of contaminated sediment mounds that formed behind the existing bridge piers.

Schedule:

Dredging Stage 1 – Start & Complete Fall 2013 (840,000 cy removed)

Dredging Stage 2 – Anticipated Start & Complete Fall 2014

Mound Removal – Anticipated Start & Complete Fall 2014



Dredging and Mound Removal

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-2 Control Point and Non-Point Loadings of Pollutants

Section 4.2 - Management of Toxic Contamination

- Goal T-6 Track-Down and Clean-Up Other Sources of Chemicals of Concern
- Goal T-9 Identify and Remediate Selected Contaminated Sediments
- Goal T-12 Assess Ambient Levels, Loadings, and Effects of Chemicals

Section 4.3 - Management of Dredged Materials

- Goal D-3 Characterize, Categorize, and Quantify Material to be Dredged
- Goal D-4 Identify, Evaluate and Select Disposal and Treatment/Decontamination Alternatives, Including Beneficial Uses of Dredged Material



Dredge Material Disposal

Scope:

Cost = \$69,800,000

This element consists of disposing of approximately 950,000 cubic yards of dredged material in appropriate upland disposal location, decreasing the amount of contaminant within the Estuary.

Schedule:

Disposal Stage 1 - Start Summer 2013 & Complete Fall 2013 (840,000 cy removed)

Disposal Stage 2 – Anticipated Start & Complete Fall 2014



Dredge Material Disposal

CCMP Objectives:

Section 4.2 - Management of Toxic Contamination

- Goal T-9 Identify and Remediate Selected Contaminated Sediments

Section 4.3 - Management of Dredged Materials

- Goal D-2 Reduce Continuing Inputs of Toxic Chemicals and Upland Sediments and Soils. Better Understand the Toxic Contamination Problem and Take Additional Management Actions as More is Learned
- Goal D-3 Characterize, Categorize, and Quantify Material to be Dredged
- Goal D-4 Identify, Evaluate and Select Disposal and Treatment/Decontamination Alternatives, Including Beneficial Uses of Dredged Material
- Goal D-6 Improve Dredging, Transport, and Disposal Operations

Section 4.4 – Management of Floatable Debris

- Goal F-6 Reduce Loadings of Floatables from CSOs, Storm Water Discharges, and Non-Point Sources



Falcon Nest Box Relocation

Scope:

Cost = \$100,000

This element consists of management of activities near existing Peregrine Falcon nesting areas to avoid impacts during construction and provision of Falcon nesting boxes on the new crossing structure prior to demolition of the existing bridge.

Schedule: Anticipated Complete Fall 2016



Falcon Nest Box Relocation

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-1 Develop a Comprehensive Regional Strategy to Protect the Harbor/Bight Watershed and to Mitigate Continuing Adverse Human-Induced Effects
- Goal H-3 Manage Coastal Development
- Goal H-4 Manage Shoreline and Aquatic Habitat Modifications
- Goal H-6 Minimize Human Disturbance of Natural Habitats
- Goal H-7 Preserve and Improve Fish, Wildlife, and Plant Populations and Biodiversity



Removal of Existing Structure

Scope:

Cost = \$65,000,000

This element consists of demolition & removal of the existing Tappan Zee Bridge foundation piers, substructure and superstructure. All 197 piers will be cut below the mudline and removals will include approximately 18,400 timber piles and other floatable materials.

The cutting and lifting method was determined to be an extremely cost-efficient alternative. Additionally, the selected alternative allows the removal of lead-based paint or asbestos containing materials in a controlled environment outside of the river and allowing for the recycling of construction materials.

Schedule:

Anticipated Start Summer 2017

& Complete Spring 2018



Removal of Existing Structure

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-3 Manage Coastal Development
- Goal H-4 Manage Shoreline and Aquatic Habitat Modifications
- Goal H-6 Minimize Human Disturbance of Natural Habitats
- Goal H-7 Preserve and Improve Fish, Wildlife, and Plant Populations and Biodiversity

Section 4.2 - Management of Toxic Contamination

- Goal T-6 Track-Down and Clean-Up Other Sources of Chemicals of Concern
- Goal T-9 Identify and Remediate Selected Contaminated Sediments

Section 4.4 - Management of Floatable Debris

- Goal F-6 Reduce Loadings of Floatables



Shared Use Path

Scope:

Cost = \$66,700,000

This element consists of constructing a Shared-Use Path across the northern structure allowing connection in the vicinity of the Esposito Trail in Rockland County and Route 9 in Westchester County, providing indirect access between inland pedestrian pathways and the Estuary.

Schedule: Anticipated Start Winter 2014 & Complete Spring 2018



Shared Use Path

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-8 Increase Public Access Consistent with Other Ecosystem Objectives

Section 4.7 – Public Involvement and Education

- Goal E-2 Build Community Awareness, Appreciation, and Understanding of the Ecosystem and its Importance; and Encourage Action at the Community Level
- Goal E-6 Enhance Educations Opportunities for All Education Levels

Action Plan Objectives:

Goal 5 – Public Education and Community Involvement

- Promote an informed and educated constituency involved in decisions affecting the ecological health of the Harbor and its living resources



Net Conservation Benefit Plan (Sturgeon)

Scope:

Cost = \$2,800,000

This element consists of a series of scientific studies that will result in a net conservation benefit to endangered shortnose and Atlantic sturgeon by providing new ecological information or promoting conservation measures for these species. The studies include; mapping shallow-water benthic habitats through unmapped portions of the Hudson River, a foraging study to describe the diets of several life stages of the sturgeon in the Hudson River, a tagging and tracking study to determine localized movement patterns by several life stages of the sturgeon. This element also entails development and implementation of an outreach program directed at the commercial and recreational fishing industry. The program will include creation and distribution of a pamphlet and creation of signs to be posted at beach access locations and marinas regarding reporting of sturgeon.

Schedule:

Start Spring 2014 and Complete Fall 2014



Net Conservation Benefit Plan (Sturgeon)

CCMP Objectives:

Section 4.1 - Management of Habitat and Living Resources

- Goal H-1 Develop a Comprehensive Regional Strategy to Protect the Harbor/Bight Watershed and to Mitigate Continuing Adverse Human-Induced Effects
- Goal H-6 Minimize Human Disturbance of Natural Habitats
- Goal H-7 Preserve and Improve Fish, Wildlife and Plant Populations and Biodiversity
- Goal H-9 Increase Public Education, Stewardship and Involvement on Issues Related to Management of Habitat and Living Resources
- Goal H-10 Complete Ongoing Research and Initial Special Studies on Habitat Issues
- Goal H-11 Identify Significant Coastal Habitats Warranting Enhanced Protection and Restoration
- Goal H-12 Develop and Implement Plans to Protect and Restore Significant Coastal Habitats and Impacted Resources



Net Conservation Benefit Plan (Sturgeon)

CCMP Objectives:

Section 4.7 – Public Involvement and Education

- Goal E-2 Build Community Awareness, Appreciation, and Understanding of the Ecosystem and its Importance; and Encourage Action at the Community Level
- Goal E-5 Promote Individual and Group Involvement and Sponsorship of Education and Stewardship Activities to Clean Up and Restore the Ecosystem
- Goal E-6 Enhance Educations Opportunities for All Education Levels

Action Plan Objectives:

Goal 5 – Public Education and Community Involvement

- Promote an informed and educated constituency involved in decisions affecting the ecological health of the Harbor and its living resources



Pro-Rated Project Elements

Ancillary Construction Elements

Eligible Non-Ancillary Construction Cost
= \$337.8 Million
Total Construction Cost = \$2.63 Billion
Multiplier = 12.84%

Examples Include:

- Mobilization
- Soil Disposal at Landings
- River Staging Areas
- Site Clearance/Access
- Utility Relocations

Subtotal = \$297.8 Million

Total Ancillary Cost = \$38,200,000

Development Costs

Eligible Construction Cost = \$376 Million
Total Construction Cost = \$2.63 Billion
Multiplier = 14.29%

Examples Include:

- Engineering
- In-House Design Support
- Legal (Counsel, Bond Counsel, Fiscal)

Subtotal = \$924.4 Million

Total Development Cost = \$132,100,000



CWSRF Project Elements & Estimated Costs

NNYB CWSRF Project Elements	Estimated Cost (millions)
Gay's Point Restoration	\$1.4
Piermont Marsh Restoration	\$0.8
Oyster Bed Restoration	\$1.2
River Bottom Armoring	\$29.9
Stormwater Treatment at Landings	\$14.4
Underwater Noise Protection	\$48.0
Dredging and Mound Removal	\$40.4
Dredge Material Disposal	\$69.8
Falcon Nest Box Relocation	\$0.1
Removal of Existing Structure	\$65.0
Shared Use Path	\$66.7
Ancillary Prorated Construction Elements	\$38.2
Construction Subtotal for Water Quality Elements	\$376
Net Conservation Benefit Plan (Sturgeon)	\$2.8
Design and Engineering	\$101.8
In house Design Support	\$5.2
Legal (Counsel, Bond Counsel, Fiscal, etc)	\$1.4
Other Potential Expenses (Contingencies – Administrative)	\$23.7
Development Cost Subtotal for Water Quality Elements	\$135
Total CWSRF Project Cost	\$511

