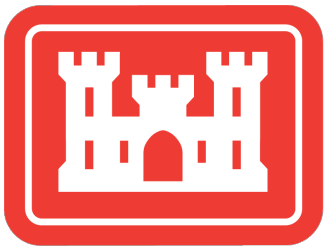
HUDSON RIVER HABITAT RESTORATION

ECOSYSTEM RESTORATION
FINAL INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

Appendix G2: Clean Water Act Section 404(b)(1) Evaluation



U.S. ARMY CORPS OF ENGINEERS
NEW YORK DISTRICT
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SCHODACK ISLAND

INTRODUCTION

This document presents an evaluation of the Hudson River Habitat Restoration, Hudson River Basin, New York Ecosystem Restoration Feasibility Study (Study) pursuant to the Clean Water Act section 404 (b)(1) guidelines. Specifically, this document evaluates the Schodack Island alternative of a side channel and tidal wetland corridor (8.4 acres), tidal wetland restoration (19.05 acres) with a road crossing.

I Project Description

a. Location

The Schodack Island alternative site is part of the Schodack Island State Park that sits off the eastern shore of the Hudson River approximately 10 miles south of Albany, New York. The park is located in the Town of Schodack (Rensselaer County), the Town of New Baltimore (Columbia County), and the Town of Stuyvesant (Greene County). The project site is limited to the southern portion of Schodack Island Park between the Hudson River and Schodack Creek.

b. General Description

Tidal Wetland Restoration

Approximately 2.77 acres of existing tidal habitat, dominated by invasive species such as common reed, would be treated. Minor grading would expand the existing tidal channel to accommodate increased flows with the proposed side channel connection. Fringe wetlands would be graded as necessary to stabilize the wetland and native vegetation would be planted.

Side Channel and Tidal Wetland Corridor Restoration

A side channel would be excavated in areas of historic fill placement to hydrologically connect Schodack Creek and the Hudson River with tidal waters. The channel would convey flow during low tide and higher water levels providing refuge to aquatic species during increased river velocities. A 160-foot tidal wetland corridor would be established adjacent to the channel. To accommodate local vehicular access to the southern portion of the island, the channel would be spanned by a road crossing with rectangular reinforced box culverts.

c. Authority and Purpose

To identify environmental restoration problems or opportunities, determine if there is a likely, feasible solution, and determine if there is federal interest, the U.S. Senate Committee on Environment and Public Works authorized a reconnaissance study by a resolution. The resolution dated 21 January 1987 reads:

> *Resolved by the Committee on Environment and Public Works of the United States Senate, that the Board of Engineers for Rivers and Harbors is requested to review previous reports on the Hudson River Channel, New York City to Albany, contained in House Document No. 228, 83rd Congress, 2nd session, dated September 3, 1954, with a view towards improving the existing Federal navigation project, providing anchorages and necessary spur channels.*

The Reconnaissance Study was initiated following a 1994 Congressional appropriation utilizing the Section 216 of the Harbor and River and Flood Control Act of 1970, which allows the review of the operation of completed projects, when found advisable, due to significantly changed physical or economic conditions. The completed project was the Hudson River Channel Federal Navigation Project.

Following completion of the Reconnaissance Report in 1995, the Hudson River Habitat Restoration, New York Feasibility Study was authorized via Section 551, Water Resource Development Act (WRDA) of 1996 (P.L. 104-303) authorized the Hudson River Habitat Restoration, New York Feasibility Study.

d. General Description of Dredged or Fill Material
   1) General Characteristics of Material (grain size, soil type)
   2) Quantity of Material
      Construction of the side channel and wetland restoration would require the removal of 92,729 cubic yards of soil, 8,478 cubic yards of amended soils to be added, 125 square yards of gravel fill to be added, 8 acres of invasive species treatment, 207 pounds of seeds and 54,833 plantings.
   3) Source of Material
      Sources for fill material may include on-site and off site substrate dependent upon the composition of soils at the site-specific locations.

e. Description of the Proposed Discharge Site(s)
   1) Location

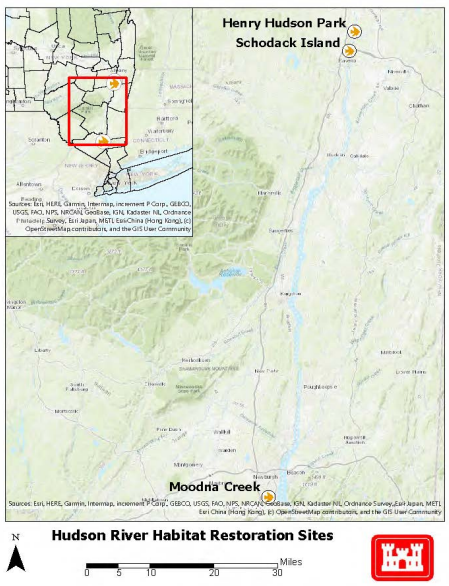


Figure 1. HRHR Study Overview

Figure 2. Schodack Island Site

   2) Size (acres)
      The site consists of 61,254 square yards of grading, 1,500 linear feet of shoreline stabilization, and 8 acres of invasive species treatment.
   3) Type of Site

The site is in a New York State Park

4) Type(s) of Habitat
The site contains tidal and freshwater wetlands, open water, and uplands.

5) Timing and Duration of Discharge
Construction is anticipated to take 24 months.

f. Description of Disposal Method (hydraulic, drag line, etc.)
Construction equipment may include; hydraulic excavators outfitted with long reach booms; low ground pressure off-road hauling equipment; low ground pressure dozers; low ground pressure utility vehicles; and the use of crane mats to support excavators and assist them in moving across wetlands of the site.

II Factual Determinations

a. Physical Substrate Determinations

1) Substrate Elevation and Slope
The elevation is about 20 feet with a relative flat slope.

2) Sediment Type
Sediment analyses have not been conducted for the alternative. However, available information indicates that the substrate consists of finer silts, clays, and/or sand material.

3) Dredged/Fill Material Movement
12-inch riprap will be used to reinforce shoreline stabilization, Select amended soil will be added to promote vegetative growth and uptake of seed and plantings, 36-inch bank stabilization boulders are used as shoreline stabilization and bank stabilization, and riverstone was proposed in the base of the side channel crossing box culverts to mimic a natural channel bottom. The riverstone consists of round river stone aggregate and 18-inch riprap spread across the culvert base.

4) Physical Effects on Benthos (burial, changes in sediment type, etc.)
Benthos will change in areas that are changed from upland to water. Benthos is anticipated to colonize within two years

5) Other Effects
No other effects are anticipated

6) Actions Taken to Minimize Impacts (Subpart H)
Measures to be implemented to minimize adverse impacts to substrate include: a) implementation of erosion and sediment control best management practices; b) on-site restoration of temporary workspaces; and c) utilization of mats for wetland work

b. Water Circulation. Fluctuation and Salinity Determinations

1) Water

(a) Salinity
No effects are anticipated.

(b) Water Chemistry

There may be minor changes to water chemistry as a result of suspended sediment during construction. Long-term changes to water chemistry are not expected.

(c) Clarity
Water clarity may be temporarily impacted but will return to base levels after construction. No long-term effects anticipated.

(d) Color
Minor impacts associated with turbidity may affect watercolor during construction. Erosion and sediment control best management practices will be implemented during construction to minimize turbidity.

(e) Odor
No effects are anticipated.

(f) Taste
No effects are anticipated.

(g) Dissolved Gas Levels
Dissolved oxygen levels may be reduced to some degree during construction, but this will be a temporary effect.

(h) Nutrients
Nutrient load may increase during construction as a result of resuspension of sediments during construction of the levee and wetland and tidal creek mitigation. Erosion and sediment control best management practices will be implemented during construction to minimize the suspension of nutrient laden sediment during construction.

(i) Eutrophication
Eutrophication is not expected to occur during construction due to the tidal nature of the river in this area in addition to the implementation of erosion and sediment control best management practices.

(j) Others as Appropriate
No other effects are anticipated.

2) Current Patterns and Circulation

(a) Current Patterns and Flow
There will be changes to flow as the Schodack Creek will now flow directly from the Hudson River. No changes in Hudson River patterns and flows are anticipated.

(b) Velocity
Velocities are not expected to appreciably increase or decrease.

(c) Stratification
Stratification is not anticipated to be impacted.

(d) Hydrologic Regime
The hydrologic regime of the Schodack Creek will change, as it will flow directly from the Hudson River. The Hudson Rivers hydrologic regime will not change.

3) Normal Water Level Fluctuations (tides, river stage, etc.)

Impacts to normal water level fluctuation are not anticipated.

4) Salinity Gradients
The proposed action will not adversely impact salinity gradients. Any changes in salinity gradients would be from the restoration of low marsh. This would be viewed as a positive impact as it would reduce the presence of phragmites.

c. Actions That Will Be Taken to Minimize Impacts
Impacts are anticipated to be short term and to occur only during construction activities.

d. Suspended Particulate/Turbidity Determinations

1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site
Minor impacts in suspended particulates and turbidity are expected during the construction however, levels should return to normal post construction.

2) Effects on Chemical and Physical Properties of the Water Column

(a) Light Penetration
Minor impacts to light penetration may occur during construction as sediments rise in the water column during construction.

(b) Dissolved Oxygen
Dissolved oxygen levels may be reduced during construction,

(c) Toxic Metals and Organics
There is a potential that construction activities may disturb sediments contaminated with organics. Erosion and sediment controls such as silt fence and turbidity curtains with help mitigate that potential

(d) Pathogens
No effects on pathogens are anticipated

(e) Aesthetics
No effects on aesthetics are anticipated

(f) Others as Appropriate
No other effects anticipated

3) Effects on Biota

(a) Primary Production, Photosynthesis
Removal of vegetation reduces amount of organic material within the wetland complex that aquatic species use for food/cover/spawning. This impact will be compensated for by the on-site restoration of wetlands

(b) Suspension/Filter Feeders
Construction activities could create turbid conditions that would temporarily impact suspension/filter feeders. Erosion and sediment control best management practices will be implemented during construction to reduce sedimentation.

(c) Sight Feeders
Construction activities could create turbid conditions that would temporarily impact sight feeders. Erosion and sediment control best management practices will be implemented during construction to reduce sedimentation

4) Actions taken to Minimize Impacts
Measures to be implemented to minimize adverse impacts include: a) implementation of erosion and sediment control best management practices such as turbidity curtains; b) on-site restoration of temporary workspaces; and c) onsite restoration of four acres of wetlands.

e. Contaminant Determinations

There are no concerns with contaminant within the alternative area. All fill material will be clean and will not pose a risk.

f. Aquatic Ecosystem and Organism Determinations

1) Effects on Plankton
An increase in sedimentation/nutrients during construction may increase some plankton species such as algae. Erosion and sediment control best management practices will be implemented to reduce this potential.

2) Effects on Benthos
Project construction will result in the removal of benthic species during side channel and wetland mitigation construction. However, this impact is expected to be temporary as recruitment of benthic species from undisturbed areas of the wetlands is expected to occur subsequent of construction.

3) Effects on Nekton
Mobile aquatic life will move from area during construction.

4) Effects on Aquatic Food Web
The project will have temporary adverse impacts on the food web as a result of turbidity. Permanent significant adverse impacts are not expected from implementation of the project.

5) Effects on Special Aquatic Sites

(a) Sanctuaries and Refuges
The site is in Schodack Island State Park and within the NY Department of State (DOS) Significant Coastal Fish and Wildlife Habitat and a DOS Significant Scenic Area. Effects include increased feeding, hiding, and spawning habitat for fishes and removal of invasive wetland species.

(b) Wetlands
Wetlands will be positively impacted through restoration with the removal if invasive species.

(c) Mud Flats
The mud flat at the southern end of the site will not be impacted.

(d) Vegetated Shallows
Vegetated shallow will be positively impacted through the removal of invasive species and restoration of vegetated shallows along the side channel.

(e) Coral Reefs
There are no coral reefs at the site.

(f) Riffle and Pool Complexes
There are no riffle and pool complexes in the site.

6) Threatened and Endangered Species

Threatened and Endangered Species will not be negatively impacted

7) Other Wildlife
Other wildlife will be temporarily impacted through the removal of vegetation and the restoration of the side channel.

8) Actions to Minimize Impacts
The impacts will be temporary in nature and only occur during construction.

g. Proposed Disposal Site Determinations

1) Mixing Zone Determination
The mixing zone of fresh and salt water will not be impacted.

2) Determination of Compliance with Applicable Water Quality Standards
All fill used to construct the project will be comprised of clean material that meets water quality standards and comes from a state approved and permitted source.

3) Potential Effects on Human Use Characteristic

(a) Municipal and Private Water Supply
There are no municipal or private water supplies impacted

(b) Recreational and Commercial Fisheries
There are no commercial fisheries in the project area. Recreational fisheries may be positively impacted with the restoration of the side channel increasing fish habitat.

(c) Water Related Recreation
Water related recreation will not be impacted.

(d) Aesthetics
Aesthetics will be altered, as a bridge will need to be built in order to maintain the service road and foot trails.

(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves
There will be no adverse impact on Parks, National and Historical Monuments, National Seashores, Wilderness Areas, or Research Sites

h. Determination of Cumulative Effects on the Aquatic Ecosystem
The proposed project will have a positive effect on the aquatic ecosystem, as it will create a side channel that will provide habitat for fish and birds and increase the backwater exchange with the Hudson River. There will be more wetlands restored within the Hudson River from this project as well with the other wetland restoration project in the HRHR study

i. Determination of Secondary Effects on the Aquatic Ecosystem
There are no secondary effects on the aquatic ecosystem

III Findings of Compliance or Non-Compliance With the Restrictions on Discharge

a. Adaptation of the Section 404(b)(l) Guidelines to this Evaluation
No significant adaptation of the Section 404(b)(1) guidelines was made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem

The alternative to restore pocket wetlands would have less of an impact however; it would not create a side channel and did not meet the objective of the Study

c. Compliance with Applicable State Water Quality Standards
The alternative will comply will a state water quality standards.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 Of the Clean Water Act
The proposed activity will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

e. Compliance with Endangered Species Act of 1973
The proposed alternative will not harm any endangered species or their critical habitats under the Endangered Species Act of 1973.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection. Research, and Sanctuaries Act of 1972
The proposed alternative will not impact the any Marine Sanctuaries.

g. Evaluation of Extent of Degradation of the Waters of the United States

1) Significant Adverse Effects on Human Health and Welfare

(a) Municipal and Private Water Supplies
The proposed alternative will not result in significant adverse effects on human health and welfare including municipal and private waters supplies.

(b) Recreation and Commercial Fisheries
The proposed alternative will not result in significant adverse effects on human health and welfare including recreation and commercial fisheries.

(c) Plankton
The proposed alternative will not result in significant adverse effects on human health and welfare including plankton.

(d) Fish
The proposed alternative will not result in significant adverse effects on human health and welfare including fish.

(e) Shellfish
The proposed alternative will not result in significant adverse effects on human health and welfare including shellfish.

(f) Wildlife
The proposed alternative will not result in significant adverse effects on human health and welfare including wildlife.

(g) Special Aquatic Sites
The proposed alternative will not result in significant adverse effects on human health and welfare including special aquatic sites

2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems
The proposed alternative will not result in significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems.

3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability
   The proposed alternative will not have significant adverse effects on aquatic ecosystem diversity, productivity, and stability.
4) Significant Adverse Effects on Recreational, Aesthetic, and Economic Values
   The proposed alternative will not have significant adverse effects on recreational, aesthetic, and economic values.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem
   Appropriate steps to minimize potential adverse impacts of the discharge of fill material include the implementation of an erosion and sediment control plan and judicious engineering practices.

i. On the Basis of the Guidelines. The Proposed Disposal Site(s) for the Discharge of Dredged or Fill Material

Specified as complying with the requirements of these guidelines.

HENRY HUDSON PARK

INTRODUCTION

This document presents an evaluation of the Hudson River Habitat Restoration, Hudson River Basin, New York Ecosystem Restoration Feasibility Study (Study) pursuant to the Clean Water Act section 404 (b)(1) guidelines. Specifically, this document evaluates the Henry Hudson Park alternative of tidal wetland restoration and vegetated riprap creation.

IV Project Description

a. Location

The Henry Hudson Park is public open space owned by the Town of Bethlehem, NY and is located on the western shore of the Hudson River. The park serves as the only public access location to the Hudson River within the Town of Bethlehem. Lyons Road traverses the park connecting it to other local residential roads and to NY Route 144 - River Road. The Vloman Kill traverses through the southern portion of the park and drains to the Hudson River; the area of the park to the south of the Vloman Kill is inaccessible by foot from the main area of the park.

b. General Description

Western Tidal Wetland Restoration

Approximately 3.59 acres of existing upland will be converted to tidal wetland. Soils would be excavated to an average depth of five feet below existing grade to achieve tidal wetland hydrology. The soils would be amended as necessary and planted with native vegetation. The shoreline would also be stabilized with rock to dissipate erosive forces.

Vegetated Riprap Creation

Along the Hudson River shoreline, the existing timber cribbing would remain. The concrete cap would be removed and replaced with riprap and graded to achieve a 1V:3H slope. The void spaces of the riprap would be filled with soil and subsequently planted with native vegetation. These modifications to the structure would not significantly encroach upon the park's upland areas.

Cove Tidal Wetland Restoration

Along the northern bank on the Vloman Kill, coir log toe protection would be installed at the toe of the slope around the existing mudflat and riprap would be installed at the top of slope to stabilize existing scour. Native wetland vegetation would be planted within the intertidal area.

c. Authority and Purpose

To identify environmental restoration problems or opportunities, determine if there is a likely, feasible solution, and determine if there is federal interest, the U.S. Senate Committee on Environment and Public Works authorized a reconnaissance study by a resolution. The resolution dated 21 January 1987 reads:

> *Resolved by the Committee on Environment and Public Works of the United States Senate, that the Board of Engineers for Rivers and Harbors is requested*

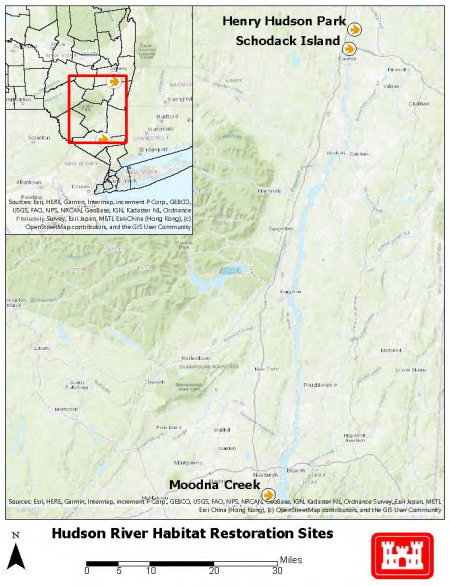
to review previous reports on the Hudson River Channel, New York City to Albany, contained in House Document No. 228, 83rd Congress, 2nd session, dated September 3, 1954, with a view towards improving the existing Federal navigation project, providing anchorages and necessary spur channels.

The Reconnaissance Study was initiated following a 1994 Congressional appropriation utilizing the Section 216 of the Harbor and River and Flood Control Act of 1970, which allows the review of the operation of completed projects, when found advisable, due to significantly changed physical or economic conditions. The completed project was the Hudson River Channel Federal Navigation Project.

Following completion of the Reconnaissance Report in 1995, the Hudson River Habitat Restoration, New York Feasibility Study was authorized via Section 551, Water Resource Development Act (WRDA) of 1996 (P.L. 104-303) authorized the Hudson River Habitat Restoration, New York Feasibility Study.

d. General Description of Dredged or Fill Material
   1) General Characteristics of Material (grain size, soil type)
   2) Quantity of Material
      Construction would require excavating 36,890 cubic yards of soil, adding 4,692 cubic yard of amended soils, adding 113 pounds of seeds, planting 7,598 plugs and shrubs, adding 1739 tons of boulders for stabilization, and disposing 1,100 tons of concrete.
   3) Source of Material
      Sources for fill material may include on-site and off site substrate dependent upon the composition of soils at the site-specific locations.

e. Description of the Proposed Discharge Site(s)
   1) Location



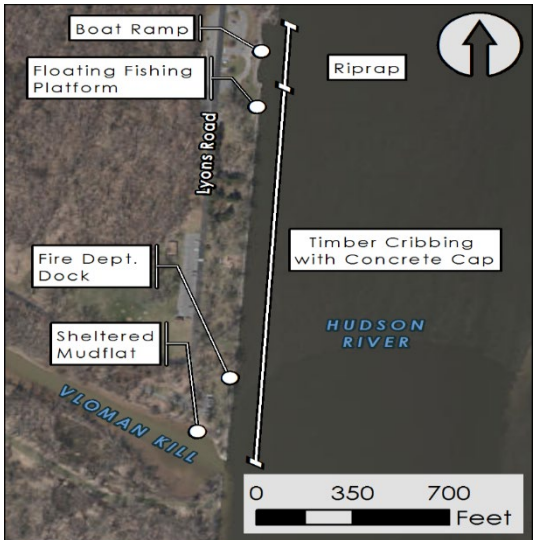


Figure 3. HRHR Overview *Figure 4. Henry Hudson Park Overview*

2) Size
The site consists of 26,441 square yard in area.
3) Type of Site
The site is on city property.
4) Type(s) of Habitat
The site contains tidal and freshwater wetlands, open water, and uplands.
5) Timing and Duration of Discharge
Construction is anticipated to take 12 months.

f. Description of Disposal Method (hydraulic, drag line, etc.)
Construction equipment may include; hydraulic excavators outfitted with long reach booms; low ground pressure off-road hauling equipment; low ground pressure dozers; low ground pressure utility vehicles; and the use of crane mats to support excavators and assist them in moving across wetlands of the site.

V Factual Determinations

a. Physical Substrate Determinations
1) Substrate Elevation and Slope
The elevation is about 20 feet with a relative flat slope.
2) Sediment Type
Sediment analyses have not been conducted for the alternative. However, available information indicates that the substrate consists of finer silts, clays, and/or sand material.
3) Dredged/Fill Material Movement
12-inch riprap will be used to reinforce shoreline stabilization, Select amended soil will be added to promote vegetative growth and uptake of seed and plantings, and 36-inch bank stabilization boulders are used as shoreline stabilization and bank stabilization.
4) Physical Effects on Benthos (burial, changes in sediment type, etc.)
Benthos will change in areas that are changed from upland to water. Benthos is anticipated to colonize within two years
5) Other Effects
No other effects are anticipated
6) Actions Taken to Minimize Impacts (Subpart H)
Measures to be implemented to minimize adverse impacts to substrate include: a) implementation of erosion and sediment control best management practices; b) on-site restoration of temporary workspaces; and c) utilization of mats for wetland work

b. Water Circulation. Fluctuation and Salinity Determinations
1) Water
(a) Salinity
No effects are anticipated.
(b) Water Chemistry

There may be minor changes to water chemistry as a result of suspended sediment during construction. Long-term changes to water chemistry are not expected.

(c) Clarity
Water clarity may be temporarily impacted but will return to base levels after construction. No long-term effects anticipated.

(d) Color
Minor impacts associated with turbidity may affect watercolor during construction. Erosion and sediment control best management practices will be implemented during construction to minimize turbidity.

(e) Odor
No effects are anticipated.

(f) Taste
No effects are anticipated.

(g) Dissolved Gas Levels
Dissolved oxygen levels may be reduced to some degree during construction, but this will be a temporary effect.

(h) Nutrients
Nutrient load may increase during construction as a result of resuspension of sediments during construction of the levee and wetland and tidal creek mitigation. Erosion and sediment control best management practices will be implemented during construction to minimize the suspension of nutrient laden sediment during construction.

(i) Eutrophication
Eutrophication is not expected to occur during construction due to the tidal nature of the river in this area in addition to the implementation of erosion and sediment control best management practices.

(j) Others as Appropriate
No other effects are anticipated.

2) Current Patterns and Circulation

(a) Current Patterns and Flow
No changes in Hudson River and Vloman Kill patterns and flows are anticipated.

(b) Velocity
Velocities are not expected to appreciably increase or decrease.

(c) Stratification
Stratification is not anticipated to be impacted.

(d) Hydrologic Regime
The Hudson River and Vloman Kill hydrologic regime will not change.

3) Normal Water Level Fluctuations (tides, river stage, etc.)
Impacts to normal water level fluctuation are not anticipated.

4) Salinity Gradients

The proposed action will not adversely impact salinity gradients. Any changes in salinity gradients would be from the restoration of the wetlands. This would be viewed as a positive impact as it would reduce the presence of phragmites.

c. Actions That Will Be Taken to Minimize Impacts
Impacts are anticipated to be short term and to occur only during construction activities.

d. Suspended Particulate/Turbidity Determinations

1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site
Minor impacts in suspended particulates and turbidity are expected during the construction however, levels should return to normal post construction.

2) Effects on Chemical and Physical Properties of the Water Column
(a) Light Penetration
Minor impacts to light penetration may occur during construction as sediments rise in the water column during construction.
(b) Dissolved Oxygen
Dissolved oxygen levels may be reduced during construction,
(c) Toxic Metals and Organics
There is a potential that construction activities may disturb sediments contaminated with organics. Erosion and sediment controls such as silt fence and turbidity curtains with help mitigate that potential
(d) Pathogens
No effects on pathogens are anticipated
(e) Aesthetics
No effects on aesthetics are anticipated
(f) Others as Appropriate
No other effects anticipated

3) Effects on Biota
(a) Primary Production, Photosynthesis
Removal of vegetation reduces amount of organic material within the wetland complex that aquatic species use for food/cover/spawning. This impact will be compensated for by the on-site restoration of wetlands
(b) Suspension/Filter Feeders
Construction activities could create turbid conditions that would temporarily impact suspension/filter feeders. Erosion and sediment control best management practices will be implemented during construction to reduce sedimentation.
(c) Sight Feeders
Construction activities could create turbid conditions that would temporarily impact sight feeders. Erosion and sediment control best management practices will be implemented during construction to reduce sedimentation

4) Actions taken to Minimize Impacts

Measures to be implemented to minimize adverse impacts include: a) implementation of erosion and sediment control best management practices such as turbidity curtains; b) on-site restoration of temporary workspaces; and c) onsite restoration of wetlands

e. Contaminant Determinations

There are no concerns with contaminant within the alternative area. All fill material will be clean and will not pose a risk.

f. Aquatic Ecosystem and Organism Determinations

1) Effects on Plankton

An increase in sedimentation/nutrients during construction may increase some plankton species such as algae. Erosion and sediment control best management practices will be implemented to reduce this potential.

2) Effects on Benthos

Project construction will result in the removal of benthic species during side channel and wetland mitigation construction. However, this impact is expected to be temporary as recruitment of benthic species from undisturbed areas of the wetlands is expected to occur subsequent of construction.

3) Effects on Nekton

Mobile aquatic life will move from area during construction.

4) Effects on Aquatic Food Web

The project will have temporary adverse impacts on the food web as a result of turbidity. Permanent significant adverse impacts are not expected from implementation of the project.

5) Effects on Special Aquatic Sites

(a) Sanctuaries and Refuges

The site is within the NY Department of State (DOS) Significant Coastal Fish and Wildlife Habitat and a DOS Significant Scenic Area. Effects include increased feeding, hiding, and spawning habitat for fishes and removal of invasive wetland species.

(b) Wetlands

Wetlands will be positively impacted through restoration with the removal if invasive species.

(c) Mud Flats

There are no mud flats in the area.

(d) Vegetated Shallows

Vegetated shallow will be positively impacted through the removal of invasive species and restoration of vegetated shallows along the side channel.

(e) Coral Reefs

There are no coral reefs at the site.

(f) Riffle and Pool Complexes

There are no riffle and pool complexes in the site.

6) Threatened and Endangered Species

Threatened and Endangered Species will not be negatively impacted

7) Other Wildlife
Other wildlife will be temporarily impacted through the removal of vegetation.
8) Actions to Minimize Impacts
The impacts will be temporary in nature and only occur during construction.

g. Proposed Disposal Site Determinations
1) Mixing Zone Determination
The mixing zone of fresh and salt water will not be impacted.
2) Determination of Compliance with Applicable Water Quality Standards
All fill used to construct the project will be comprised of clean material that meets water quality standards and comes from a state approved and permitted source.
3) Potential Effects on Human Use Characteristic
(a) Municipal and Private Water Supply
There are no municipal or private water supplies impacted
(b) Recreational and Commercial Fisheries
There are no commercial fisheries in the project area. Recreational fisheries may be positively impacted with more suitable habitat along the shore.
(c) Water Related Recreation
Water related recreation will not be impacted.
(d) Aesthetics
Aesthetics will be altered, as direct access to the shore on the southern end of the park will be limited.
(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves
There will be no adverse impact on Parks, National and Historical Monuments, National Seashores, Wilderness Areas, or Research Sites

h. Determination of Cumulative Effects on the Aquatic Ecosystem
There will be more wetlands restored within the Hudson River from this project as well with the other wetland restoration project in the HRHR study

i. Determination of Secondary Effects on the Aquatic Ecosystem
There are no secondary effects on the aquatic ecosystem

VI Findings of Compliance or Non-Compliance With the Restrictions on Discharge

a. Adaptation of the Section 404(b)(I) Guidelines to this Evaluation
No significant adaptation of the Section 404(b)(1) guidelines was made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem
The other alternatives would not have less adverse impacts

c. Compliance with Applicable State Water Quality Standards
The alternative will comply will a state water quality standards.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 Of the Clean Water Act

The proposed activity will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

e. Compliance with Endangered Species Act of 1973

The proposed alternative will not harm any endangered species or their critical habitats under the Endangered Species Act of 1973.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection. Research, and Sanctuaries Act of 1972

The proposed alternative will not impact the any Marine Sanctuaries.

g. Evaluation of Extent of Degradation of the Waters of the United States

1) Significant Adverse Effects on Human Health and Welfare

(a) Municipal and Private Water Supplies

The proposed alternative will not result in significant adverse effects on human health and welfare including municipal and private waters supplies.

(b) Recreation and Commercial Fisheries

The proposed alternative will not result in significant adverse effects on human health and welfare including recreation and commercial fisheries.

(c) Plankton

The proposed alternative will not result in significant adverse effects on human health and welfare including plankton.

(d) Fish

The proposed alternative will not result in significant adverse effects on human health and welfare including fish.

(e) Shellfish

The proposed alternative will not result in significant adverse effects on human health and welfare including shellfish.

(f) Wildlife

The proposed alternative will not result in significant adverse effects on human health and welfare including wildlife.

(g) Special Aquatic Sites

The proposed alternative will not result in significant adverse effects on human health and welfare including special aquatic sites

2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems

The proposed alternative will not result in significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems.

3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability

The proposed alternative will not have significant adverse effects on aquatic ecosystem diversity, productivity, and stability.

4) Significant Adverse Effects on Recreational, Aesthetic, and Economic Values

The proposed alternative will not have significant adverse effects on recreational, aesthetic, and economic values.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

Appropriate steps to minimize potential adverse impacts of the discharge of fill material include the implementation of an erosion and sediment control plan and judicious engineering practices.

i. On the Basis of the Guidelines. The Proposed Disposal Site(s) for the Discharge of Dredged or Fill Material

1) Specified as complying with the requirements of these guidelines.

MOODNA CREEK

INTRODUCTION

This document presents an evaluation of the Hudson River Habitat Restoration, Hudson River Basin, New York Ecosystem Restoration Feasibility Study (Study) pursuant to the Clean Water Act section 404 (b)(1) guidelines. Specifically, this document evaluates the Moodna Creek alternative of removing three aquatic organism passages (AOP): one utility pipe and two dams.

VII Project Description

a. Location

Approximately 1,000 feet upstream of the Forge Hill Road (Route 74) crossing in the Town of New Windsor and 1.8 miles upstream of the Hudson River confluence, a sewer utility line (AOP 1) crosses Moodna Creek, forming a weir that creates a vertical drop of water approximately two feet in height at normal flows. The Firth Cliff Dam (AOP 2) is located on Moodna Creek adjacent to a former textile-manufacturing site and is approximately three miles upstream of the Hudson River confluence. The Orr's Mill Dam (AOP 3) is located on Moodna Creek 75-feet upstream of the Route 32 bridge crossing and is approximately 3.7 miles upstream of the Hudson River confluence.

b. General Description

This alternative for AOP 1 entails decommissioning the utility line and removal of the section that crosses Moodna Creek. The sanitary sewer line is a 16-inch ductile iron pipe (DIP); an approximately 100-foot-long section spans the channel and is contained in a concrete encasement approximately five feet wide and five feet deep. The recommended approach to decommissioning the line includes accessing the existing manhole on the floodplain to the north (i.e. river left side), and sealing-off the incoming sanitary line with concrete or similar means. On the river right bank, where the utility descends steeply from the inactive railroad bed at the top of the slope, the recommended approach to decommissioning this sewer line is to break the existing line at the base of the slope and install a manhole in connection with upgradient line, but with no outlet toward the Creek. The installation of the manhole on river right creates a stable and secure closure to the existing sewer line, and prevents any inadvertent leakage or discharge of fluid into the Creek, in the event of any unknown inflow or infiltration into the sewer line. A total of 175 feet of sewer line (100-foot concrete encased section and the 75-foot section under floodplain soils leading to the existing manhole) would be excavated and disposed of offsite. The proposed manhole could potentially be used to re-install the line in the future, if necessary.

The alternative for AOP 2 entails demolition and removal of the concrete spillway to the full vertical extent and, pending favorable results of impounded sediment analysis, passive release of the impounded sediment. The abutments attached to the valley wall on river left and the building foundations on river right may be left in place pending observations from a more detailed site investigation.

The alternative for AOP 3 entails breaking through the spillway concrete crest, and underlying cobble/boulder-filled timber crib structure, removing the vertical extent of

a central portion of the spillway, and leaving the side portions in place. The ends of the spillway could be stabilized at their base with placed boulders, while the upper portions could be left open for visibility of the spillway's interior construction.

The multiple extremely large boulders (i.e. five to ten feet in diameter) that are situated immediately upstream of the spillway are anticipated to form boulder-dominated steps or a cascade. Following dam notching, finer sediment would transport downstream, while the larger cobble and boulder may shift position. Due to the steep slope that is anticipated to re-form, full fish passage conditions for the full range of target fish could not be guaranteed to form passively and thus, some active re-grading and re-positioning of boulders may be necessary to facilitate the formation of a stable grade control and fish passability. If *in situ* boulders are insufficient to maintain a stable grade change and/or fish passage conditions, this alternative also includes supplementing this reach with large boulders to establish grade control.

c. Authority and Purpose

To identify environmental restoration problems or opportunities, determine if there is a likely, feasible solution, and determine if there is federal interest, the U.S. Senate Committee on Environment and Public Works authorized a reconnaissance study by a resolution. The resolution dated 21 January 1987 reads:

> *Resolved by the Committee on Environment and Public Works of the United States Senate, that the Board of Engineers for Rivers and Harbors is requested to review previous reports on the Hudson River Channel, New York City to Albany, contained in House Document No. 228, 83rd Congress, 2nd session, dated September 3, 1954, with a view towards improving the existing Federal navigation project, providing anchorages and necessary spur channels.*

The Reconnaissance Study was initiated following a 1994 Congressional appropriation utilizing the Section 216 of the Harbor and River and Flood Control Act of 1970, which allows the review of the operation of completed projects, when found advisable, due to significantly changed physical or economic conditions. The completed project was the Hudson River Channel Federal Navigation Project.

Following completion of the Reconnaissance Report in 1995, the Hudson River Habitat Restoration, New York Feasibility Study was authorized via Section 551, Water Resource Development Act (WRDA) of 1996 (P.L. 104-303) authorized the Hudson River Habitat Restoration, New York Feasibility Study.

d. General Description of Dredged or Fill Material

1) General Characteristics of Material (grain size, soil type)
2) Quantity of Material

Construction for AOP 2 would require 400 linear feet of sandbags, 400 tons of boulders, 50 tons to stabilize the construction entrance, 210 tons for construction access reinforcement, 260 tons for a construction access ramp, 80 linear feet of silt fence, and 0.3 acres of clearing and grubbing.

Construction for AOP 2 would require 300 linear feet of sandbags, 50 tons to stabilize the construction entrance, 90 tons for construction access reinforcement, 160 tons for a construction access ramp, 0.1 acres of clearing and grubbing, 710 cubic yards of spillway demolition and excavation, 840 square yards of regarded streambed, 1390 tons of concrete disposal, 200 linear feet of bank stabilization, 80 linear feet of silt fence, and 230 tons for construction access pad.

Construction for AOP 3 would require 400 linear feet of sandbags, 50 tons to stabilize the construction entrance, 90 tons for a construction access ramp, 0.2 acres of clearing and grubbing, 780 cubic yards of spillway demolition and excavation, 3340 square yards of regarded streambed, 520 tons of concrete disposal, 170 ton breach stabilization, 1600 square feet construction access matting, 80 linear feet of silt fence, and 620 tons for construction access pad.

3) Source of Material

Sources for fill material may include on-site and off site substrate dependent upon the composition of soils at the site-specific locations.

e. Description of the Proposed Discharge Site(s)

1) Location

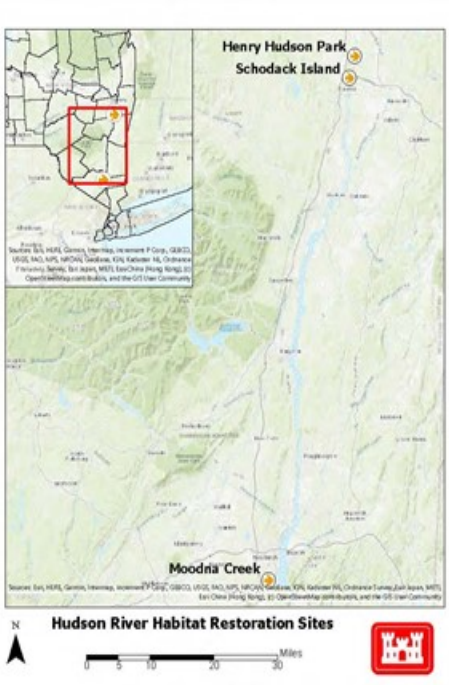


Figure 5. HRHR Overview

Figure 6. Moodna Creek Overview

2) Size

AOP 1 is encased in concrete, approximately five feet wide and 100 feet long.

AOP 2 is 9 feet high and 162 feet long.

AOP 3 is 10 feet high and 180 feet long.

3) Type of Site
   The site is on private property.
4) Type(s) of Habitat
   The site contains a dam, open water, and uplands.
5) Timing and Duration of Discharge
   Construction is anticipated to take 15 months for all AOPs.

f. Description of Disposal Method (hydraulic, drag line, etc.)
Construction equipment may include; hydraulic excavators outfitted with long reach booms; low ground pressure off-road hauling equipment; low ground pressure dozers; low ground pressure utility vehicles; and the use of crane mats to support excavators and assist them in moving across wetlands of the site.

VIII Factual Determinations

a. Physical Substrate Determinations

1) Substrate Elevation and Slope
   The elevation is about 15 feet with steep slopes along the riverbanks.
2) Sediment Type
   Below AOP 1 the riverbed sediment is coarse-grained and compact above the sewer line the sediment is fine- and coarse-grained glacial till (e.g. clay, silt, sand, gravel, cobble, and boulder).
   Below AOP 2, the sediment is very coarse sand and small gravel, and coarser moving upstream, transitioning from gravel, cobble, and boulders. Sediment upstream of AOP 3 is compact, primarily bedload, and is not penetrable with a manual probe; as such, there is no substantial fine sediment accumulation impounded by this dam. Additionally, there may be a natural boulder cascade or bedrock falls near the current dam location. In addition to large boulders, the lower impoundment is made up of large cobble with limited bedrock outcrop.
3) Dredged/Fill Material Movement
   AOP 1 is a sever line encased in concrete.
   AOP 2 is constructed of concrete.
   AOP 3 is constructed of cobbles/boulders with steel I-beams and timbers running longitudinally along the spillway, and capped with a layer of concrete.
4) Physical Effects on Benthos (burial, changes in sediment type, etc.)
   Benthos is not anticipated to change
5) Other Effects
   The flow of water, sediment, and fishes will be allowed with the dam removal.
6) Actions Taken to Minimize Impacts (Subpart H)
   Measures to be implemented to minimize adverse impacts to substrate include: a) implementation of erosion and sediment control best management practices; b) on-site restoration of temporary workspaces; and c) utilization of mats.

b. Water Circulation. Fluctuation and Salinity Determinations

1) Water

(a) Salinity
Salinity is not expected to change.
(b) Water Chemistry
There may be minor changes to water chemistry as a result of suspended sediment during construction. Long-term changes to water chemistry are not expected.
(c) Clarity
Water clarity may be temporarily impacted but will return to base levels after construction. No long-term effects anticipated.
(d) Color
Minor impacts associated with turbidity may affect watercolor during construction. Erosion and sediment control best management practices will be implemented during construction to minimize turbidity.
(e) Odor
No effects are anticipated.
(f) Taste
No effects are anticipated.
(g) Dissolved Gas Levels
Dissolved oxygen levels will be increased as water temperatures are anticipated to decrease.
(h) Nutrients
Nutrient load may increase during construction as a result of resuspension of sediments during removal of the dam. Erosion and sediment control best management practices will be implemented during construction to minimize the suspension of nutrient laden sediment during construction.
(i) Eutrophication
Eutrophication is not expected to occur during construction due to the implementation of erosion and sediment control best management practices.
(j) Others as Appropriate
No other effects are anticipated.

2) Current Patterns and Circulation
(a) Current Patterns and Flow
Moodna creek will now flow unimpeded to the Hudson River. Normal water surface elevation would drop approximately 10 feet above AOP 2, 3, and 2 feet above AOP 1.
(b) Velocity
Velocities are not expected to slightly increase through the dam removal.
(c) Stratification
Stratification is not anticipated to be impacted.
(d) Hydrologic Regime
Surface water hydrology would be restored to a more natural condition.

3) Normal Water Level Fluctuations (tides, river stage, etc.)

Water level fluctuations are not anticipated to change.

4) Salinity Gradients
Salinity gradients will not change.

c. Actions That Will Be Taken to Minimize Impacts
Impacts are anticipated to be short term and to occur only during construction activities.

d. Suspended Particulate/Turbidity Determinations

1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site
Minor impacts in suspended particulates and turbidity are expected during the construction however, levels should return to normal post construction.

2) Effects on Chemical and Physical Properties of the Water Column
(a) Light Penetration
Minor impacts to light penetration may occur during construction as sediments rise in the water column during construction.
(b) Dissolved Oxygen
Dissolved oxygen levels may be reduced during construction however; they are anticipated to increase after construction.
(c) Toxic Metals and Organics
There is a potential that construction activities may disturb sediments contaminated with organics. Erosion and sediment controls such as silt fence and turbidity curtains with help mitigate that potential.
(d) Pathogens
No effects on pathogens are anticipated
(e) Aesthetics
No effects on aesthetics are anticipated
(f) Others as Appropriate
No other effects anticipated

3) Effects on Biota
(a) Primary Production, Photosynthesis
Primary production is not anticipated to change.
(b) Suspension/Filter Feeders
Construction activities could create turbid conditions that would temporarily impact suspension/filter feeders. Erosion and sediment control best management practices will be implemented during construction to reduce sedimentation.
(c) Sight Feeders
Construction activities could create turbid conditions that would temporarily impact sight feeders. Erosion and sediment control best management practices will be implemented during construction to reduce sedimentation

4) Actions taken to Minimize Impacts

Measures to be implemented to minimize adverse impacts include: implementation of erosion and sediment control best management practices such as turbidity curtains and on-site restoration of temporary workspaces.

e. Contaminant Determinations

There are no concerns with contaminant within the alternative area. All fill material will be clean and will not pose a risk.

f. Aquatic Ecosystem and Organism Determinations

1) Effects on Plankton
An increase in sedimentation/nutrients during construction may increase some plankton species such as algae. Erosion and sediment control best management practices will be implemented to reduce this potential.

2) Effects on Benthos
Benthos is not expected to change.

3) Effects on Nekton
Mobile aquatic life will move from area during construction.

4) Effects on Aquatic Food Web
The project will have temporary adverse impacts on the food web as a result of turbidity. Permanent significant adverse impacts are not expected from implementation of the project.

5) Effects on Special Aquatic Sites

(a) Sanctuaries and Refuges
The site is within the NY Department of State (DOS) Significant Coastal Fish and Wildlife Habitat and a DOS Significant Scenic Area. Effects include increased feeding, hiding, and spawning habitat for fishes, as they will be able to run further upstream.

(b) Wetlands
Wetlands will be positively impacted shallow areas in the impoundment area are expected to naturally revert to wetlands after the AOPs are removed.

(c) Mud Flats
There are no mud flats in the area.

(d) Vegetated Shallows
Vegetated shallow will be positively impacted as shallow areas in the impoundment area are expected to naturally revert to wetlands after the AOPs are removed.

(e) Coral Reefs
There are no coral reefs at the site.

(f) Riffle and Pool Complexes
There are no riffle and pool complexes will be maintained at the sites.

6) Threatened and Endangered Species
Threatened and Endangered Species will not be negatively impacted

7) Other Wildlife
Other wildlife will be temporarily impacted during construction but will be temporary.

8) Actions to Minimize Impacts
The impacts will be temporary in nature and only occur during construction.

g. Proposed Disposal Site Determinations

1) Mixing Zone Determination
The mixing zone will not be impacted.

2) Determination of Compliance with Applicable Water Quality Standards
All fill used to construct the project will be comprised of clean material that meets water quality standards and comes from a state approved and permitted source.

3) Potential Effects on Human Use Characteristic

(a) Municipal and Private Water Supply
Municipal and private water supply will not be impacted.

(b) Recreational and Commercial Fisheries
There are no commercial fisheries in the project area. Recreational fisheries may be positively impacted with the increase of available habitat. It is possible that, the fish consumption advisories for the Hudson River would be expanded to a new upstream extent on Moodna Creek.

(c) Water Related Recreation
Water related recreation will be positively impacted as flow will be unimpeded from Salisbury Mills Dam to the Hudson River

(d) Aesthetics
Aesthetics will be altered as the dam is removed, the surface water level will decrease by 10 feet near AOP 2 and 3 and 2 feet near AOP 1.

(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves
There will be no adverse impact on Parks, National and Historical Monuments, National Seashores, Wilderness Areas, or Research Sites.

h. Determination of Cumulative Effects on the Aquatic Ecosystem
Herring and eel would be able continue further upstream to the natural ledges, at Salisbury Mills Dam upstream.

i. Determination of Secondary Effects on the Aquatic Ecosystem
There are no secondary effects on the aquatic ecosystem.

IX Findings of Compliance or Non-Compliance With the Restrictions on Discharge

a. Adaptation of the Section 404(b)(I) Guidelines to this Evaluation
No significant adaptation of the Section 404(b)(1) guidelines was made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem
The other alternatives would not have less adverse impacts.

c. Compliance with Applicable State Water Quality Standards
The alternative will comply will a state water quality standards.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 Of the Clean Water Act

The proposed activity will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

e. Compliance with Endangered Species Act of 1973

The proposed alternative will not harm any endangered species or their critical habitats under the Endangered Species Act of 1973.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection. Research, and Sanctuaries Act of 1972

The proposed alternative will not impact the any Marine Sanctuaries.

g. Evaluation of Extent of Degradation of the Waters of the United States

1) Significant Adverse Effects on Human Health and Welfare

(a) Municipal and Private Water Supplies

The proposed alternative will not result in significant adverse effects on human health and welfare including municipal and private waters supplies.

(b) Recreation and Commercial Fisheries

The proposed alternative will not result in significant adverse effects on human health and welfare including recreation and commercial fisheries.

(c) Plankton

The proposed alternative will not result in significant adverse effects on human health and welfare including plankton.

(d) Fish

The proposed alternative will not result in significant adverse effects on human health and welfare including fish.

(e) Shellfish

The proposed alternative will not result in significant adverse effects on human health and welfare including shellfish.

(f) Wildlife

The proposed alternative will not result in significant adverse effects on human health and welfare including wildlife.

(g) Special Aquatic Sites

The proposed alternative will not result in significant adverse effects on human health and welfare including special aquatic sites

2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems

The proposed alternative will not result in significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems.

3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability

The proposed alternative will not have significant adverse effects on aquatic ecosystem diversity, productivity, and stability.

4) Significant Adverse Effects on Recreational, Aesthetic, and Economic Values

The proposed alternative will not have significant adverse effects on recreational, aesthetic, and economic values.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

Appropriate steps to minimize potential adverse impacts of the discharge of fill material include the implementation of an erosion and sediment control plan and judicious engineering practices.

i. On the Basis of the Guidelines. The Proposed Disposal Site(s) for the Discharge of Dredged or Fill Material

1) Specified as complying with the requirements of these guidelines.