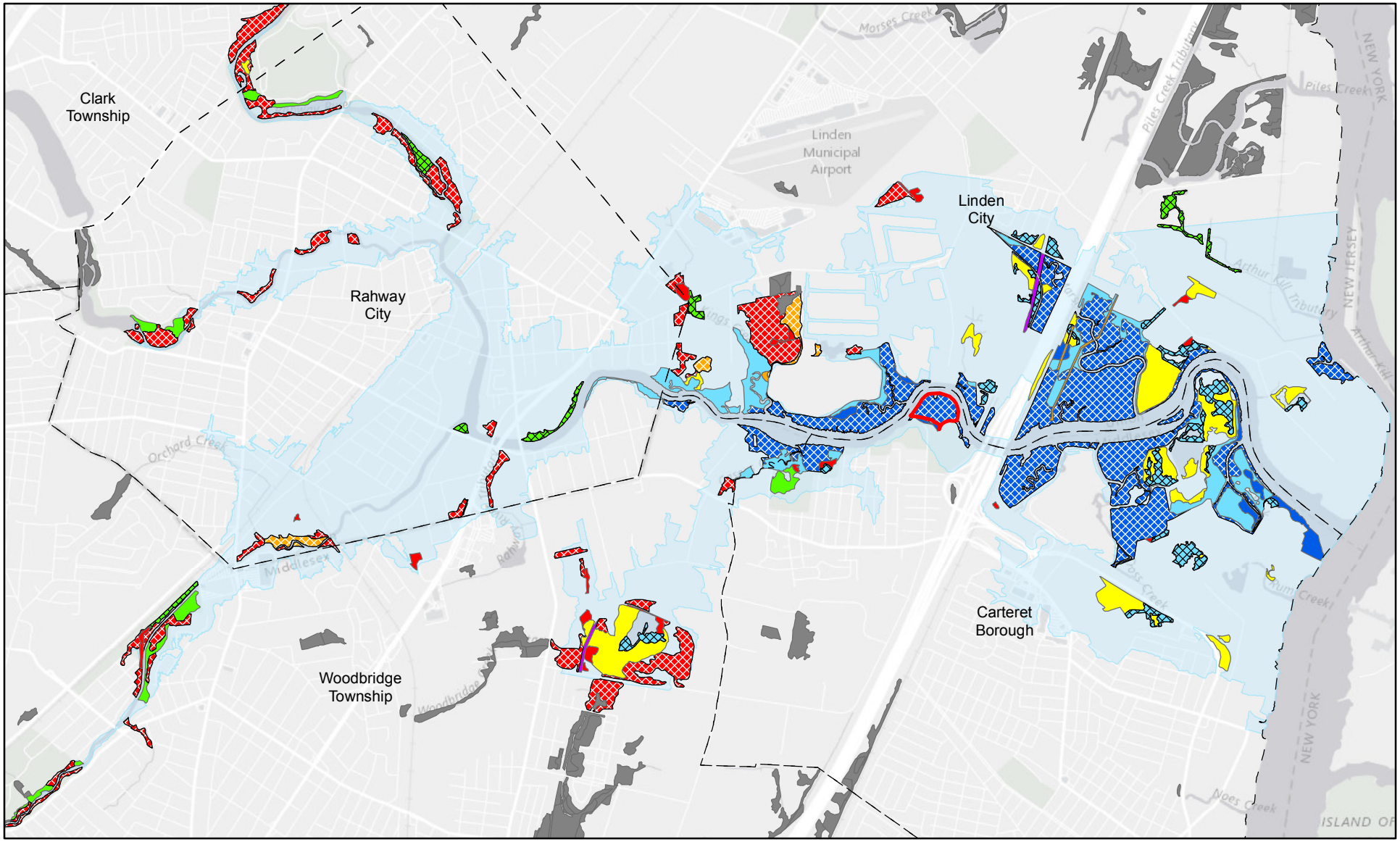
Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Appendix A.1
Environmental Documentation

Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Figure 1
Wetland Habitat Types Within Project Area



Wetlands within Study Area (NJDEP 2012)
Rahway River (Tidal) Basin Coastal Storm Risk Management

0 0.5 1 1.5 2 Miles

N W E S

US Army Corps of Engineers
New York District

Legend

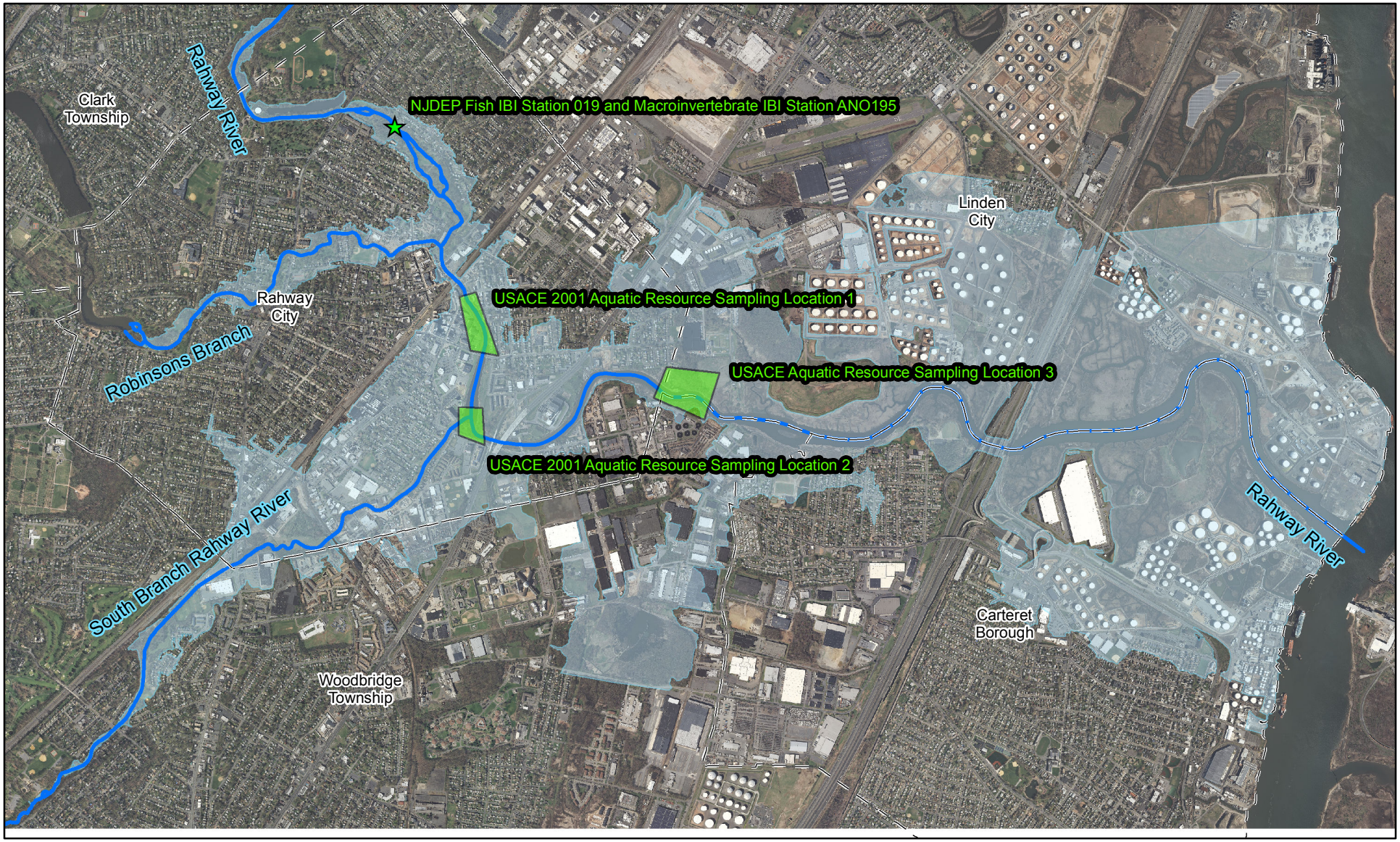
- Project Study Area
- New Jersey Municipal Boundaries
- USACE Tidal Marsh Mitigation Site
- Various Wetlands outside the Study Area

Types of Wetlands within the Study Area

- DECIDUOUS SCRUB/SHRUB WETLANDS
- DECIDUOUS WOODED WETLANDS
- DISTURBED TIDAL WETLANDS
- DISTURBED WETLANDS (MODIFIED)
- HERBACEOUS WETLANDS
- MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA
- MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE
- PHRAGMITES DOMINATE COASTAL WETLANDS
- PHRAGMITES DOMINATE INTERIOR WETLANDS
- SALINE MARSH (HIGH MARSH)
- SALINE MARSH (LOW MARSH)
- WETLAND RIGHTS-OF-WAY

Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Figure 2
Aquatic Resource Sampling Conducted by Others Within the Project Area



Locations of Aquatic Resource Sampling Conducted by Others

Rahway River (Tidal) Basin Coastal Storm Risk Management

US Army Corps of Engineers
New York District

0 0.5 1 1.5 2 Miles

N W E S

Legend

- Aquatic Resource Sampling Points
- Aquatic Resource Sampling Areas
- New Jersey Municipal Boundaries
- Significant Rivers within Project Study Area
- Project Study Area

Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Table 1
Species Identified During 2001 USACE Bird Survey

Table 1. Bird Species Observed During the 2001 Summer and Fall Avian Surveys at the Rahway River Project and Reference Areas for USACE Aquatic Ecosystem Restoration Study.

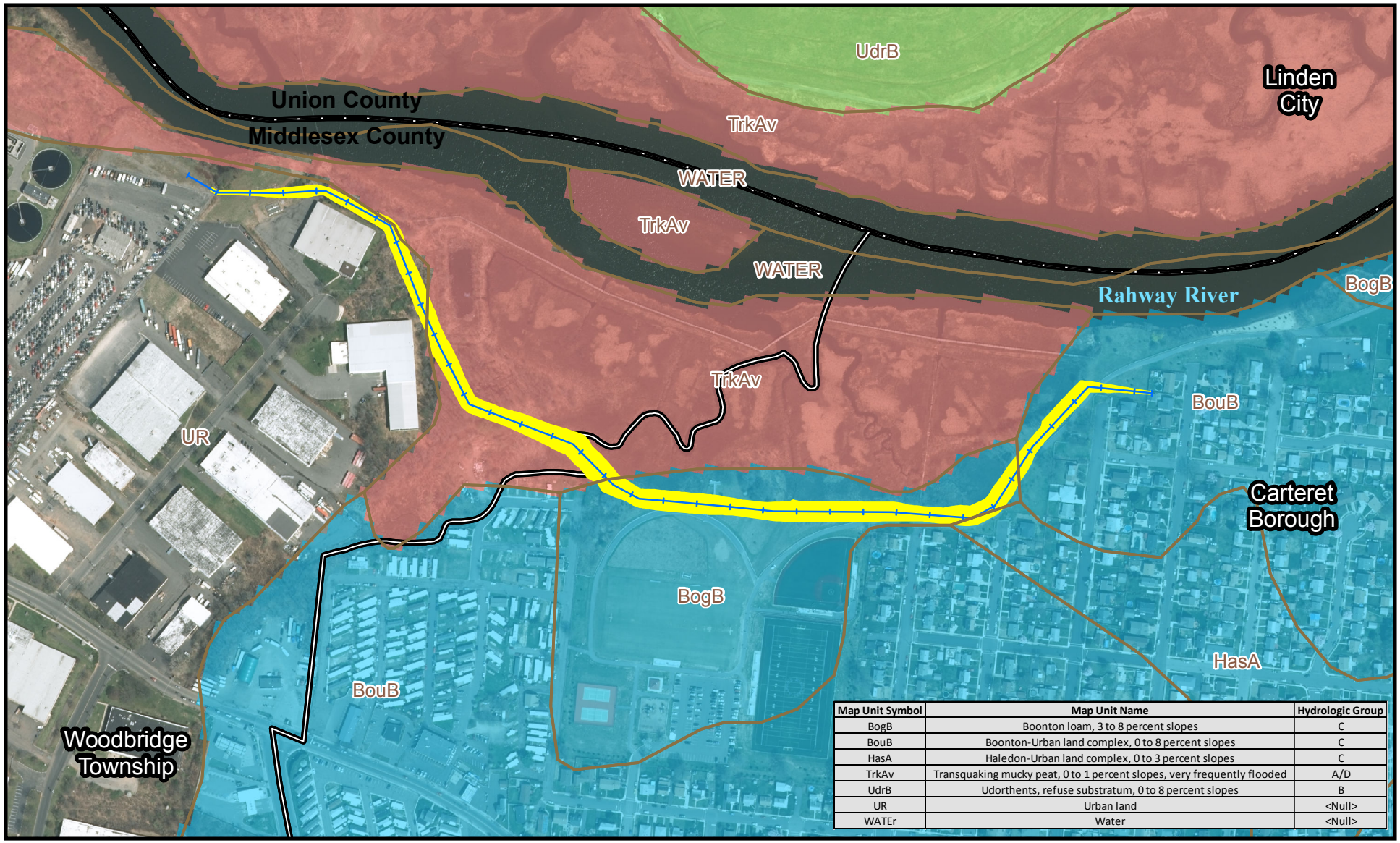
Common Name	Scientific Name	Habitat Use
Waterfowl		
Common merganser	*Mergus merganser*	Open water
Canada goose	*Branta canadensis*	Open water, mudflat, upland grass
Mallard duck	*Anas platyrhynchos*	Mudflat, open water
Snow goose	*Chen caerulescens*	Open water
Wading Birds		
Black-crowned night heron*	*Nycticorax nycticorax*	Emergent marsh, mudflat, open water edge
Cattle egret	*Bubulcus ibis*	Emergent marsh, mudflat, open water edge
Great blue heron	*Ardea herodias*	Emergent marsh, mudflat, open water edge
Great egret	*Casmerodius albus*	Emergent marsh, mudflat, open water
Green heron	*Butorides virescens*	Mudflat, open water, emergent marsh
Snowy egret	*Egreytta thula*	Emergent marsh, mudflat, open water
Shorebirds		
Double-crested cormorant	*Phalacrocorax auritus*	Mudflat, open water
Great black backed gull	*Larus marinus*	Mudflat, open water
Herring gull	*Larus argentatus*	Mudflat, open water
Killdeer	*Charadrius vociferous*	Upland grass, open water
Ring billed gull	*Larus delawarensis*	Mudflat, open water
Spotted sandpiper	*Actitus macularia*	Emergent marsh, mudflat, open water
Songbirds		
American crow	*Corvus brachyrhynchos*	Generalist
American goldfinch	*Carduelis tristis*	Generalist
American robin	*Turdus migratorius*	Generalist
Bank swallow	*Riparia riparia*	Bridges/embankments over water
Black-capped chickadee	*Parus atricapillus*	Forest, forest/scrub-shrub

Common Name	Scientific Name	Habitat Use
Belted kingfisher	*Megaceryle alcyon*	Open water, riparian areas
Blue jay	*Cyanocitta cristata*	Generalist
Brown headed cowbird	*Molothrus ater*	Urban edge
Carolina wren	*Thryothorus ludovicianus*	Forest, forest scrub-shrub, scrub-shrub
Cedar waxwing	*Bombycilla cedrorum*	Upland forest/scrub-shrub
Clapper rail	*Rallus longirostris*	Emergent marsh
Common grackle	*Quiscalus quiscula*	Generalist
Common yellowthroat	*Geothlypis trichas*	Scrub-shrub
Downy woodpecker	*Picoides pubescens*	Forest, forest scrub-shrub
Eastern kingbird	*Tyrannus tyrannus*	Forest, forest scrub-shrub, foraging in open areas, road edges
European starling	*Sturnus vulgaris*	Generalist, urban areas
Fish crow	*Corvus ossifragus*	Generalist, esp. found near riparian areas
Gray catbird	*Dumetella carolinensis*	Scrub-shrub, urban areas
Greater yellowlegs	*Tringa melanoleuca*	Emergent marsh, mudflat, open water edge
Hairy woodpecker	*Picoides villosus*	Forest, forest-scrub-shrub
Hermit thrush	*Catharus guttatus*	Forest, forest scrub-shrub
House finch	*Carpodacus mexicanus*	Generalist, urban areas
House sparrow	*Passer domesticus*	Generalist, urban areas
House wren	*Troglodytes aedon*	Forest, forest-scrub-shrub
Marsh wren	*Cistothorus palustris*	Emergent marsh, *Phragmites*, cattails
Mourning dove	*Zenaida macroura*	Generalist, urban areas
Northern cardinal	*Cardinalis cardinalis*	Forest, forest scrub-shrub
Northern flicker	*Colaptes auratus*	Forest, forest scrub-shrub, upland grass
Northern mockingbird	*Mimus polyglottos*	Urban areas, scrub-shrub
Northern oriole	*Icterus galbula*	Forest, forest scrub-shrub
Red-bellied woodpecker	*Melanerpes carolinus*	Forest, forest scrub-shrub
Red-eyed vireo	*Vireo olivaceus*	Forest, forest scrub-shrub
Red-winged blackbird	*Agelaius phoeniceus*	Emergent marsh, *Phragmites*, cattails, marshy
Rock dove	*Columbia livia*	Generalist, urban areas

Common Name	Scientific Name	Habitat Use
Song sparrow	*Melospiza melodia*	Scrub-shrub, herbaceous
Swamp sparrow	*Melospiza georgiana*	Emergent marsh
Tree swallow	*Tachycineta bicolor*	Scrub-shrub, open areas near water
Tufted titmouse	*Parus bicolor*	Forest, forest/scrub-shrub
Warbling vireo	*Vireo gilvus*	Forest, forest scrub-shrub, urban parks
White-throated sparrow	*Zonotrichia albicollis*	Scrub-shrub
Willow flycatcher	*Empidonax traillii*	Scrub-shrub
Wood thrush	*Hylocichla mustelina*	Forest
Yellow warbler	*Dendroica petechia*	Forest and Scrub-shrub
Others		
Osprey	*Pandion haliaetus*	Open water, coastal areas
Red-tailed hawk	*Buteo jamaicensis*	Scrub-shrub, open areas
Sharp-shinned hawk	*Accipiter striatus*	Forest, forest scrub-shrub
Turkey vulture	Cathartes aura	Generalist, urban areas roadsides

Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Figure 3
Soils within Segment Levee D Project Area



Map Unit Symbol	Map Unit Name	Hydrologic Group
BogB	Boonton loam, 3 to 8 percent slopes	C
BouB	Boonton-Urban land complex, 0 to 8 percent slopes	C
HasA	Haledon-Urban land complex, 0 to 3 percent slopes	C
TrkAv	Transquaking mucky peat, 0 to 1 percent slopes, very frequently flooded	A/D
UdrB	Udorthents, refuse substratum, 0 to 8 percent slopes	B
UR	Urban land	<Null>
WATEr	Water	<Null>

April 2017

Soils Map Units and Hydrologic Soil Groups (NRCS) in Proximity of TSP Levee D
Rahway River Basin (Tidal)
Coastal Storm Risk Management Study

US Army Corps of Engineers
New York District

0 500 1,000 Feet

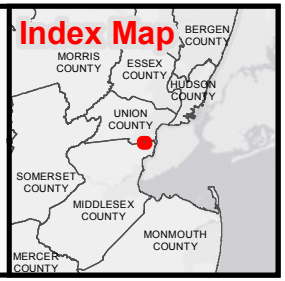
N W E S

Legend

- USACE TSP - Levee Segment D
- New Jersey County Boundaries
- New Jersey Municipal Boundaries
- Soil Map Units (NRCS)

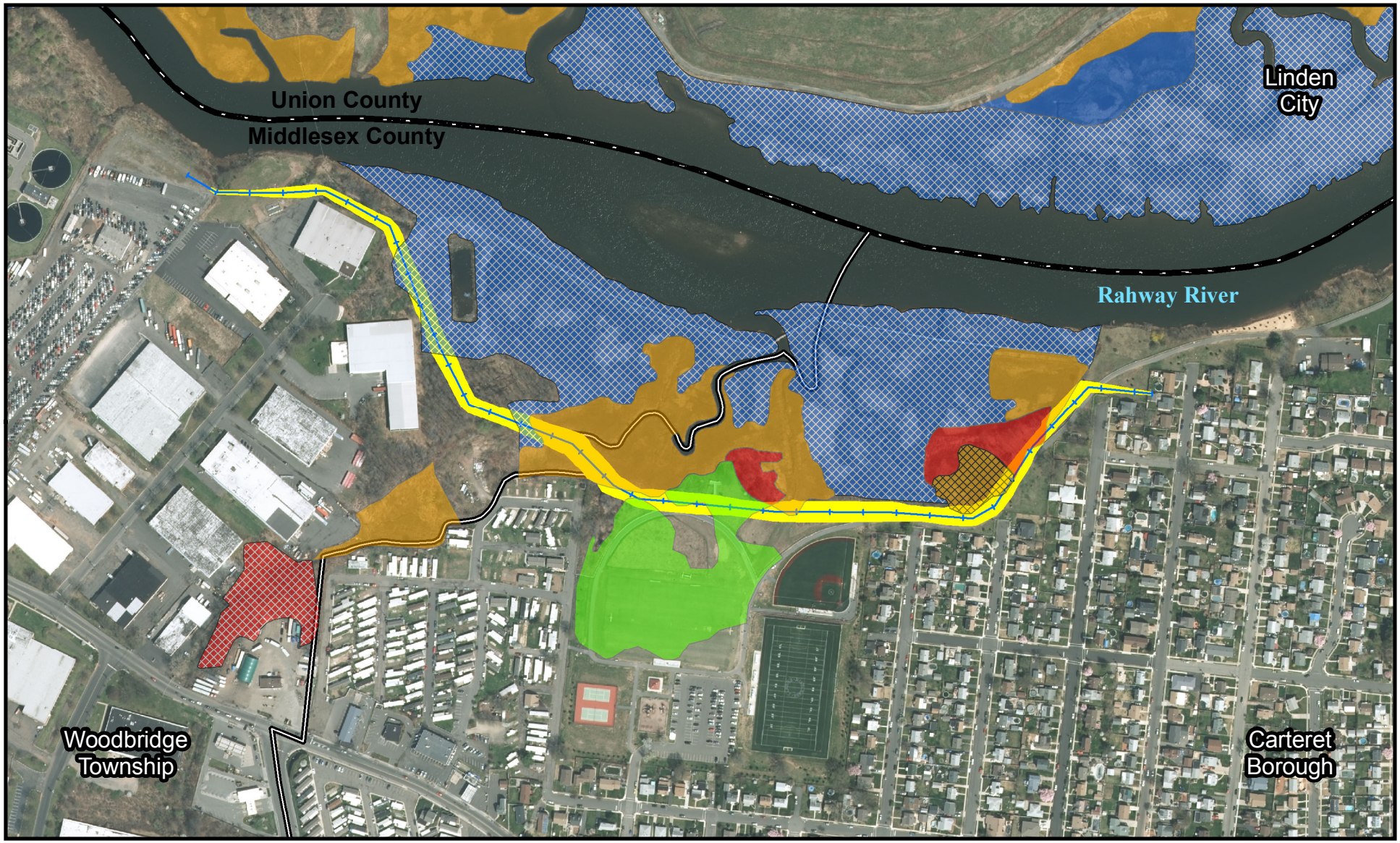
Hydrologic Soil Groups (NRCS)

- A/D - High Infiltration Rate (Drained) & Very Slow Infiltration Rate (Undrained)
- B - Moderate Infiltration Rate
- C - Slow Infiltration Rate



Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Figure 4
Wetland Types Within Levee Segment D Project Area



April 2017

Wetlands (NJDEP 2012) in Proximity of TSP Levee D
Rahway River Basin (Tidal)
Coastal Storm Risk Management Study

US Army Corps of Engineers
New York District

0 500 1,000 Feet

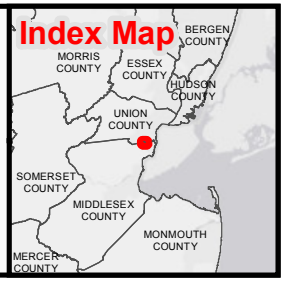
N W E S

Legend

- USACE TSP - Levee Segment D
- New Jersey County Boundaries
- New Jersey Municipal Boundaries

Types of Wetlands

- DECIDUOUS SCRUB/SHRUB WETLANDS
- DECIDUOUS WOODED WETLANDS
- MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA
- PHRAGMITES DOMINATE COASTAL WETLANDS
- PHRAGMITES DOMINATE INTERIOR WETLANDS
- SALINE MARSH (HIGH MARSH)
- SALINE MARSH (LOW MARSH)



Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Endangered Species Act Listed Species Under NOAA-NMFS Jurisdiction
And
No Effect Determination

SPECIES LISTED UNDER THE ENDANGERED SPECIES ACT UNDER THE JURISDICTION OF NMFS's GREATER ATLANTIC REGION (MAINE - VIRGINIA)

For a list of Candidate Species in the Greater Atlantic Region (GAR), please visit https://www.greateratlantic.fisheries.noaa.gov/protected/pcp/cs/index.html
For a list of Species of Concern in the GAR, please visit https://www.greateratlantic.fisheries.noaa.gov/protected/pcp/soc/index.html

FISH

Atlantic Salmon (*Salmo salar*) (Gulf of Maine DPS)

Year listed: 2000; More recent listing for Gulf of Maine Atlantic salmon as a Distinct Population Segment (DPS) encompassing a wider range in the state of Maine in 2009; Atlantic salmon are listed jointly with U.S. Fish and Wildlife Service.
Status: Endangered
General distribution: The distribution of endangered Atlantic salmon extends from the Androscoggin River in South Western Maine to the Dennys River in Eastern Maine.
Critical habitat in GAR: Critical habitat for Atlantic salmon was designated in 2009. Forty-five specific areas containing over 19,000 kilometers of rivers and streams and 799 square kilometers of lakes and ponds were identified as having the physical and biological features essential to the conservation of the species, which may require special management or protections. For more information, please visit the map book at https://www.greateratlantic.fisheries.noaa.gov/protected/atlsalmon/
Additional Information: For additional distribution information, select references, and other relevant information, please visit https://www.greateratlantic.fisheries.noaa.gov/protected/atlsalmon/ and http://www.fisheries.noaa.gov/pr/species/fish/atlantic-salmon.html

Shortnose Sturgeon (*Acipenser brevirostrum*)

Year listed: 1967
Status: Endangered
General distribution: Shortnose sturgeon occur in marine and estuarine habitat, including freshwater reaches of large rivers with access to the sea, which extends from the Minas Basin, Nova Scotia to the St. Johns River, Florida. There have been documented coastal movements between some of the major rivers.
Critical habitat in GAR: None
Additional Information: For additional distribution information, select references, and other relevant information, please visit https://www.greateratlantic.fisheries.noaa.gov/protected/snsturgeon/index.html and http://www.nmfs.noaa.gov/pr/species/fish/shortnose-sturgeon.html

Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)

Year listed: 2012 (Effective April 6, 2012)
Status: Five Distinct Population Segments (DPSs) designated along the U.S. East Coast. The Gulf of Maine population is listed as threatened while the New York Bight, Chesapeake Bay, Carolina, and South Atlantic populations are listed as endangered.
General distribution: Atlantic sturgeon belonging to each of the five DPSs occur in marine and estuarine habitat, including freshwater reaches of large rivers with access to the sea, from Hamilton Inlet, Labrador, Canada to Cape Canaveral, Florida, U.S. The range of all five DPSs overlap.
Critical habitat in the GAR: Proposed in select rivers from Maine through Virginia; Please visit: https://www.greateratlantic.fisheries.noaa.gov/protected/atlsturgeon/docs/maps_proposed_ch_for_gom_nyb_cb_dpss.pdf
Additional Information: For additional distribution information, select references, and other relevant information, please visit https://www.greateratlantic.fisheries.noaa.gov/protected/atlsturgeon/index.html and http://www.fisheries.noaa.gov/pr/species/fish/atlantic-sturgeon.html

MARINE MAMMALS

Blue Whale (*Balaenoptera musculus musculus*)

Year listed: 1970
Status: Endangered
General distribution: The distribution of the blue whale in the western North Atlantic generally extends from the Arctic to at least mid-latitude waters. The blue whale is best considered as an occasional visitor in U.S. Atlantic Exclusive Economic Zone (EEZ) waters, which may represent the current southern limit of its feeding range (CETAP 1982; Wenzel et al. 1988). The actual southern limit of the species' range is unknown.
Critical habitat in GAR: None
Additional Information: For additional distribution information, select references, and other relevant information, please visit http://www.fisheries.noaa.gov/pr/species/mammals/whales/blue-whale.html and http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2010whbl-wn.pdf

Fin Whale (*Balaenoptera physalus*)

Year listed: 1970
Status: Endangered
General distribution: Fin whales are common in waters of the U. S. Atlantic Exclusive Economic Zone (EEZ), principally from Cape Hatteras northward. Fin whales are migratory, moving seasonally into and out of high-latitude feeding areas, but the overall migration pattern is complex, and specific routes have not been documented. However, acoustic recordings from passive-listening hydrophone arrays indicate that a southward "flow pattern" occurs in the fall from the Labrador-Newfoundland region, past Bermuda, and into the West Indies (Clark 1995).
Critical habitat in GAR: None
Additional Information: For additional distribution information, select references, and other relevant information, please visit http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/finwhale.htm and http://www.nmfs.noaa.gov/pr/sars/pdf/stocks/atlantic/2015/f2015_finwhale.pdf

North Atlantic Right Whale (*Eubalaena glacialis*)

Year listed: 1970; Listed as two separate, endangered species in 2008 - the North Pacific right whale (*Eubalaena japonica*) and North Atlantic right whale (*Eubalaena glacialis*)
Status: Endangered
General distribution: Population ranges primarily from calving grounds in coastal waters of the southeastern United States to feeding grounds in New England waters and the Canadian Bay of Fundy, Scotian Shelf, and Gulf of St. Lawrence.
Critical habitat in GAR: Expanded to include the Gulf of Maine and Georges Bank. Please see: http://www.fisheries.noaa.gov/pr/species/critical%20habitat%20files/ne_narw_ch.pdf
Additional Information: For additional distribution information, select references, and other relevant information, please visit http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/rightwhale_northatlantic.htm and http://www.nmfs.noaa.gov/pr/sars/pdf/stocks/atlantic/2015/f2015_rightwhale.pdf

Sei Whale (*Balaenoptera borealis*)

Year listed: 1970
Status: Endangered
General distribution: The range of the Nova Scotia stock includes the continental shelf waters of the northeastern U.S., and extends northeastward to south of Newfoundland. Indications are that, at least during the feeding season, a major portion of the Nova Scotia sei whale stock is centered in northerly waters, perhaps on the Scotian Shelf (Mitchell and Chapman 1977). The southern portion of the species' range during spring and summer includes the northern portions of the U.S. Atlantic Exclusive Economic Zone (EEZ) — the Gulf of Maine and Georges Bank. Spring is the period of greatest abundance in U.S. waters, with sightings concentrated along the eastern margin of Georges Bank and into the Northeast Channel area, and along the southwestern edge of Georges Bank in the area of Hydrographer Canyon (CETAP 1982).
Critical habitat in GAR: None
Additional Information: For additional distribution information, select references, and other relevant information, please visit http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/seiwhale.htm and http://www.nmfs.noaa.gov/pr/sars/pdf/stocks/atlantic/2015/f2015_seiwhale.pdf

Sperm Whale (*Physeter macrocephalus*)

Year listed: 1970
Status: Endangered
General distribution: Sperm whales feed on larger organisms that inhabit the deeper ocean regions (Whitehead 2002). Calving for the species occurs in low latitude waters. The distribution of the sperm whale in the U.S. Exclusive Economic Zone (EEZ) occurs primarily on the continental shelf edge, over the continental slope, and into mid-ocean regions.
C**ritical habitat in GAR:** None
Additional Information: For additional distribution information, select references, and other relevant information, please visit http://www.fisheries.noaa.gov/pr/species/mammals/whales/sperm-whale.html and http://nefsc.noaa.gov/publications/tm/tm231/63_spermwhale_F2014July.pdf

SEA TURTLES

While sea turtles occur year-round off the southeastern United States, they are generally present in marine and estuarine waters of the GAR from April through November. As water temperatures warm in the spring, sea turtles begin to migrate to nearshore waters and up the U.S. Atlantic coast, occurring in Virginia as early as April/May and in the Gulf of Maine in June. The trend is reversed in the fall with some animals remaining in the GAR until late fall. Outside of these times, sea turtle presence in GAR waters is considered unlikely, although juvenile sea turtles routinely strand on GAR beaches during colder months (i.e., from October to January) as a result of cold-stunning. Nesting is extremely limited in the GAR. Typically, juveniles and, to a lesser extent, adults are present in the GAR. Sea turtles are listed jointly with U.S. Fish and Wildlife Service. For additional distribution information, select references, and other relevant information, please visit https://www greateratlantic.fisheries.noaa.gov/protected/seaturtles/index.html and http://www.nmfs.noaa gov/pr/species/turtles/

Green Sea Turtle (*Chelonia mydas*)

Year listed: 1978; Eleven Distinct Population Segments (DPSs) designated in 2016
Status: The Central North Pacific, East Indian-West Pacific, East Pacific, North Atlantic, North Indian, South Atlantic, Southwest Indian, and Southwest Pacific DPSs are listed as threatened. The Central South Pacific, Central West Pacific, and Mediterranean DPSs are listed as endangered. Only the North Atlantic DPS is present in the GAR.
General Distribution: In the U.S. Atlantic, green turtles are occasionally found as far north as New England, but are more commonly seen from New York south. They occur seasonally in GAR waters, including but not limited to the Chesapeake Bay and Long Island Sound, which serve as foraging and developmental habitats.
Critical habitat in GAR: None
Additional Information: http://www.nmfs.noaa.gov/pr/species/turtles/green.html

Hawksbill Turtle (*Eretmochelys imbricata*)

Year listed: 1970
Status: Endangered
General Distribution: Hawksbill turtles are circumtropical. In the U.S. Atlantic, they are found primarily in Florida and Texas, though they have been recorded along the east coast as far north as Massachusetts. Hawksbills are rare visitors to the waters of the GAR.
Critical habitat in GAR: None
Additional Information: http://www.nmfs.noaa.gov/pr/species/turtles/hawksbill.html

Kemp's Ridley Turtle (*Lepidochelys kempii*)

Year listed: 1970
Status: Endangered
General Distribution: Kemp's ridleys typically occur only in the Gulf of Mexico and the northwestern Atlantic. In the U.S. Atlantic, they are found as far north as New England seasonally. Foraging areas in the GAR include, but are not limited to, Chesapeake Bay, Delaware Bay, Cape Cod Bay, and Long Island Sound.
Critical habitat in GAR: None
Additional Information: http://www.nmfs.noaa.gov/pr/species/turtles/kempsridley.html

Leatherback Turtle (*Dermochelys coriacea*)

Year listed: 1970
Status: Endangered
General Distribution: Leatherback sea turtles are globally distributed. They range farther than any other sea turtle species. Although frequently thought of as an oceanic species, they are also known to use coastal waters of the U.S. continental shelf. Juveniles and adults are present in the GAR seasonally and are distributed as far north as Canada.
Critical habitat in GAR: None
Additional Information: http://www.nmfs.noaa.gov/pr/species/turtles/leatherback.html

Loggerhead Turtle (*Caretta caretta*)

Year listed: 1978; Nine Distinct Population Segments (DPSs) designated in 2011
Status: The Northwest Atlantic, South Atlantic, Southeast Indo-Pacific, and Southwest Indian Ocean DPSs are listed as threatened. The Northeast Atlantic, Mediterranean, North Indian, North Pacific, and South Pacific Ocean DPSs are listed as endangered. Only the Northwest Atlantic DPS is present in the GAR.
General Distribution: Loggerheads, the most abundant species of sea turtle in U.S. waters, have a temperate and subtropical distribution, including offshore waters, continental shelves, bays, estuaries, and lagoons. In the U.S. Atlantic, their range extends north to southern Canada. They most commonly occur throughout the inner continental shelf from Florida to Massachusetts. As with other sea turtle species, their presence in the GAR varies seasonally.
Critical habitat in GAR: *Sargassum* critical habitat in offshore waters associated with the Gulf Stream current off Maryland and Virginia.
Additional Information: http://www.nmfs.noaa gov/pr/species/turtles/loggerhead.html and http://www.nmfs.noaa.gov/pr/species/turtles/criticalhabitat_loggerhead.htm

REFERENCES CITED

CETAP 1982. A characterization of marine mammals and turtles in the mid- and North Atlantic areas of the U.S. outer continental shelf, final report, Cetacean and Turtle Assessment Program, University of Rhode Island. Bureau of Land Management, Washington, DC. #AA551-CT8-48 576 pp.

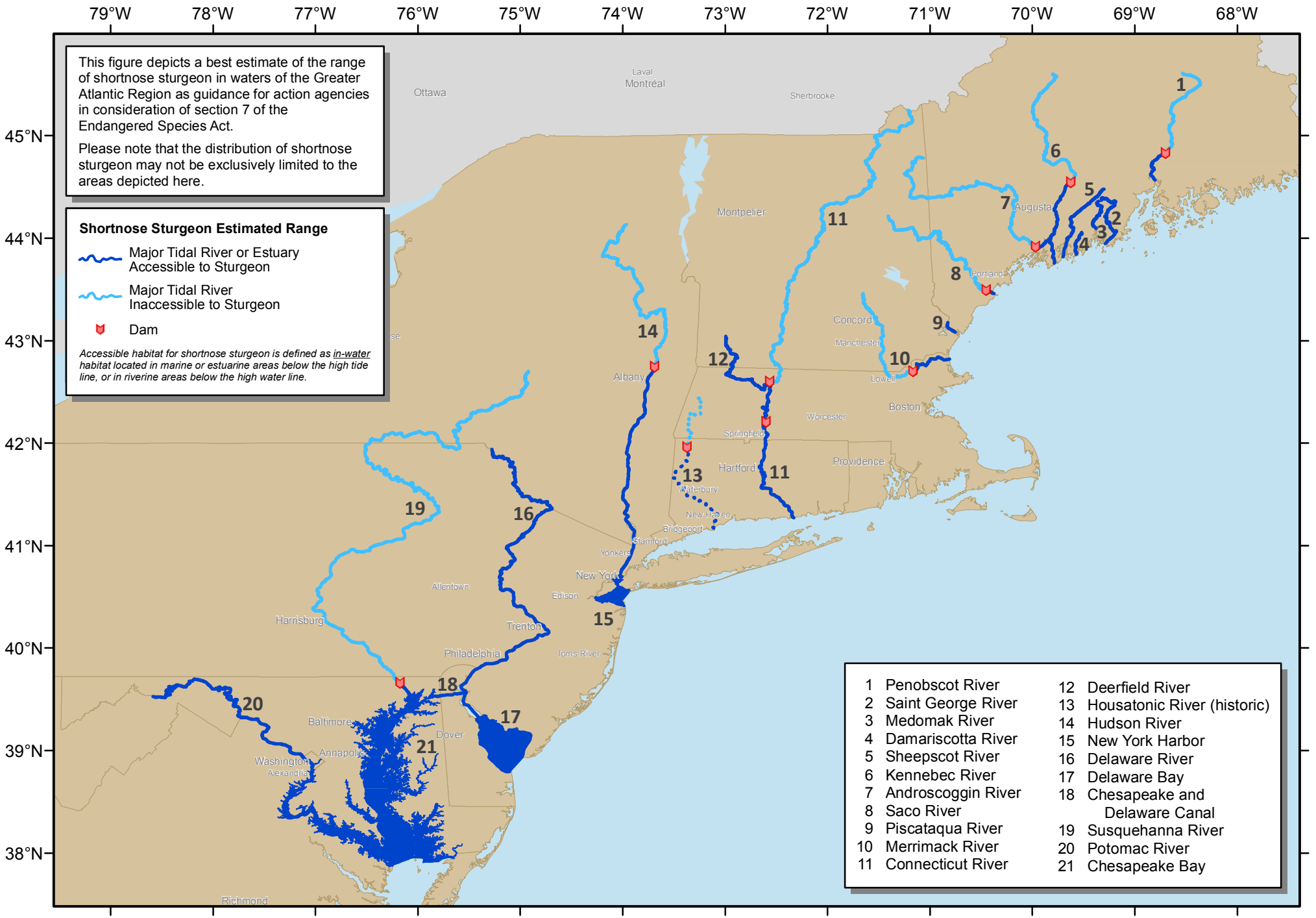
Clark, C.W. 1995. Application of U.S. Navy underwater hydrophone arrays for scientific research on whales. Rep. Int. Whal. Comm. 45: 210-212.

Mitchell, E. and D.G. Chapman 1977. Preliminary assessment of stocks of northwest Atlantic sei whales (*Balaenoptera borealis*). Rep. Int. Whal. Comm. (Special Issue) 1: 117-120.

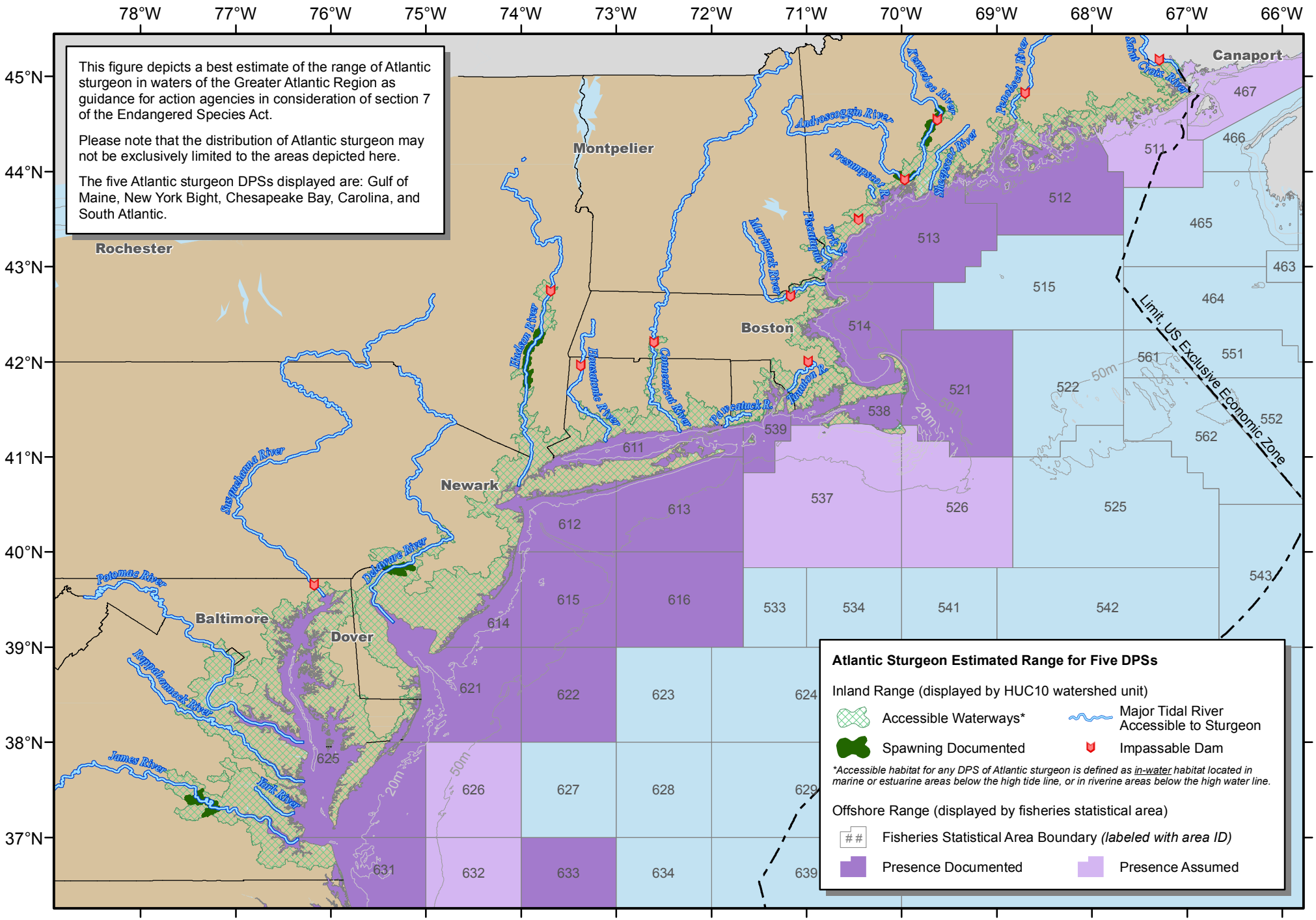
Wenzel, F., D. K. Mattila and P. J. Clapham 1988. *Balaenoptera musculus* in the Gulf of Maine. Mar. Mamm. Sci. 4(2): 172-175.

Whitehead, H. 2002. Estimates of the current global population size and historical trajectory for sperm whales. Mar. Ecol. Prog. Ser. 242: 295-304.

Estimated Range of Shortnose Sturgeon

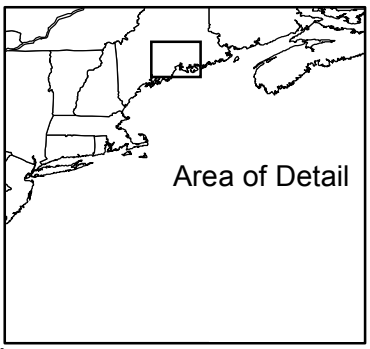


Estimated Range of Atlantic Sturgeon Distinct Population Segments (DPSs)



Gulf of Maine Unit 1
Penobscot River

Map 1



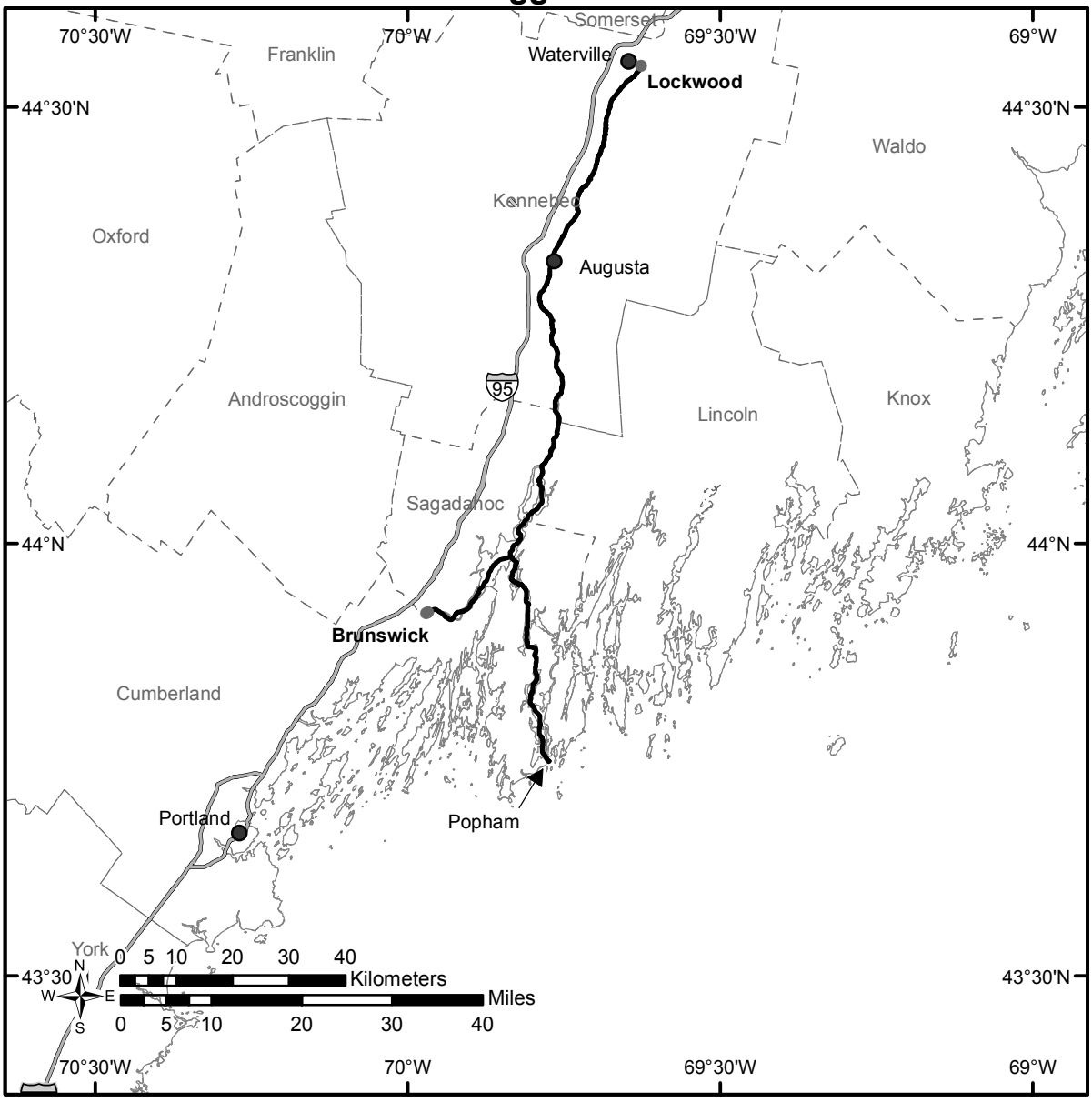
Legend

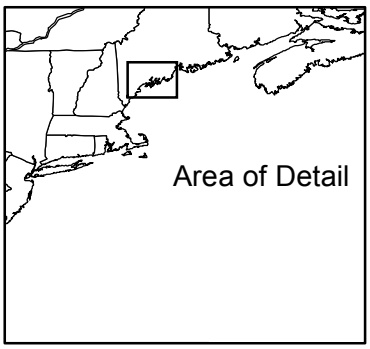
Length of the River Proposed as Critical Habitat

This map is provided for illustrative purposes only of Atlantic sturgeon critical habitat.
For the precise legal definition of critical habitat, please refer to the narrative description.
The proposed critical habitat is the full bank width of the depicted river length with the exception of U.S. Department of Defense sites determined to be ineligible for designation.
The river is not depicted in its entirety unless critical habitat is proposed for the entire length of the river.

Gulf of Maine Units 2 and 3
Kennebec River and Androscoggin River

Map 2





Legend

Length of River Proposed as Critical Habitat

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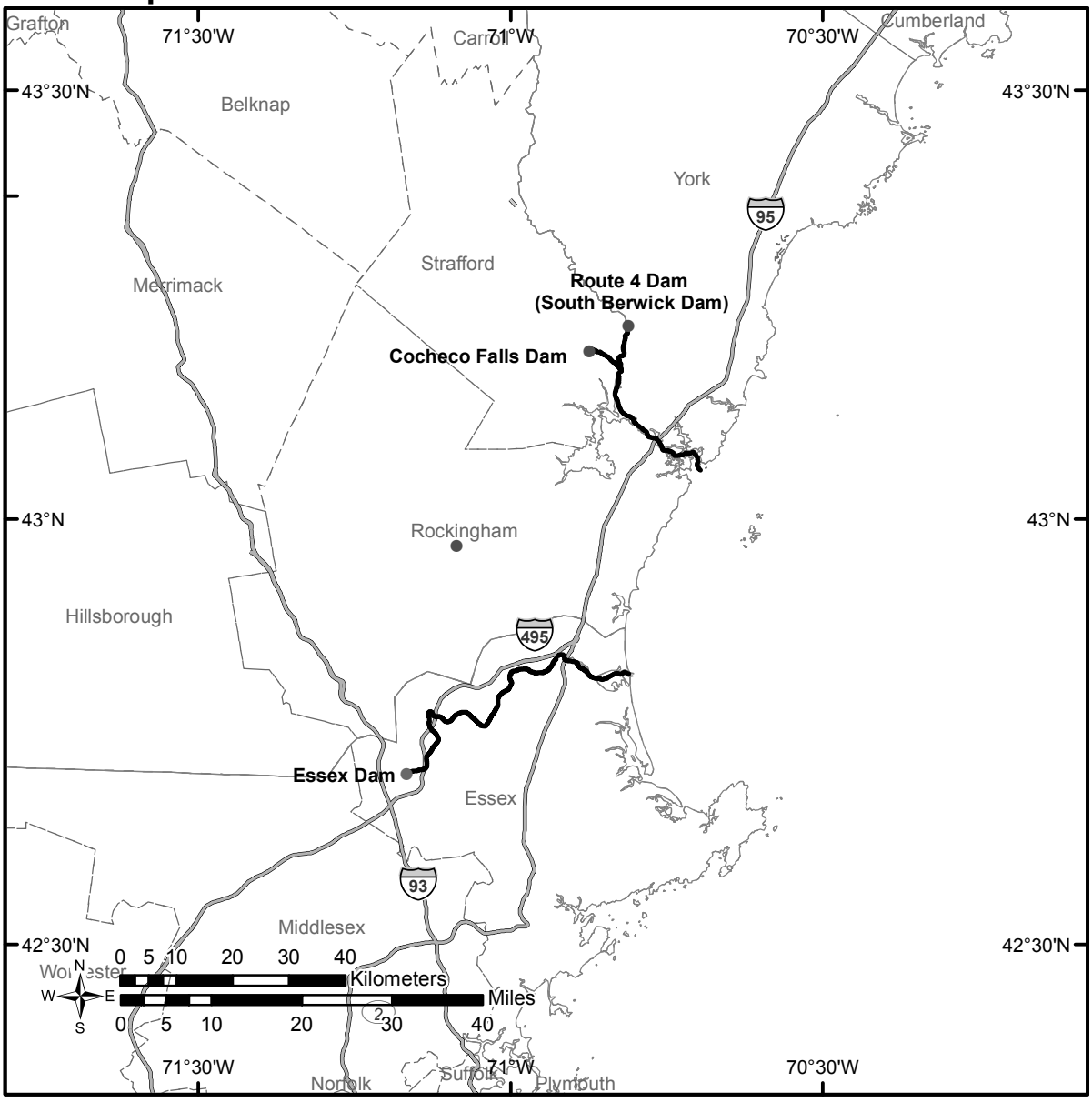
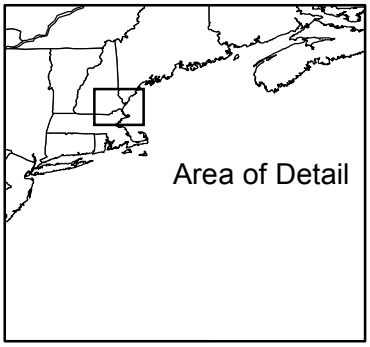
Gulf of Maine Units 4 and 5
Piscataqua and Merrimack Rivers

Map 3





Legend

Length of River Proposed as Critical Habitat

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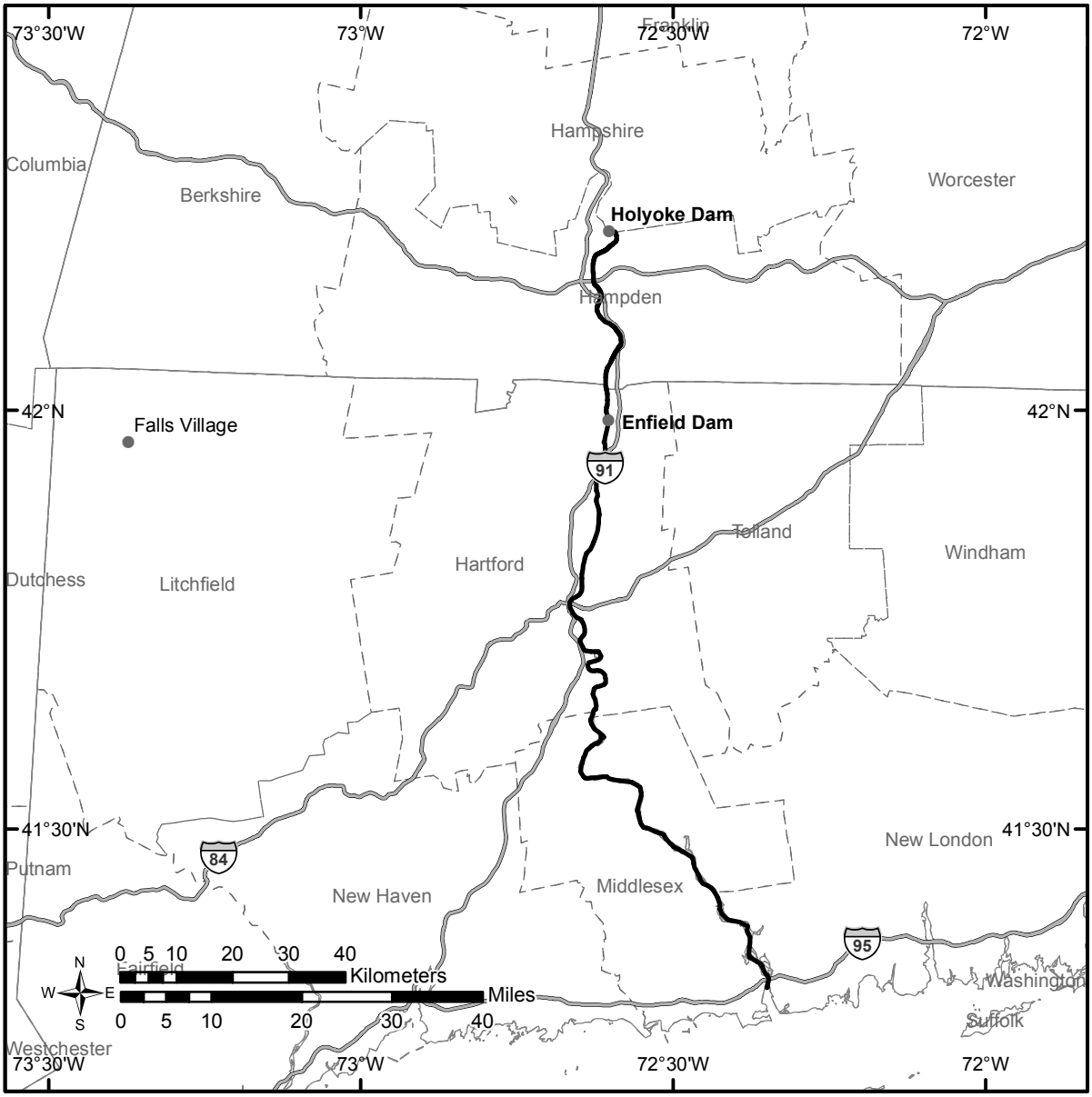
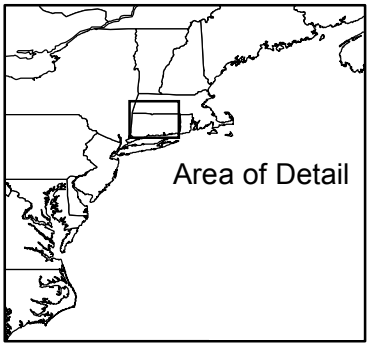
New York Bight Unit 1
Connecticut River

Map 4





Legend

River Length Proposed as Critical Habitat

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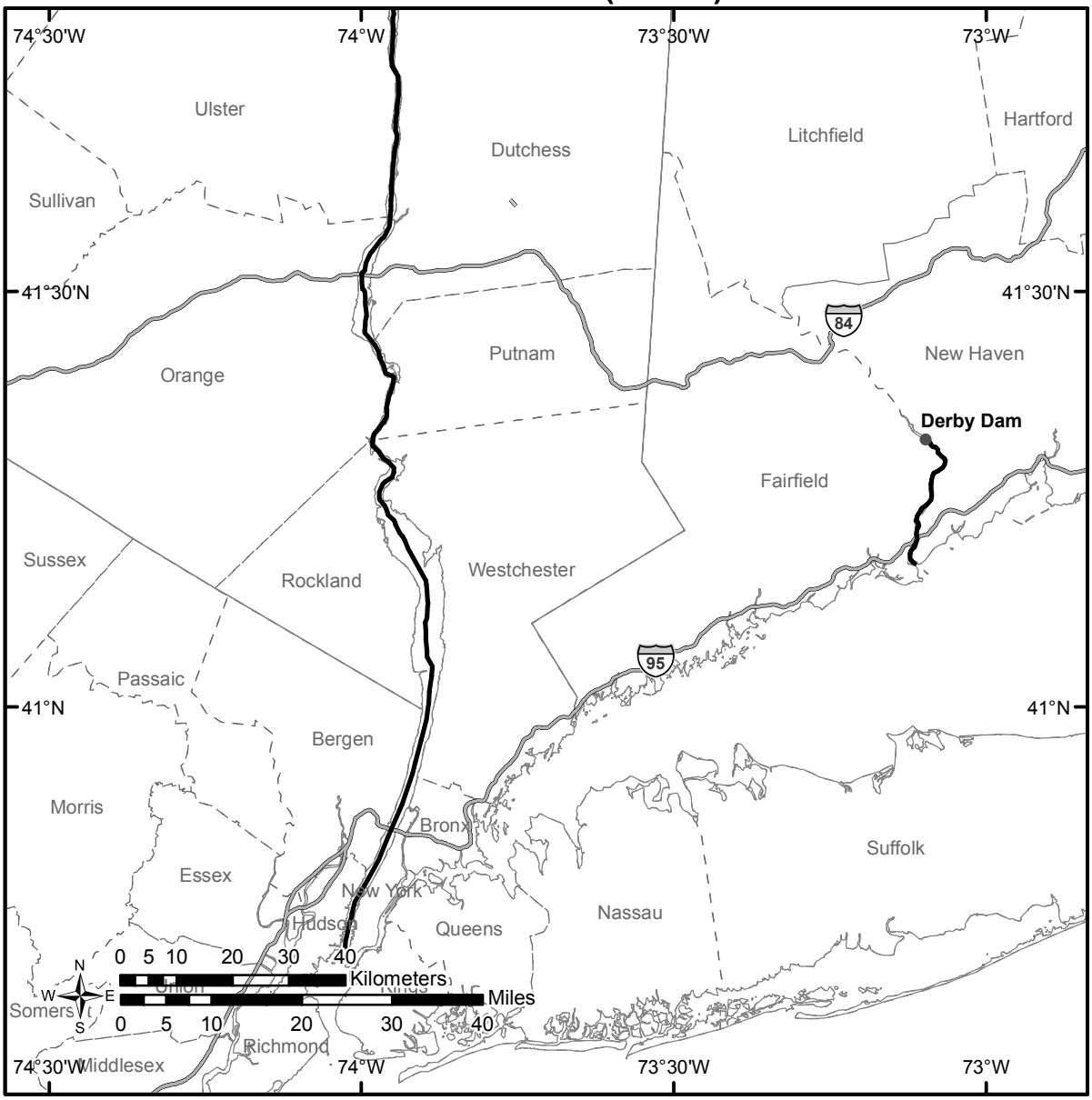
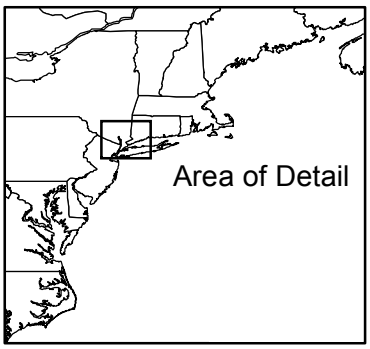
New York Bight Units 2 and 3
Housatonic River and Hudson River (Part A)

Map 5





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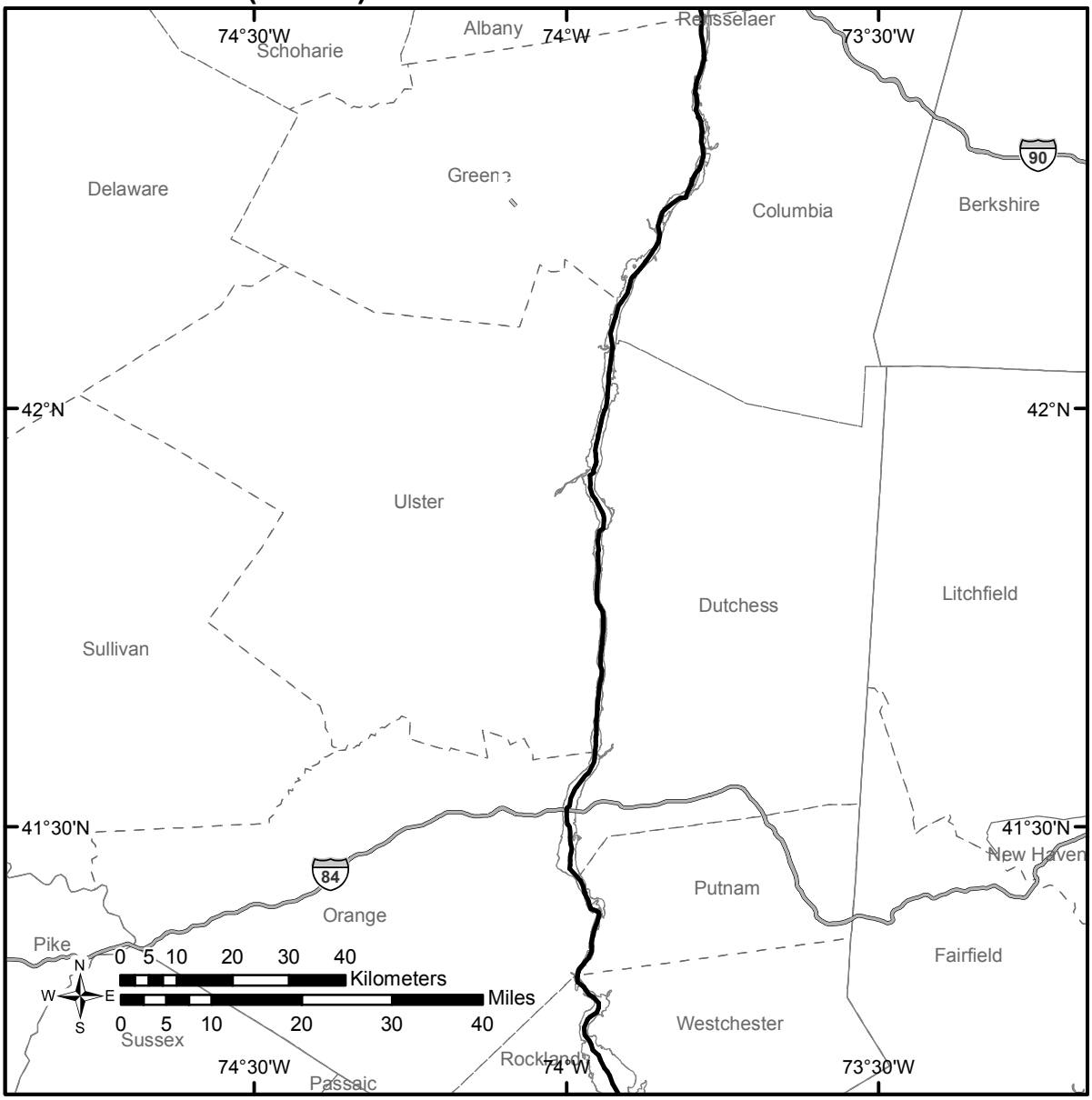
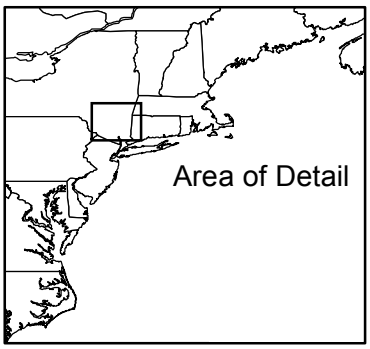
New York Bight Unit 3
Hudson River (Part B)

Map 6





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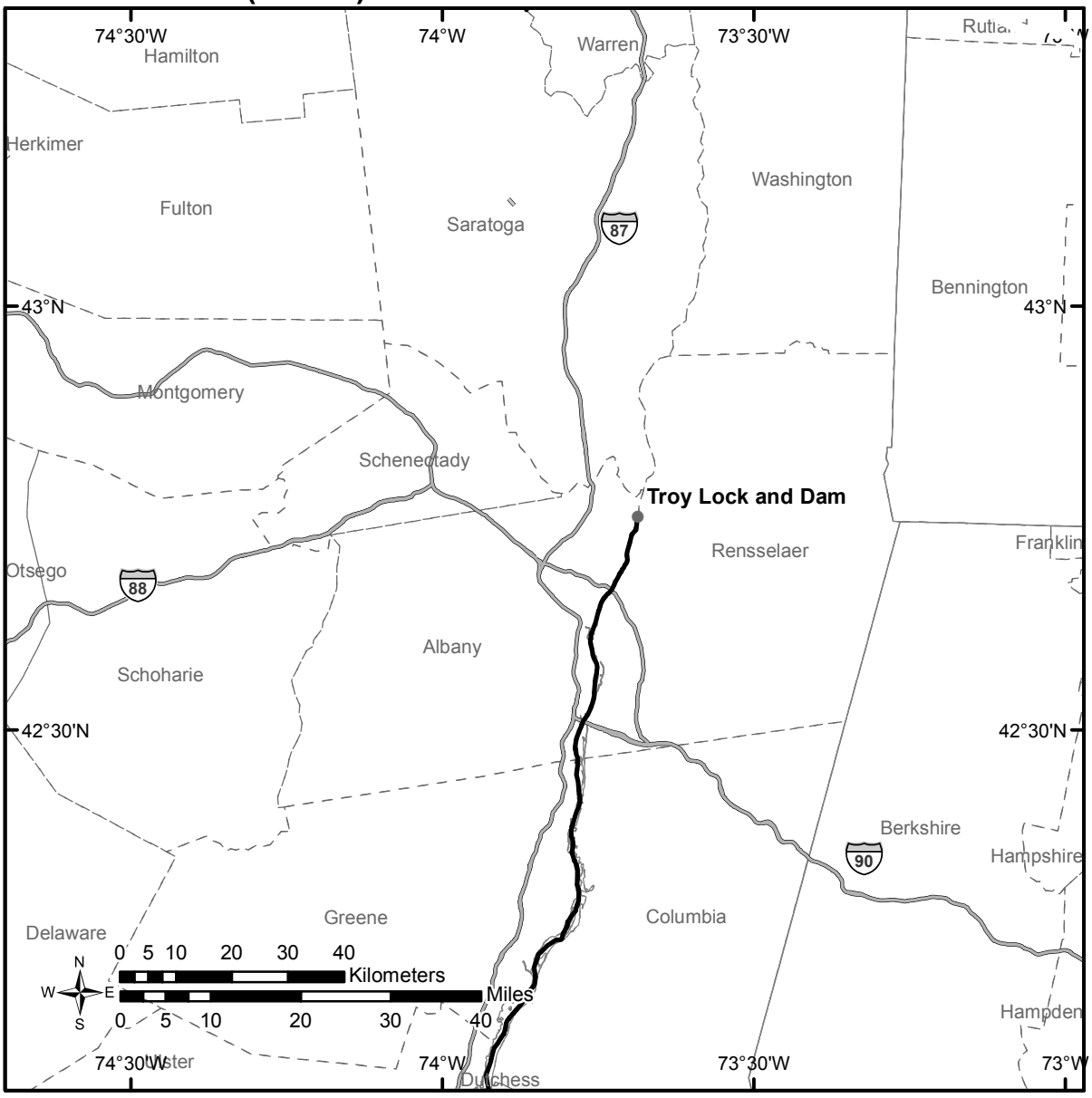
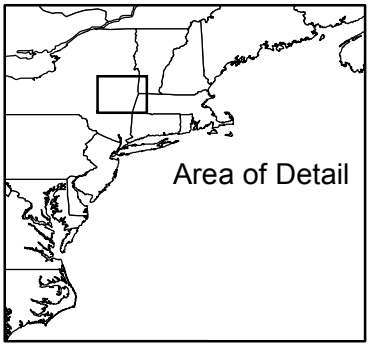
New York Bight Unit 3
Hudson River (Part C)

Map 7





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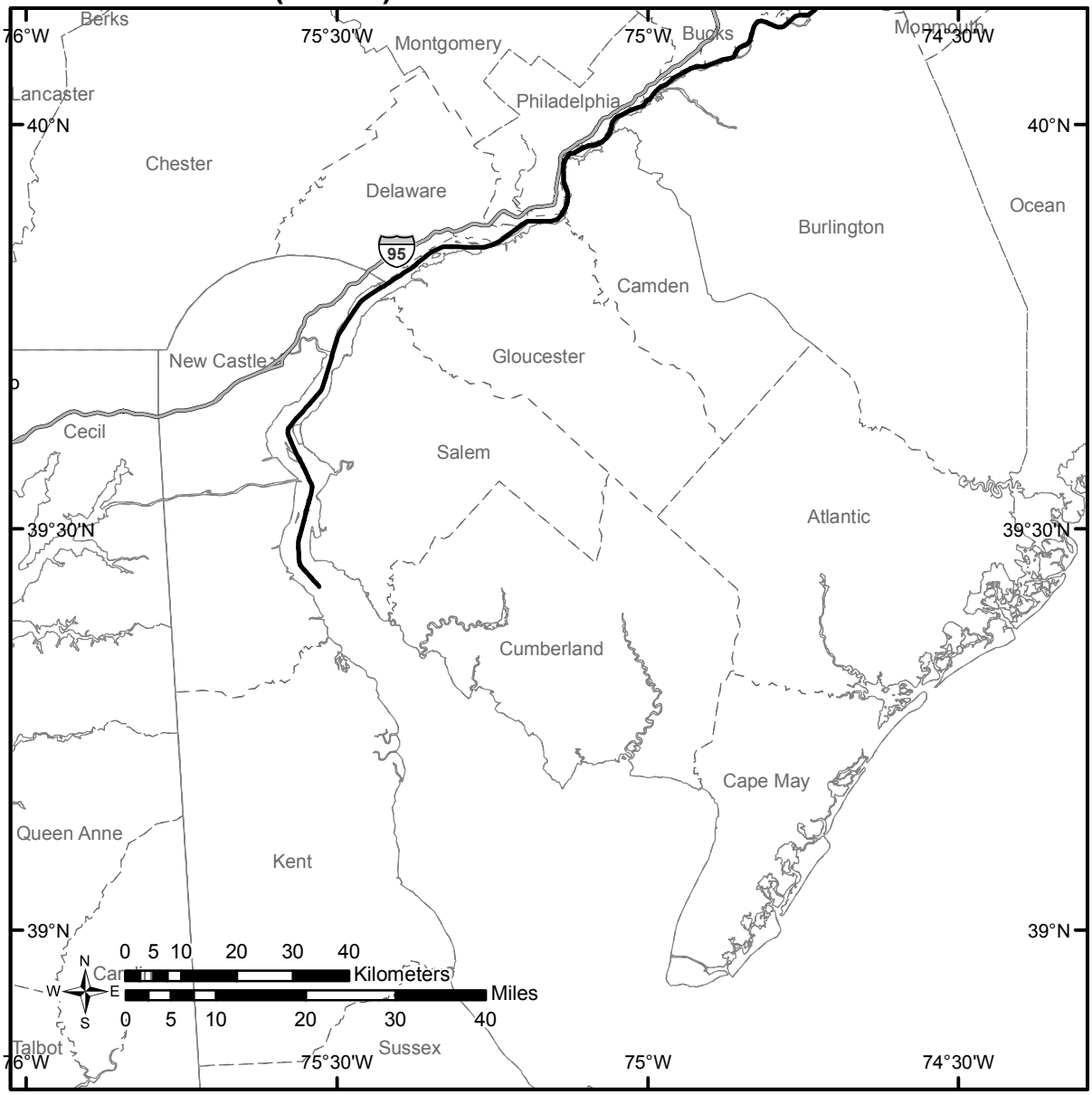
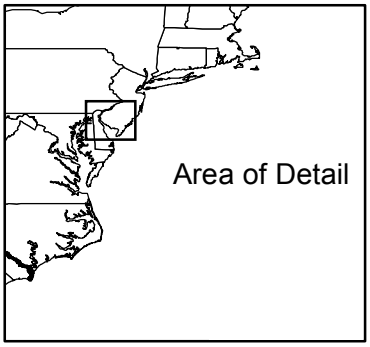
New York Bight Unit 4
Delaware River (Part A)

Map 8





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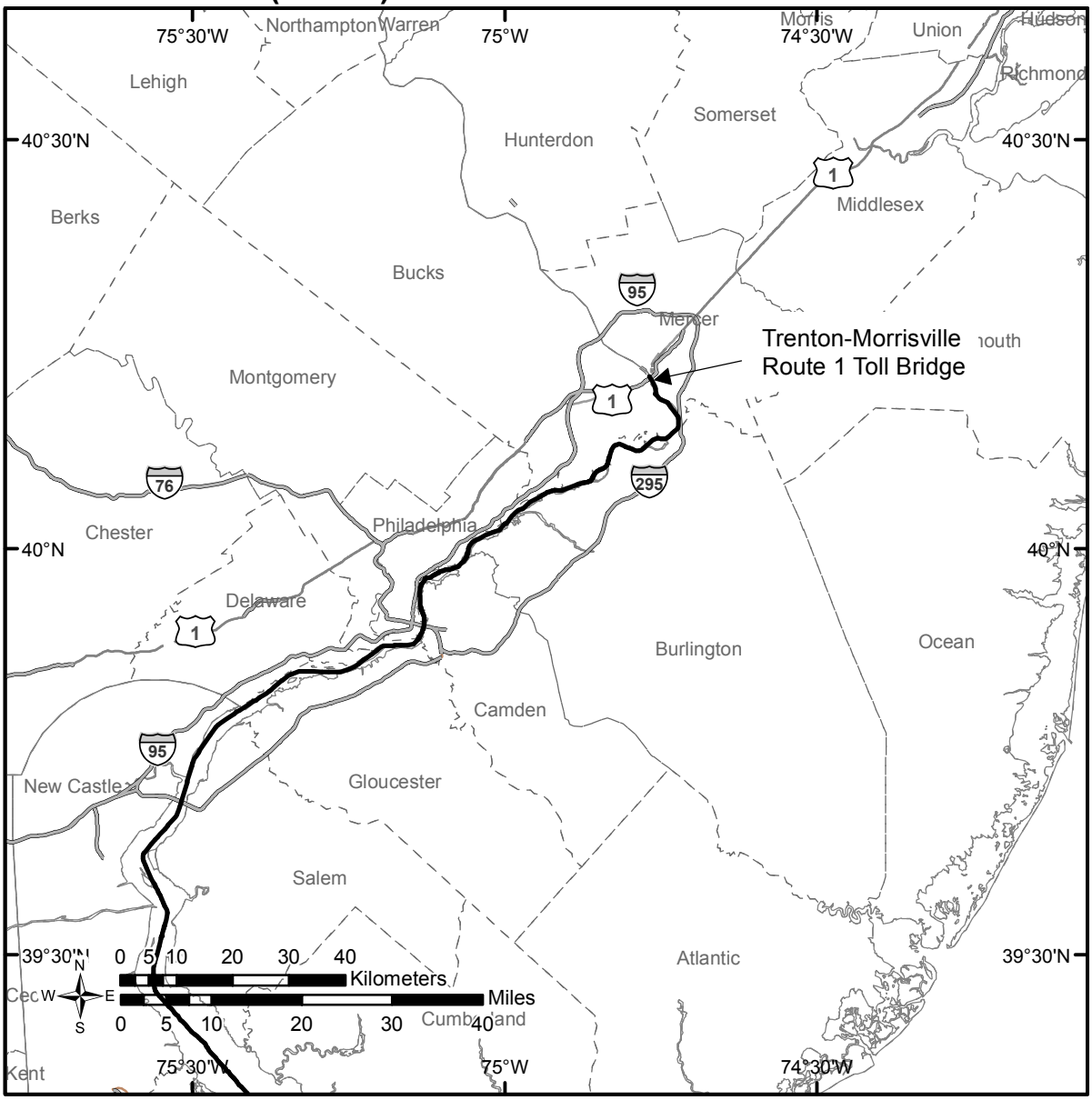
New York Bight Unit 4
Delaware River (Part B)

Map 9



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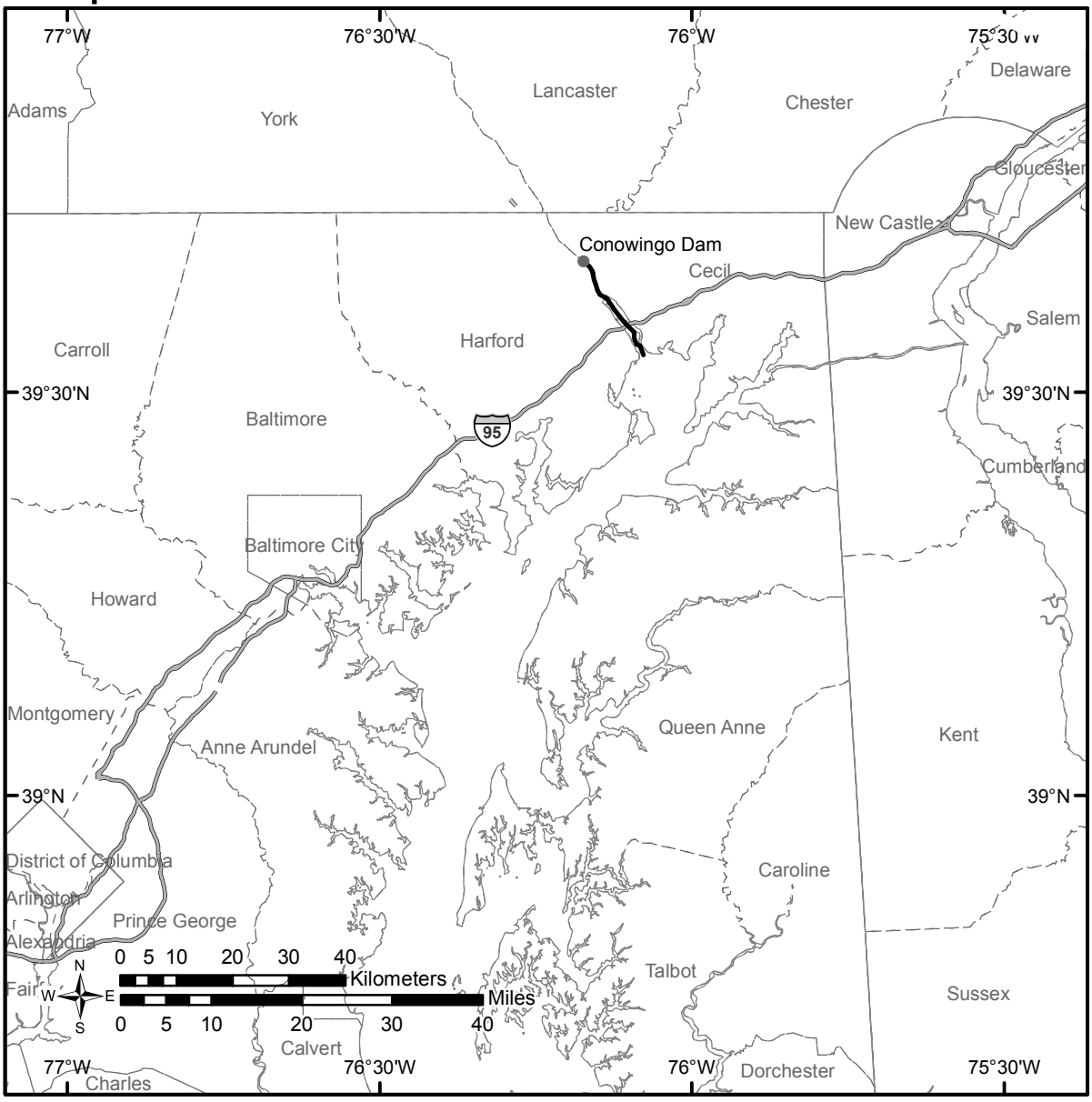
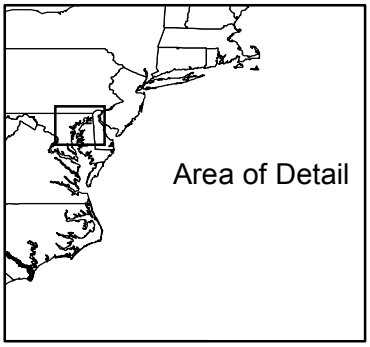
Chesapeake Bay Unit 1
Susquehanna River

Map 10





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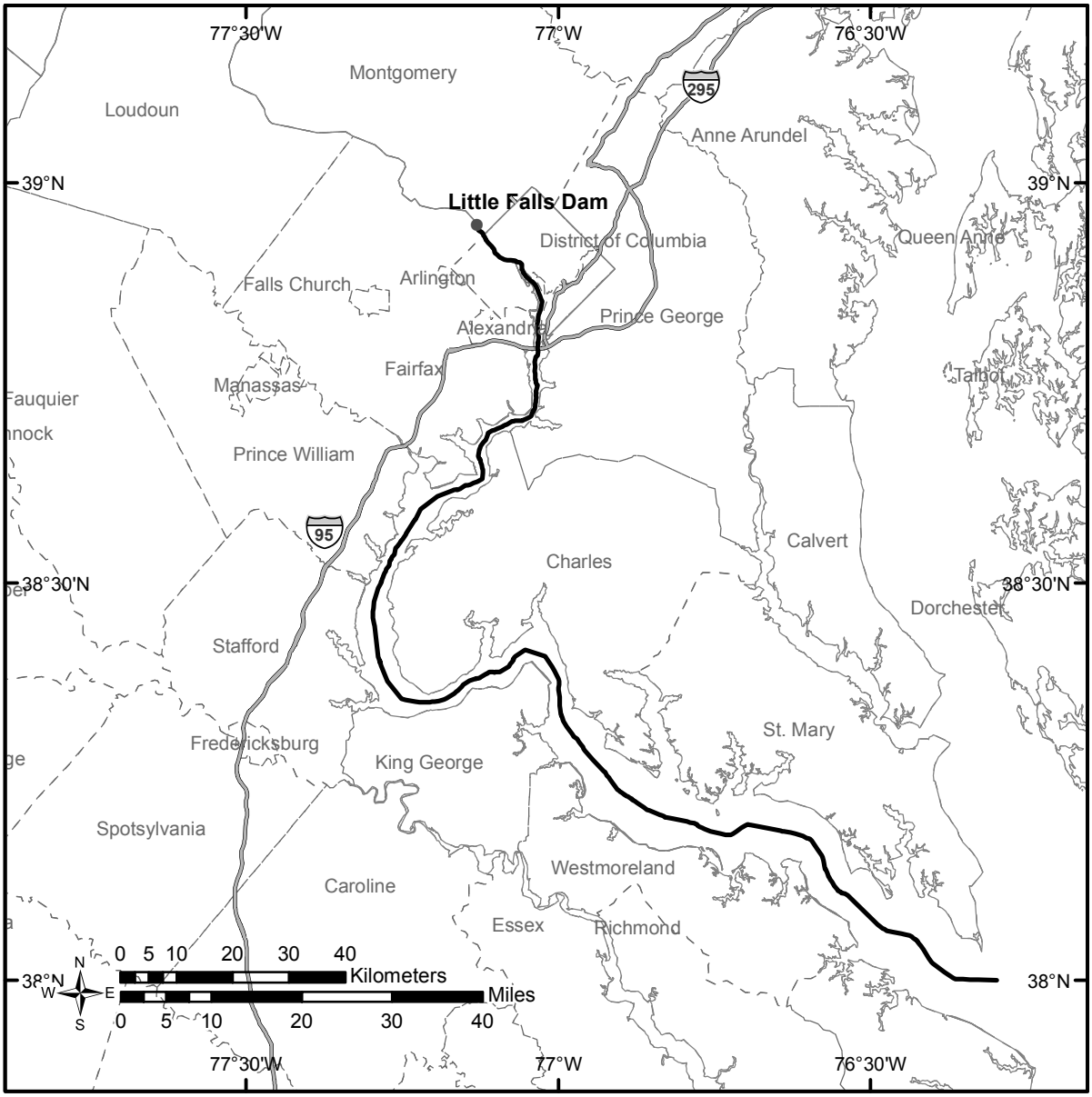
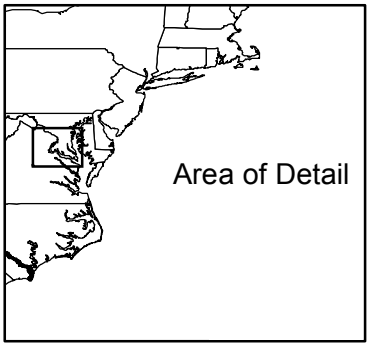
Chesapeake Bay Unit 2
Potomac River

Map 11





Legend

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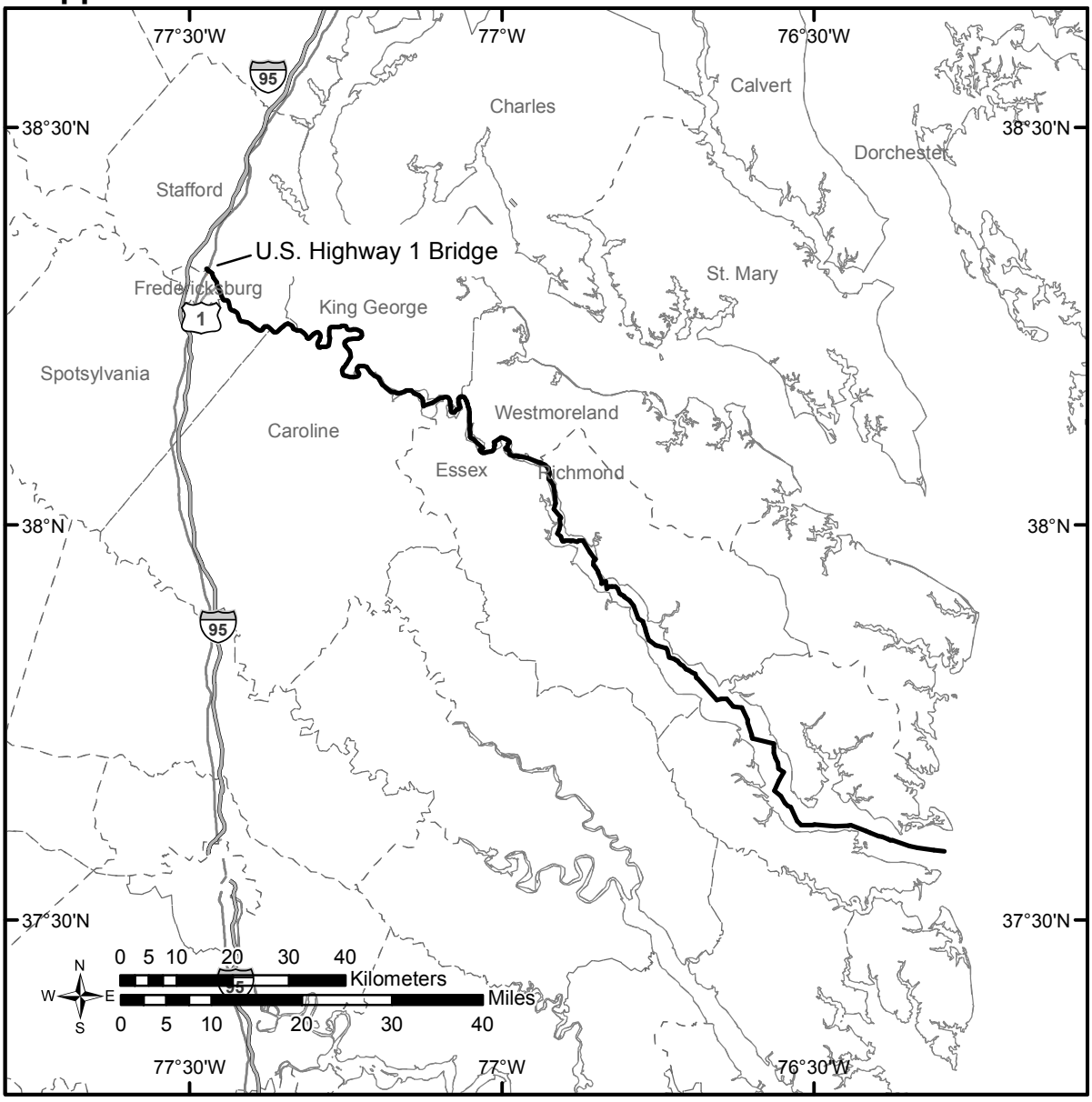
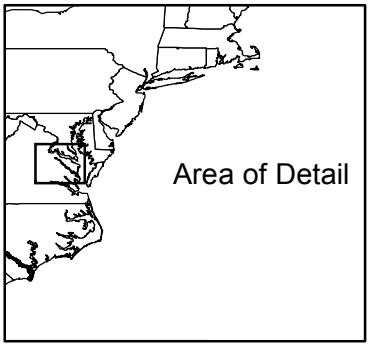
Chesapeake Bay Unit 3
Rappahannock River

Map 12





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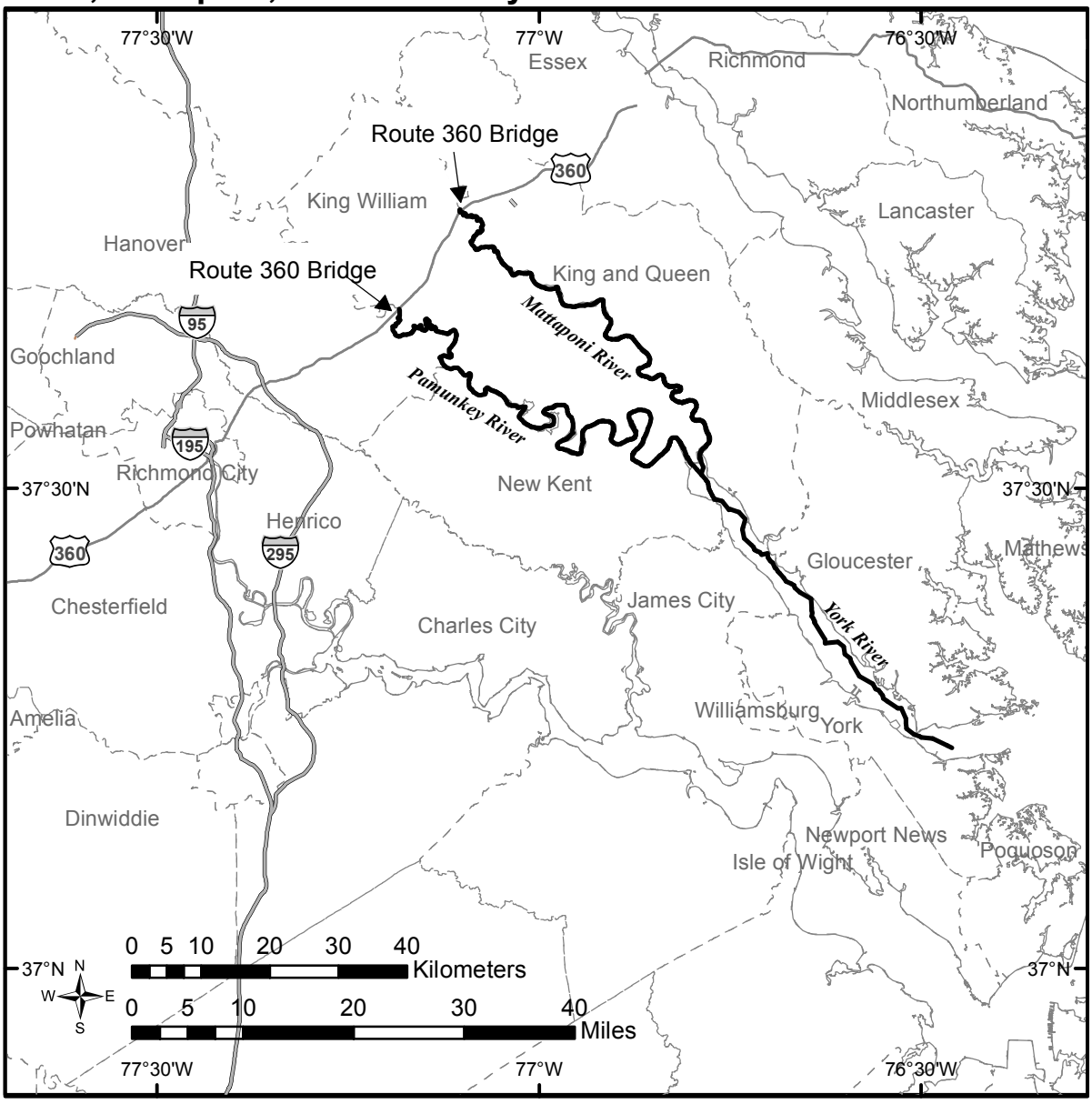
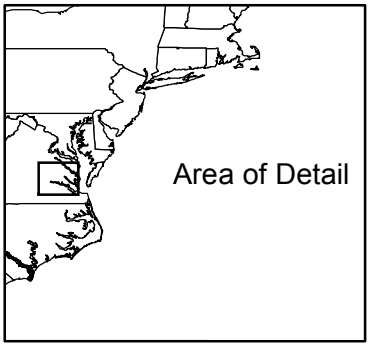
Chesapeake Bay Unit 4
York, Mattaponi, and Pamunkey Rivers

Map 13





Legend

River Length Proposed for Critical Habitat

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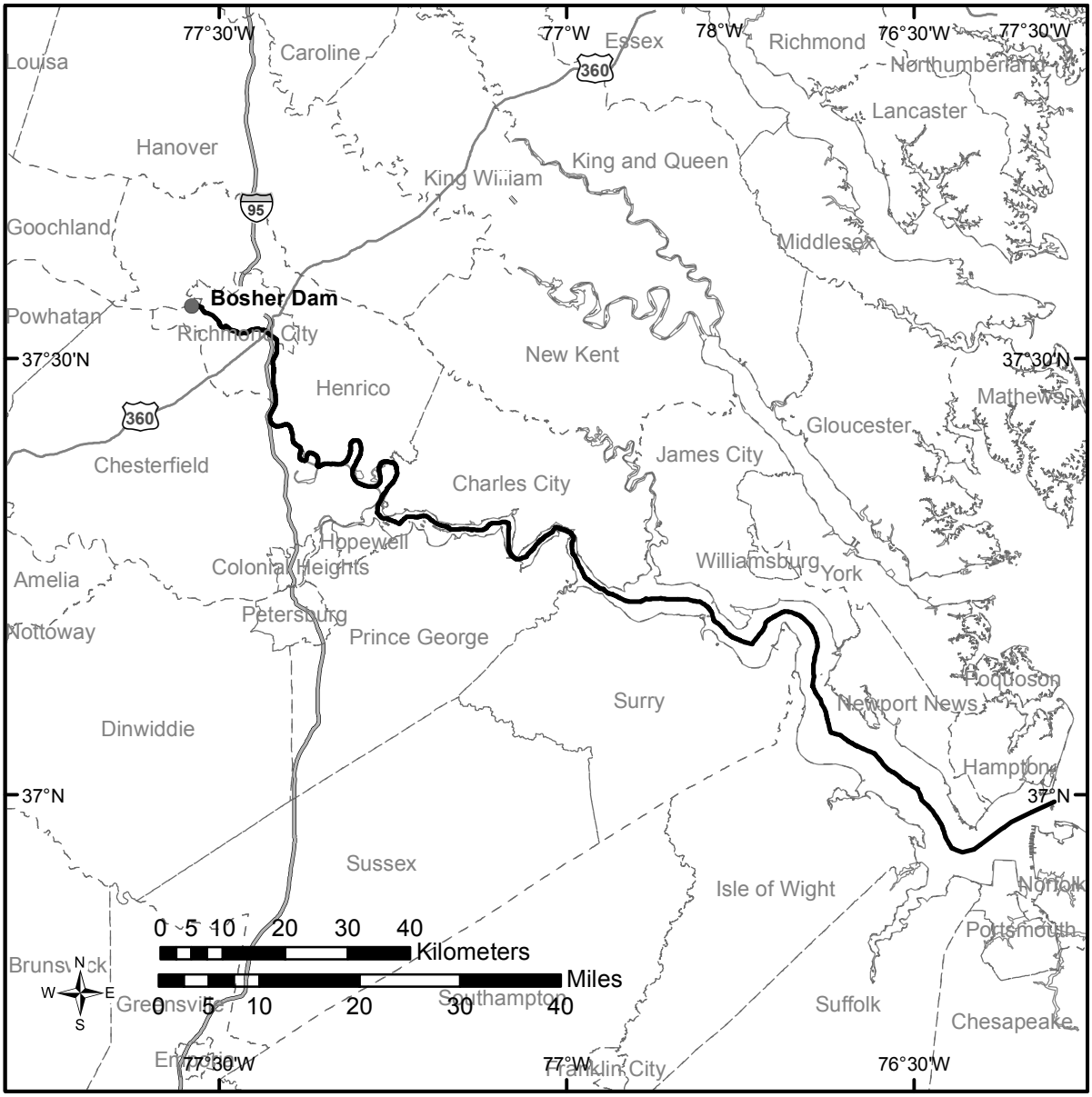
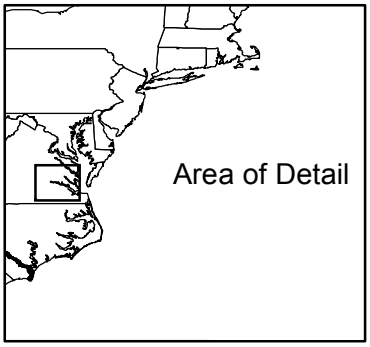
Chesapeake Bay Unit 5
James River

Map 14





Legend

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GARFO Master ESA Species Table - Atlantic Sturgeon

General distribution: Atlantic Ocean waters and associated bays, estuaries, and coastal river systems from Hamilton Inlet, Labrador, Canada, to Cape Canaveral, Florida; only subadult and adult lifestages occur in marine waters, where they are typically found in waters 5-50 meters in depth (Stein et al. 2004; ASMFC TC 2007); subadults and adults may travel long distances in marine waters, aggregate in both ocean and estuarine areas at certain times of the year, and exhibit seasonal coastal movements in the spring and fall; distribution in rivers and inshore bays typically occurs from the estuary or river mouth generally up to the first impassible barrier (e.g., a dam or falls); Atlantic sturgeon generally use the deepest habitats available to them in rivers, but they have also been collected over shallow (2.5 meters), tidally influenced flats and substrates ranging from mud to sand and mixed rubble and cobble (Savoy and Pacileo 2003)

Disclaimer: the best available information on Atlantic sturgeon presence within coastal rivers, estuaries, and bays of the Greater Atlantic Region is presented below; waterbodies highlighted below are ones where we have information specific to Atlantic sturgeon use of the area that would be helpful for action agencies reviewing proposed actions and their potential effects on Atlantic sturgeon; however, they may occur in other watersheds within this range for which we do not currently have specific information; note: individuals from any of the five listed DPSs (Gulf of Maine, New York Bight, Chesapeake Bay, Carolina, and South Atlantic) may occur in any of the areas identified throughout the species' range; a description of Atlantic sturgeon life history stages are included at the end of the table below

Body of Water (State)	Distribution/Range in Watershed	Life Stages Present	Use of the Watershed	References
Cobscook Bay/St. Croix River (ME)	Up to the Milltown Dam at Calais, ME (RKM 16)	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present	ASSRT 2007
Penobscot River (ME)	Up to the Milford Dam (RKM 62)	subadults and adults (potentially eggs, larvae, YOY, and juveniles)	**Spawning** - undocumented but suitable spawning habitat is accesible **Foraging -** lower river (RKM 21-24)	Kieffer and Kynard 1993; ASSRT 2007; Fernandes et al. 2010; Wippelhauser 2012; Dzaugis 2013; Wippelhauser et al. 2015
Damariscotta River (ME)	Up to RKM 30	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present; tag detections indicate that usage of the river is for short periods during coastal migrations	Picard and Zydlewski 2014
Sheepscot River (ME)	Up to the head-of-tide dam (RKM 35)	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present; may occur in Montsweag Bay as shortnose sturgeon foraging has been documented there	NMFS and USFWS 1998; Squiers 1998; ASSRT 2007
Kennebec River (ME)	Up to the Lockwood Dam (RKM 103); ELS, YOY, juveniles, and non-spawning sturgeon can be found up to RKM 68 primarily from spring through the fall	eggs, larvae, YOY, juveniles, subadults, and adults	**Spawning -** documented via captures of spawning condition adults (Jun-Jul from RKM 53-75) and larvae; assumed to occur in summer; potentially occurs as far upstream as the Lockwood Dam **Rearing -** ELS and YOY have been documented near spawning grounds **Foraging** - assumed to occur wherever suitable forage is present **Overwintering** - fall-winter; lower estuary or nearshore ocean	Squiers et al. 1981; Lazzari et al. 1986; ASMFC 1998; NMFS and USFWS 1998; ASSRT 2007; Wipplehauser and Squiers 2015; Wippelhauser et al. 2015

Androscoggin River (ME)	Up to the Brunswick Dam (RKM 8.4)	eggs, larvae, YOY, juveniles, subadults, and adults	**Spawning** - capture of larvae in the summer below the Brunswick Dam indicates that spawning is likely occurring **Rearing** - ELS have been documented below the Brunswick Dam; YOY from the Kennebec River could also be present due to the geography of the estuary **Foraging** - assumed to occur wherever suitable forage is present	Squiers et al. 1981; Lazzari et al. 1986; ASMFC 1998; NMFS and USFWS 1998; ASSRT 2007; ME Department of Marine Resources 2011
Presumpscot River (ME)	Up to Presumpscot Falls (RKM 3)	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present	ASSRT 2007; Yoder et al. 2009
Saco River (ME)	Up to Cataract Dam (RKM 10)	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present	Kieffer and Kynard 1993; ASSRT 2007; Fernandes et al. 2010; Furey and Sulikowski 2011; Wippelhauser 2012
Piscataqua River Watershed (NH)	Up to the confluence with the Salmon Falls and Cocheco Rivers (RKM 19) and including Great Bay	subadults and adults (eggs, larvae, YOY, and juveniles possible)	**Spawning** - potentially occurs in the Salmon Falls and Cocheco rivers based on the presence of features necessary to support reproduction and recruitment as well as the capture of an adult female Atlantic sturgeon in spawning condition in 1990 **Foraging** - spring-fall wherever suitable forage is present	Kynard et al. 2000; ASSRT 2007
Merrimack River (MA)	Up to the Essex Dam (RKM 46); often found around the lower islands reach (RKM 3-12)	subadults and adults (potentially eggs, larvae, YOY, and juveniles)	**Spawning** - potentially occurs due to the presence of features necessary to support reproduction and recruitment **Rearing** - used by ELS and YOY as a nursery area **Foraging** - mouth of the river and the lower islands area (RKM 0-12) **Overwintering** - limited information available; some overwintering at sites at RKM 14, 19, and 26	Kieffer and Kynard 1993; ASSRT 2007; Fernandes et al. 2010; Wippelhauser 2012; Wippelhauser et al. 2015
Charles River (MA)	Up to Charles River Locks	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present	Boston Globe February 20, 2012 (http://boston.cbslocal.com/2012/02/20/man-spots-rare-atlantic-sturgeon-fish-in-charles-river/)
North River (MA)	Up to Hanover/Pembroke line	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present	The Patriot Ledger June 1, 2012 (http://www.patriotledger.com/article/20120601/NEWS/306019786)
Taunton River (MA)	Lower region	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present	Burkett and Kynard 1993; ASSRT 2007

Thames River (CT)	Up to the Greenville Dam	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present	Whitworth 1996; ASSRT 2007
Connecticut River (CT/MA)	Up to the Holyoke Dam (RKM 143); mainly stay in lower range of the salt wedge (RKM 10-26)	eggs, larvae, YOY, juveniles, subadults, and adults	**Spawning** - captures of juvenile sturgeon in the river strongly suggests that spawning is occurring in this river **Rearing** - spring through fall; lower 26 RKM **Foraging** - spring through fall; adults and subadults; typically in waters less than 50 meters in depth	Savoy and Shake 1993; Savoy and Pacileo 2003; ASSRT 2007
Quinnipiac River (CT)	Up to bridge at Quinnipiac Street and River Road in Wallingford (RKM 27)	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present	Courant September 30, 1994 (http://articles.courant.com/1994-09-30/news/9409300111_1_sturgeon-fish-story-giant-fish)
Housatonic River (CT)	Up to the Derby Dam (RKM 23.5)	subadults and adults (potentially eggs, larvae, YOY, and juveniles)	**Spawning** - potentially occurs due to the presence of features necessary to support reproduction and recruitment **Foraging** - assumed to occur wherever suitable forage is present	Whitworth 1996; NMFS and USFWS 1998; ASSRT 2007
Long Island Sound (NY/CT)	All of Long Island Sound typically in late spring through fall	subadults and adults	**Migration** - typically in 10-50 meters **Foraging** - where suitable forage is present; 85% of Atlantic sturgeon caught in Long Island Sound are over mud/transitional bottoms of 27-37 meters deep in the central basin	Savoy and Pacileo 2003; ASSRT 2007; NYSDEC 2014
East River (NY)	full length of the East River	subadults and adults	**Migration** - subadults and adults have been documented using this waterbody to move between the Hudson River and western Long Island Sound **Foraging** - assumed to occur wherever suitable forage is present, but forage is limited	Savoy and Pacileo 2003; Tomichek et al. 2014

Hudson River (NY/NJ)	up to the Troy Dam (approximately RKM 246)	eggs, larvae, YOY, juveniles, subadults, and adults	**Spawning** - late spring to summer around Hyde Park (RKM 134), Catskill (RKM 182), and around RKM 112; evidence strongly suggests that there is also spawning further upstream of RKM 193 **Rearing** - eggs - RKM 60-148; larvae - summer; remain upstream of the salt wedge; vincinity of spawning area; YOY: between RKM 60-148; juveniles - spring through fall in RKM 68-107; utilize the estuary from the Tappan Zee Bridge through Kingston (RKM 69-238); occupy waters from RM 37-66 during the summer; Newburgh and Haverstraw Bays (RKM 55-61) are areas of known juvenile concentrations **Foraging** - tidally influenced flats; may be using the lower Hudson River for foraging in the summer **Overwintering** - may be using the lower Hudson River from winter; juveniles - RKM 19-74 from fall through winter	Dovel and Berggren 1983; Coch 1986; Van Eenennaam et al. 1996; Bain 1997; Kahnle et al. 1998; Bain et al. 1998, 2000; Savoy and Pacileo 2003; Sweka et al. 2006; ASSRT 2007; Normandeau Associates, Inc. 2014
Delaware River (NJ/DE/PA)	Up to the fall line near Trenton, NJ (RKM 210)	eggs, larvae, YOY, juveniles, subadults, and adults	**Spawning** - documented in spring through summer from Marcus Hook Bar to the fall line at Trenton, NJ (RKM 134-211); additional spawning sites may occur from RKM 120-150 and RKM 170-190 **Rearing** - YOY - late fall-early spring; Deepwater, NJ to Roebling (RKM 105-199) **Migration** - subadults - immigrate to the estuary late winter through fall; from nearshore ocean to Philadelphia, PA (RKM 148); areas of particular concentration near Artificial Island (RKM 80-90), Marcus Hook (RKM 123-130), and Cherry Island Flats (RKM 110-118) **Foraging** - where suitable forage and appropriate habitat conditions are present typically tidally influenced flats and mud, sand and mixed cobble substrates **Overwintering** - adults - Delaware Bay or in the nearshore ocean; juveniles - move between lower (RKM 100-150) to upper (RKM 180-199) tidal areas in the fall; may overwinter in tidal fresh water	Brundage and Meadows 1982; Lazzari et al. 1986; Shirey et al. 1997, 1999; Savoy and Pacileo 2003; ASSRT 2007; Simpson 2008; Brundage and O'Herron 2009; Fisher 2009; Brundage and O'Herron in Calvo et al. 2010; Fox and Breece 2010; Fisher 2011; Breece et al. 2013

Chesapeake Bay (MD/VA)	Throughout the bay typically in spring through fall	subadults and adults	**Migration** - subadults - spring-fall; wander among coastal and estuarine habitats **Foraging** - typically in areas where suitable forage and appropriate habitat conditions are present typically tidally influenced flats and mud, sand and mixed cobble substrates	ASSRT 2007
Susquehanna River (MD)	Up to the Conowingo Dam (RKM 16)	subadults and adults (potentially eggs, larvae, YOY, and juveniles)	**Spawning** - potentially occurs due to the presence of features necessary to support reproduction and recruitment **Foraging** - where suitable forage and appropriate habitat conditions are present	Niklitschek and Secor 2005; ASSRT 2007
Choptank River (MD)	Range has not been documented, but they have been documented in this river (likely throughout the entire river)	subadults and adults (potentially eggs, larvae, YOY, and juveniles)	**Spawning** - not documented, but a gravid female was caught at the mouth of the river near Tilghman Island	ASSRT 2007; The Baltimore Sun June 13, 2007 (http://articles.baltimoresun.com/2007-06-13/news/0706130110_1_sturgeon-chesapeake-bay-university-of-maryland)
Nanticoke River (MD)	Range has not been documented, but they have been documented in this river (likely throughout the entire river)	subadults and adults (potentially eggs, larvae, YOY, and juveniles)	**Spawning -** potential for spawning due to the presence of features necessary to support reproduction and recruitment in one of its tributaries (Marshyhope Creek) **Rearing** - may be used as a nursery **Foraging** - assumed to occur wherever suitable forage is present	ASSRT 2007; Balazik 2012; MD DNR September 17, 2014 (http://news.maryland.gov/dnr/2014/09/17/mature-endangered-atlantic-sturgeon-discovered-in-marshyhope-creek/)
Marshyhope Creek (MD), tributary of the Nanticoke River	Up to Federalsburg, MD	subadults and adults (potentially eggs, larvae, YOY, and juveniles)	**Spawning** - suspected to occur as spawn ready adults have been captured here	MD DNR September 17, 2014 (http://news.maryland.gov/dnr/2014/09/17/mature-endangered-atlantic-sturgeon-discovered-in-marshyhope-creek/); C. Stence, pers. comm., 2015
Pocomoke River (MD)	Range has not been documented, but they have been documented in this river (likely throughout the entire river)	subadults and adults	**Foraging** - assumed to occur wherever suitable forage is present	ASSRT 2007; MD DNR September 17, 2014 (http://news.maryland.gov/dnr/2014/09/17/mature-endangered-atlantic-sturgeon-discovered-in-marshyhope-creek/)
Potomac River (MD/VA)	Up to Little Falls Dam (RKM 189)	juveniles, subadults, and adults (potentially eggs, larvae, and YOY)	**Spawning** - potentially occurs as small juveniles have been captured and due to the presence of features necessary to support reproduction and recruitment **Rearing** - juveniles have been captured **Foraging** - where suitable forage and appropriate habitat conditions are present	ASSRT 2007; Kynard et al. 2007

Rappahannock River (VA)	Range has not been documented, but they have been documented in this river (likely up to the old Embrey Dam)	subadults and adults (potentially eggs, larvae, YOY, and juveniles)	**Spawning** - potentially occurs due to the capture of a male sturgeon in spawning condition and the presence of features necessary to support reproduction and recruitment **Rearing** - may be used as a nursery **Foraging** - where suitable forage and appropriate habitat conditions are present	ASSRT 2007; Balazik 2012
York River (VA)	Up to its confluence with the Mattaponi and Pamunkey Rivers (RKM 55)	subadults and adults (potentially eggs, larvae, YOY, and juveniles)	**Spawning** - potential for fall spawning due to the presence of features necessary to support reproduction and recruitment in both the river and its tributaries (Pamunkey and Mattaponi Rivers) **Rearing** - may be used as a nursery **Foraging** - where suitable forage and appropriate habitat conditions are present	ASSRT 2007; Balazik et al. 2012
Pamunkey River (VA), tributary of the York River	Up to RKM 150	eggs, larvae, YOY, juveniles, subadults, and adults	**Spawning** - documented through the capture of an adult sturgeon in spawning condition in early fall and the presence of features necessary to support reproduction and recruitment; may occur as far upstream as RKM 150 **Rearing** - in freshwater reaches downstream of spawning site	Hager et al. 2014; Kahn et al. 2014
James River (VA)	Up to Boshers Dam (RKM 160)	eggs, larvae, YOY, juveniles, subadults, and adults	**Spawning** - both a spring (likely at RKM 77) and fall spawning event (likely between RKM 77 and the fall line near Richmond, VA at RKM 155) have been documented **Rearing** - freshwater reaches downstream of spawning locations **Foraging** - where suitable forage and appropriate habitat conditions are present	ASSRT 2007; NMFS and USFWS 2007; Hager 2011; Balazik et al. 2012
Appomattox River (VA), tributary of the James River	Range has not been documented, but they have been documented in this river (likely up to the old Harvell Dam)	subadults and adults	**Foraging** - where suitable forage and appropriate habitat conditions are present	Bushnoe et al. 2005; VIMS 2005; ASSRT 2007; Hager 2011

Listing rules: 77 FR 5880 and 77 FR 5914, February 6, 2012; **Recovery plan**: none published

Descriptions of Atlantic sturgeon life history stages

Age Class	Size	Description
Eggs		Fertilized or unfertilized
Larvae		Negative photo-taxis, nourished by yolk sac
Young of Year (YOY)	**0.3 grams <41 cm total length**	Fish that are >3 months and <1 year old; capable of capturing and consuming live food
Juveniles	**>41 cm and <76 cm total length**	Fish that are at least 1 year old and are not sexually mature and do not make coastal migrations
Subadults	**>76cm and <150cm total length**	Fish that are not sexually mature, but make coastal migrations
Adults	**>150 cm total length**	Fish that are sexually mature

GARFO Master ESA Species Table - Shortnose Sturgeon

General distribution: Atlantic Ocean waters and associated bays, estuaries, and coastal river systems from Minas Basin, Nova Scotia, Canada, to the St. Johns River, Florida; only adults occur in marine waters, with some adults making coastal migrations between river systems (e.g., Penobscot River to Merrimack River via the Gulf of Maine; Merrimack River to Connecticut River via the Gulf of Maine and Long Island Sound; Connecticut River to Hudson River via Long Island Sound and the East River); typically, distribution in rivers and inshore bays occurs from the estuary or river mouth up to the first impassible barrier (e.g., a dam or falls); comprehensive information on species biology and distribution is available in the Shortnose Sturgeon Status Review Team's Biological Asessment (SSSRT 2010; available at: http://www.nmfs.noaa.gov/pr/pdfs/species/shortnosesturgeon_biological_assessment2010.pdf)

Disclaimer: the best available information on shortnose sturgeon presence within the Greater Atlantic Region is presented below; waterbodies included are ones where we have information specific to shortnose sturgeon use of the area that would be helpful for action agencies reviewing proposed actions and their potential effects on shortnose sturgeon; for waterbodies not listed below, we have no data on usage by shortnose sturgeon; however, we expect the species may be present in other coastal waters in the Gulf of Maine and along the U.S. Atlantic coast between the Merrimack and Hudson Rivers; bracketed footnotes are provided in the table to match up "Use of the Watershed" information to the specific reference(s) from which it came; a description of shortnose sturgeon life history stages are included at the end of the table below

Body of Water (State)	Distribution/Range in Watershed	Life Stages Present	Use of the Watershed	References
Narraguagus River (ME)	Up to Cherryfield Dam (RKM 10.6)	adults	**Foraging** - May be used for foraging; tag detections indicate that usage of the river is for short periods during coastal migrations[1]	[1] Dionne et al. 2013
Penobscot River (ME)	Up to Milford Dam (RKM 62)	adults documented; other life stages assumed but unknown	**Spawning** - Not documented to date; suitable spawning habitat is accessible[3] **Foraging** - Foraging concentrations from RKM 10-24.5 during the summer months as well as throughout the lower and middle estuary; RKM 21-45 by mid-July and August[1] **Overwintering** - Aggregations located from RKM 36.5-42 from mid-August to mid-April[2]	[1] Fernandes et al. 2010; [2] Lachapelle 2013; [3] Johnston 2016
St. George River (ME)	Up to RKM 39 in lower estuary	adults	**Foraging** - May be used for foraging; tag detections indicate that usage of the river is for short periods during coastal migrations[1][2]	[1] Zydlewski et al. 2011; [2] Dionne et al. 2013
Medomak River (ME)	Up to RKM 17.5	adults	**Foraging** - May be used for foraging; tag detections indicate that usage of the river is for short periods during coastal migrations[1][2][3]	[1] Zydlewski et al. 2011; [2] Dionne et al. 2013; [3] Johnston 2016
Damariscotta River (ME)	Up to RKM 30.3	adults	**Foraging** - May be used for foraging; tag detections indicate that usage of the river is for short periods during coastal migrations[1][2]	[1] Zydlewski et al. 2011; [2] Dionne et al. 2013
Sheepscot River (ME)	Up to Head Tide Dam (RKM 35)	adults	**Foraging** - Montsweag Bay during the summer [1] **Overwintering** - Suspected to occur in the estuary[2]	[1] Fried and McCleave 1973; [2] SSSRT 2010

Kennebec River (ME)	Up to Lockwood Dam (RKM 103)	eggs, larvae, YOY, juveniles, and adults	**Spawning** - Occurs at two sites: below the former Edwards Dam[7] (RKM 58-74) and downstream of the Lockwood Dam[8] (RKM 87-103) **Rearing** - Eggs and larvae occur in freshwater reaches below the spawning sites[8] **Foraging** - Throughout the lower estuary to the mouth of the river[4][5][8] (below RKM 70) with concentration areas near Bath[3][5][8] (RKM 16-29) including Sagadahoc Bay[6] and the Back and Sasanoa Rivers[1][8] **Overwintering** - Majority in Merrymeeting Bay [5][7] (RKM 37-40 and 40-42), also Bluff Head [2][5] (RKM 15), and in the lower portions of the Eastern and Cathance Rivers (tributaries to Merrymeeting Bay)[2]	[1] McCleave et al. 1977; [2] Squiers and Robillard 1997; [3] Squiers 2003; [4] Fernandes et al. 2010; [5] SSSRT 2010; [6] Fire et al. 2012; [7] Wippelhauser and Squiers 2015; [8] Wippelhauser et al. 2015
Androscoggin River (ME)	Up to Brunswick Dam (RKM 8.4)	eggs, larvae, YOY, juveniles, and adults	**Spawning** - Below Brunswick Dam to the Rt. 201 Bridge(RKM 7.7-8.4)[2] **Rearing** - Eggs and larvae occur in freshwater reaches below the spawning sites[3] **Foraging** - Montsweag Bay during the summer [1]	[1] McCleave et al. 1977; [2] Wippelhauser and Squiers 2015; [3] Wippelhauser et al. 2015
Presumpscot River (ME)	Up to Presumpscot Falls (RKM 4)	adults	**Foraging** - May be used for foraging[1]	[1] Yoder et al. 2009
Saco River (ME)	Up to Cataract Dam (RKM 10)	adults	**Foraging** - Used seasonally May-November[1]	[1] Little et al. 2013
Piscataqua River (NH)	Entirety of Piscataqua River including Cocheco River from its confluence with Piscataqua River upstream to Cocheco Falls Dam and waters of Salmon Falls River from its confluence with Piscataqua River upstream to the Route 4 Dam	adults	**Foraging** - Used seasonally for foraging and resting during spring and fall migrations; tagging data indicates that use by individual sturgeon is limited to days or weeks[1]	[1] Kieffer and Trefry, pers. comm., April 18, 2017
Merrimack River (MA)	Up to Essex Dam (RKM 46)	eggs, larvae, YOY, juveniles, and adults	**Spawning** - Near Haverhill[2] (RKM 30-32) **Rearing** - Eggs and larvae present in spawning grounds four weeks after spawning occurs, following which they would begin to move downstream continuing their development in the freshwater reach of the river[1] (RKM 16-32) **Foraging** - Lower river with concentrations near Amesbury and the lower islands[1][3] (RKM 6-24) **Overwintering** - Late fall to early spring[1]; multiple overwintering sites from RKM 15-29 in freshwater reaches beyond the maximum salt penetration[4]	[1] Kieffer and Kynard 1993; [2] Kieffer and Kynard 1996; [3] Kynard et al. 2000; [4] Wippelhauser et al. 2015

Narragansett Bay (RI)	Throughout the bay	adults	**Foraging** - Potentially occurs where suitable forage is present[1]	[1] NMFS 1998
Thames River (CT)	Up to the Greenville Dam (RKM 28)	adults undocumented, but assumed based on documented occurrences of Atlantic sturgeon in the river	**Foraging** - Assumed to occur where suitable forage is present[1]	[1] The Day June 17, 2016 (http://www.theday.com/article/20160617/NWS01/160619212)
Connecticut River (CT/MA)	Up to Turners Falls Dam, MA (RKM 198)	eggs, larvae, YOY, juveniles, and adults	**Spawning** - Below Turners Falls Dam/Cabot Station at two locations depending on river conditions[3] (RKM 193-194); limited spawning may occasionally occur below Holyoke Dam[3] (RKM 139-140) **Rearing** - Eggs and larvae spawned upstream documented up to 20 km downstream of the spawning site[3]; if spawning is successful downstream of Holyoke, early life stages would be present in downstream freshwater reaches [1][3] (RKM 13-194) **Foraging** - Concentrations above the Holyoke Dam in the Deerfield Concentration Area[3] (RKM 144-192), Agawam Concentration Area [1] (RKM 114-119), and the lower Connecticut Concentration Area[3] (RKM 0-110) **Overwintering** - Concentrations above the Holyoke Dam in the Deerfield Concentration Area[3] (RKM 144-192); below the Holyoke Dam concentrations near Holyoke[2] (RKM 137-140), Agawam[3] (RKM 114-119), Hartford [2] (RKM 82-86), Portland, CT[3] (RKM 46), and the lower river[2] (RKM 0-25)	[1] Buckley and Kynard 1983; [2] Buckley and Kynard 1985; [3] Kynard et al. 2012
Deerfield River (MA), tributary of the Connecticut River	Up to Deerfield No. 2 at Shelburne Falls (RKM 22.5)	adults documented in lower 3 km; larvae spawned in Connecticut River may be present during certain flow conditions	**Rearing** - Water flow could potentially draw migrating larvae into unfavorable habitat in the Deerfield River[1]; potential refuge area during high flows[2] **Foraging** - Spring through fall in lower river[2] (RKM 0-3.5) **Overwintering** - May be used as an overwintering area potential pre-spawning staging area for adults[1]	[1] Kieffer and Kynard 1992; [2] Kynard et al. 2012
Westfield River (MA), tributary of the Connecticut River	Up to DSI Dam (RKM 9.5)	adults	**Foraging** - Assumed to occur where suitable forage is present[1]	[1] USFWS 2007 in SSSRT 2010
Quinnipiac River (CT)	Up to Wallace Dam (RKM 27)	adults undocumented, but assumed based on documented occurrences of Atlantic sturgeon in the river	**Foraging** - Assumed to occur where suitable forage is present[1]	[1] Courant September 30, 1994 (http://articles.courant.com/1994-09-30/news/9409300111_1_sturgeon-fish-story-giant-fish)

Housatonic River (CT)	Up to Derby Dam (RKM 23.5)	adults	**Spawning** - Historical spawning occurred above the Derby Dam, none known to occur currently[1] **Foraging** - Potentially occurs where suitable forage is present[1]	[1] Savoy and Benway 2006 in SSSRT 2010
Long Island Sound (CT/NY)	Full length of Long Island Sound in nearshore coastal waters	adults	**Foraging** - Potentially occurs where suitable forage is present[1]	[1] Savoy 2004 in SSSRT 2010
East River (NY)	Full length of the East River	transient adults undocumented, but assumed based on detections of Atlantic sturgeon and occasional movements of shortnose sturgeon from Hudson River to Connecticut River	**Foraging** - Potentially occurs where suitable forage is present[1]	[1] Savoy 2004 in SSSRT 2010
Hudson River (NY/NJ)	Up to Troy Dam, NY (approximately RKM 246)	eggs, larvae, YOY, juveniles, and adults	**Spawning** - Documented from late March to early May when water temperatures reach 10° -18°C[1] from Coxsackie to below the Federal Dam at Troy[1][3] (RKM 190-246) **Rearing** - Eggs on the spawning grounds; larvae downstream to at least RKM 104; YOY downstream to at least RKM 64[1] **Foraging** - Throughout the Hudson River[3] (RKM 38-166) with concentrations in Haverstraw Bay[1] (RKM 56-64) **Overwintering** - Late fall to early spring[3]; largest area (mainly spawning adults) near Kingston[2] (RKM 137-149); smaller overwintering areas are located from Saugerties to Hyde Park[2] (RKM 123-170) and in the Croton-Haverstraw Bay area[2] (RKM 54-61); many juveniles overwinter in the lower river[1] (RKM 0-64)	[1] Dovel et al. 1992; [2] Geoghegan et al. 1992; [3] Bain 1997

Delaware River and Bay (NJ/DE/PA)	Up to Lambertville, PA (RKM 240)	eggs, larvae, YOY, juveniles, and adults	**Spawning** - Documented from late March through late May; water temperatures 6-18°C; between Trenton and Lambertville[6] (RKM 214-238) **Rearing** - Eggs and larvae between Trenton and Lambertville[6] (RKM 214-238); juveniles located upstream of the salt wedge from Wilmington to Philadelphia[3] (RKM 114-148) **Foraging** - Throughout the river, between the vicinity of Trenton south to Artificial Island[7] (RKM 79) **Overwintering** - November to March[1]; overwinter when waters reach 10°C (typically mid-November)[2]; many adults concentrate from RKM 190-212[1][4], but occur downstream below Wilmington[4] (RKM 116); juveniles overwinter from Philadelphia to below Artificial Island[5] (RKM 70-154); variety of behaviors from sedentary to active[6]	[1] O'Herron et al. 1993; [2] USGS gauge at Philadelphia (01467200) during the 2003-2008 time period; [3] Burton et al. 2005; [4] ERC 2006; [5] Brundage and O'Herron 2009; [6] ERC 2009; [7] SSSRT 2010
Schuykill River (PA), tributary of the Delaware River	Up to Fairmount Dam (RKM 13.6)	juveniles and adults	**Foraging** - Potentially occurs where suitable forage is present[1]	[1] Philadelphia Water Department November 7, 2014 (http://www.phillywatersheds.org/endangered-shortnose-sturgeon-returns-schuylkill)
C&D Canal (DE/MD)	Used at least occasionally to move from Chesapeake Bay to the Delaware River	adults	**Foraging** - Assumed to occur in areas with suitable forage[1]	[1] Welsh et al. 2002
Chesapeake Bay (MD/VA)	Maryland waters of mainstem bay and tidal tributaries listed below; documented modern use of Virginia waters limited to one individual captured in 2016	adults documented; other life stages assumed but unknown	**Foraging, Resting, and Overwintering** - Assumed to occur in areas with suitable forage [1]	[1] SSSRT 2010
Susquehanna River (MD)	Up to Conowingo Dam (RKM 16)	adults documented; other life stages assumed but unknown	**Spawning** - Historically occurred; currently unknown as suitability of habitat is likely impacted by dam operations[1] **Foraging** - Assumed to occur in areas with suitable forage[2] **Overwintering** - Not documented but assumed based on anecdotal reports of aggregations of sturgeon in deep holes near Lapidum and Perrysville[2]	[1] Litwiler 2001; [2] SSSRT 2010

Potomac River (MD/VA)	Up to Little Falls Dam (RKM 189)	adults documented; other life stages assumed but unknown	**Spawning** - Historically occurred; current spawning not documented but assumed based on presence of pre-spawning females and suitable habitat at RKM 185-187[1] **Rearing** - Eggs expected at RKM 185-187, larvae would be present downstream in freshwater[1] **Foraging** - Mainly in the deepwater channel from RKM 63-141[1][2] **Overwintering** - Near Mattawoman Creek; saltwater/freshwater reach near Craney Island [1][2] (RKM 63-141)	[1] Kynard et al. 2007; [2] Kynard et al. 2009
Rappahannock River (VA)	Range not confirned, but they have been documented in this river (likely throughout the entire river)	adults	**Foraging** - Potentially occurs where suitable forage is present; one was captured in May 1998[1]	[1] Spells 1998

Listing rule: 32 FR 4001, March 11, 1967; **Recovery plan**: NMFS 1998. Available online: http://www.nmfs.noaa.gov/pr/pdfs/recovery/sturgeon_shortnose.pdf

Descriptions of shortnose sturgeon life history stages

Stage	Size (mm)	Duration	Behaviors/Habitat Used
Eggs	3-4	13 days post spawn	Stationary on bottom; cobble and rock, fast flowing freshwater
Yolk Sac Larvae	7-15	8-12 days post hatch	Photonegative; swim up and drift behavior; form aggregations with other yolk sac larvae; cobble and rock, stay at bottom near spawning site
Post Yolk Sac Larvae	15-57	12-40 days post hatch	Free swimming; feeding; silt bottom, deep channel; freshwater
Young of Year (YOY)	57-140 (north); 57-300 (south)	From 40 days post-hatch to one year	Deep, muddy areas upstream of the salt wedge
Juveniles	140 to 450-550 (north); 300 to 450-550 (south)	One year to maturation	Increasing salinity tolerance with age; same habitat patterns as adults
Adults	450-1,100 average; (max recorded 1,400)	Post-maturation	Freshwater to estuary with some individuals making nearshore coastal migrations

Action Agency NO EFFECT Determination

In order for an Action Agency to determine if any activities will have "no effect" on listed species and critical habitat in the action area, you must be able to make the determination for ALL species and critical habitat in the action area. If you determine that the action has no effect, there is no further Section 7 consultation with NMFS. You should document the "no effect" determination for your files in order to explain why you are not consulting with NMFS under ESA Section 7. Be sure to indicate which STRESSORS are relevant to the action under consideration. It is not necessary to notify NMFS or seek our concurrence with your no effect determination as we are not obligated to review it, concur with it, or otherwise provide comments on it.

Project Name: Rahway River Coastal Storm Risk Management Feasibility Study, May 2017

PART ONE: STRESSORS ON LISTED SPECIES	Yes	No Effect
Sound: Appropriate determination if any of the following apply: •**Species Not Present where effects are likely to occur** •Sound intensity (dB) is < ambient noise •Frequency (hertz[Hz]) outside hearing range of all listed species in action area		**X**
Habitat Structure & Disturbance: Appropriate determination if either of the following apply**:** •**Species Not Present where effects are likely to occur** •No change in water depth AND No change in substrate characteristics		**X**
Dredging: Appropriate determination if species are not present where effects are likely to occur		**X**
Water Quality: Appropriate determination if any of the following apply: •**Species NOT Present where effects are likely to occur** •No exposure to pollutants •No change in water quality (temporary or permanent)including water current (speed/direction) and temperature		

	YES	NO Effect
Prey Quantity / Quality: Appropriate determination if <u>any</u> of the following apply:		**X**

- **Species do not occur in area where prey is likely to be affected**
- Not an area used for foraging
- No change in the abundance, availability, accessibility or quality of prey and no loss of SAV or shellfish beds

Vessels: Appropriate determination if either of the following apply:		**X**

- **Species NOT present in area where vessels are transiting**
- No change in vessel traffic (volume, speed, travel route, etc.)

In-water structures including: Appropriate determination if listed species are NOT present in area affected by the gear aquaculture

PART TWO: CRITICAL HABITAT

ATLANTIC SALMON **NOT APPLICABLE**

If action area is within Atlantic salmon CH (see 50 CFR Sec. 226.217), review Atlantic salmon CH matrix to determine which essential features are present in the action area. Then, determine if any of the activities will have "no effect" on CH.

Indicate which STRESSORS are relevant to the action under consideration.

Sound: Appropriate determination if either of the following apply:

- No Essential Features Present in area affected by sound
- Sound generated by activity has no effect on fish passage because either the sound intensity (dB) is < ambient noise or frequency (hertz[Hz]) outside hearing range (source is > 1000 Hz)

Habitat Structure & Disturbance: Appropriate determination if either of the following apply:

- No Essential Features Present in action area
- Activity results in no change in substrate characteristics, depth, velocity and no change in the availability of cover or ability of a fish to pass through the action area

Dredging: Appropriate only if no Essential Features Present in action area

Water Quality: Appropriate determination if any of the following apply:

- No Essential Features Present in area where water quality will be affected
- No change in temperature, DO or pH

In-Water Structures: Appropriate only if no Essential Features Present in action area (Including aquaculture)

Prey Quantity / Quality: Appropriate if any of the following apply:

- No Essential Features Present
- Not an area used for foraging
- No change in the abundance, availability, accessibility or quality of prey

Native Fish Composition: Appropriate determination if the following applies:

- No change in native fish community (i.e., no change in the abundance of native fish community, the accessibility of the habitat in the action area to them, or the ability of that habitat to support them)

NORTH ATLANTIC RIGHT WHALES **NOT APPLICABLE**

If action area is within North Atlantic Right Whale Critical Habitat (CH) (see 81 FR 4838, January 27, 2016) determine if any aspects of the action have "no effect" on the physical or biological features of CH.
The activity is only eligible for the expedited LOC program if the action area does not overlap at all with right whale CH or, if there is overlap, you have not identified any routes of effects/stressors that may affect the physical or biological features of RW CH (i.e., you can make a "no effect" determination for RW CH).

Size and Density of adult copepod patches: Appropriate determination if all of the following apply:

- No direct or indirect removal of copepods
- No increase in temperature in action area above 21°C
- Proposed activity has no direct or indirect effect on the abundance, distribution, quality and availability of copepod patches

Physical and Oceanographic Features that aggregate copepods

- Appropriate determination if the activity under consideration will have no effect on:
- currents and circulation patterns
- bathymetric features (basins, banks, and channels),oceanic fronts
- density gradients
- temperature regimes in any part of the designation within the Gulf of Maine

Based upon USACE, New York District, Operation Division review of protected species that may utilize the affected area and analyses of the stressors that could adversely affect those species, it is the Action Agency's Determination that the proposed Federal Action will result in NO EFFECT.

Peter Weppler, Chief
Environmental Analysis Branch

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Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

APPENDIX A.2
Section 404 (b)(1) Evaluation

Rahway River Basin Coastal Storm Risk Management Feasibility Study, Union and Middlesex Counties, New Jersey

Section 404 (b)(1) Evaluation

I. Introduction

This 404(b)(1) summarizes the evaluation of effects the proposed action will have on water resources pursuant to the Clean Water Act Section 404(b)(1) guidelines. The proposed action involves the implementation of non-structural measures and a levee in the City of Rahway and the Borough of Carteret, Union and Middlesex Counties, New Jersey. For a full description of the project, existing conditions and environmental impacts, refer to the draft Feasibility Report/Environmental Assessment (draft Feasibility Report/EA).

PROJECT DESCRIPTION

a. Location: Woodbridge Township and Borough of Carteret, Middlesex County, New Jersey.

b. General Description: Construction of a levee approximately 3,360 ft long with a top width of 12 ft. The average height is approximately 7.5 ft. On-site compensatory wetland and open water mitigation. The wetland mitigation will consist of approximately 4 acres of low marsh restoration, 0.50 acres of deciduous scrub shrub wetland and 0.40 acres of managed freshwater wetland. The open water mitigation will consist of restoration of 200 linear feet of tidal creek and 0.14 acres of mudflat.

c. Authority and Purpose: The Coastal Storm Risk Management study was authorized by the Disaster Relieve Appropriation Act of 2013 (P.L. 113-2).

d. General Description of Fill Material:

1) Characteristics of Material: Material to be used to construct the levee include clay to create an impervious inner core, embankment fill, and a concrete drainage structure.

2) Quantity of Material: Levee: Approximately 18,625 cy yards of embankment material, 10,430 cy of clay material that will serve as the inner core,

3) Source of Material: Fill that meets the construction specifications for the levee will be obtained from a state approved and permitted commercial source.

e. Description of the Proposed Discharge Sites

1) Location: The discharge site is located within tidal marsh wetlands along the Rahway River and Casey's Creek, a tidally influenced tributary of the Rahway River within the marsh wetland complex in Woodbridge Township, Union County and Carteret Borough, Middlesex County.

2) Size: The levee is approximately 3,360 ft long with a 12 ft top width and a base width of approximately 100 feet. The proposed mitigation is approximately five acres in size.

3) Type of Site: The site is a combination of a Middlesex County owned park space (Joseph Medwick Memorial Park), private residences and private businesses.

4) Types of Habitat: Habitat type within the vicinity of the proposed levee includes phragmites dominated marsh, low tidal marsh, deciduous scrub shrub wetland, and developed uplands. The aquatic habitat for of Casey's Creek, a tidal marsh classified as Saline Estuary (SE)3 by the NJDEP.

5) Time and Duration of Disposal: Construction of the levee will take approximately 2 years. All in-water activities are restricted between 1 April and June 30 to comply with the NJDEP fish spawning window.

f. Description of Disposal Method: Land based construction equipment will be used to construct the project. The project will also be sequenced to minimize in water work to the extent possible. Wetland anti-track mats will be used within the wetland areas to prevent significant disturbance.

II. FACTUAL DETERMINATION

a. Physical Substrate Determinations

1) Substrate Evaluation, Sediment Type and Slope: Sediment analyses have not been conducted for the study. However, available information indicates that the substrate consists of finer silts, clays and/or sand material. The slope of the wetlands and Casey's Creek is generally flat.

2) Dredged/Fill Material Movement: The excavation and placement of fill in the form of soil and riprap/stone will result in the impact 5 acres of wetlands, 200 linear feet of open water and 0.14 acres of mudflat. Soil used to construct the levee will be stabilized with seeding.

3) Physical Effects on Stream Bottom: 200 linear feet of Casey's Creek will be modified by the construction of the levee and installation of a concrete drainage structure.

4) Other Effects: N/A

5) Actions Taken to Minimize Impacts: 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 work spaces; c) installation of a sluice gate/flapgate within the levee to maintain flow of Casey's Creek.

b. Water Circulation, Fluctuation and Salinity Determinations

1) Water, Consider Effects on:

(a) Salinity: No effect
(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 is not expected.
(c) Clarity: Water clarity within Casey's Creek may be slightly to moderately impacted during drawdown of the during construction of the levee. However, no long-term effect is anticipated. There will be no impact to the Rahway River during construction.
(d) Color: Minor impacts associated with turbidity may affect water color during construction. Erosion and sediment control best management practices including the installation of a temporary diversion to construct the levee within Casey's Creek will be implemented during construction to minimize turbidity.
(e) Odor: Excavation and dewatering of excavated sediment from the wetland areas to construct the levee may emit a foul odor as it dries out. This is expected to be temporary..
(f) Taste: The Rahway River is used as water supply for the City of Rahway. However, the water is withdrawn approximately 3 miles upstream of the proposed action. Therefore, the proposed action will not an adverse impact on taste.
(g) Dissolved Gas Levels: Dissolved oxygen levels may be reduced to some degree during construction, but this will be a temporary effect. The installation of erosion and sediment

controls and restoration of the site with vegetation will reduce sedimentation and pollutant runoff which can have detrimental impacts to dissolved oxygen levels.

(h) Nutrients: Nutrient load to the Rahway River 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 adverse impacts are anticipated from the project.

2) Current Patterns and Circulation:

(a) Current Patterns and Flow: There will be no significant adverse impacts to river current patterns or flow from implementation of the proposed action. The distance from which the levee is set back from the Rahway River ranges from approximately 100 feet to 500 feet. The levee will extend over Casey's Creek, however, a drainage structure with a flapgate will be installed to allow the creek to flow unimpeded during normal events.

(b) Velocity: Velocities are not expected to appreciably increase or decrease as a result of the proposed action.

(c) Stratification: The project will not impact stratification.

(d) Hydrologic Regime: The proposed action will not change normal daily or seasonal water level fluctuations.

3) Normal Water Level Fluctuations: The project will not have any permanent adverse impacts on normal water level fluctuations.

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.

5) Actions Taken to Minimize Impacts: Measures to be implemented to minimize adverse impacts include: a) installation of a flap gate within the levee drainage structure to maintain normal tidal flows and b) restoration of 200 linear feet of tidal marsh by enhancing the tidal regime in either Casey's Creek or one of the minor tributaries within the wetland complex.

c. Suspended Particulate/Turbidity Determinations.

1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Sites: Minor increases in particle suspension and turbidity during construction of the levee and wetland/open water mitigation are expected to occur.

2) Effects on Chemical/Physical Properties of the Water Column:

(a) Light Penetration: Minor adverse impacts may occur within the project area during construction of the channel modifications within Casey's Creek due to turbid conditions.

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

(c) Toxic Metals and Organics: There is a slight potential that construction activities may disturb sediments contaminated with organics. Erosion and sediment controls such as silt fence, turbidity curtains, and implementing a temporary pipe/culvert diversion in Casey's Creek so work levee work can be conducted in dry conditions during construction to minimize the risk.

(d) Pathogens: There is a potential that the sediments within Casey's Creek and the wetland complex could contain pathogens such as e. coli that could be transported downstream during construction of the levee and wetland/open water mitigation. This potential will be minimized through the implementation of erosion and sediment control practices.

(e) Aesthetics: The aesthetics of the project area will be adversely impacted during construction activities. In addition, the levee will obscure the view of the Rahway River and adjacent wetland complexes for patrons of the Joseph Medwick Memorial Park and private property owners located on the landside of the levee. A footpath will be installed on top of the levee to facilitate visual access to the river.

(f) Others as Appropriate: Not applicable

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 five acres of low marsh and deciduous scrub shrub 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 to the portion of Casey's Creek downstream of the project area and the Rahway River. No permanent adverse impact is expected.

(c) Sight Feeders: There may be temporary adverse impacts to sight feeders during the construction of the levee and wetland/open water mitigation. These impacts will be minimized through implementation of erosion and sediment control practices during construction.

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) constructing the levee over Casey's Creek in dry cofferdams; c) implementation of an in-water work restriction from 1 May – 30 June to protect spawning fish species; and d) compensation of wetland impacts through the on-site restoration of low marsh and deciduous scrub shrub wetland habitats.

d. Contaminant Determinations: There are no issues with contaminant issues within the study area. All fill material will be clean and will not pose a risk.

e. 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 levee and wetland mitigation construction. However, this impact is expected to be temporary as recruitment of benthic species from undisturbed areas of the wetland complex and Rahway River is expected to occur subsequent of construction. The mitigation component of the proposed action will be designed in a manner to provide similar or better habitat than existing conditions in order to provide long term benefits to benthic species.

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, and the modification of 200 linear feet of tidal channel from the construction of the levee and the restoration of 200 linear feet of tidal creek restoration proposed for mitigation. Permanent significant adverse impacts are not expected from implementation of the project.

5) Effects on Special Aquatic Sites:

(a) Sanctuaries and Refuges: Not applicable

(b) Wetlands - Approximately 1.8 acres of phragmites dominated high marsh, 2.3 acres of low marsh, 0.50 acres of deciduous scrub shrub and 0.40 acres of managed wetland will be permanently impacted by construction of the levee. On-site compensatory mitigation of these habitats through restoration of approximately 4 acres of low marsh, 0.50 acres of deciduous scrub shrub and 0.40 acres of freshwater wetland. Approixmately 0.77 acres of predominantly phragmites dominated marsh, and low marsh will be subject to temporary disturbance as a result of implementation of the proposed action and will be restored with native high and low marsh species upon completion of the project.

(c) Mudflats: Approximately 0.14 acres of mudflat within Casey's Creek will be permanently impacted through construction of the levee and drainage structure. Approximately 0.14 acres of mudflat will be restored through on-site mitigation.

(d) Vegetated Shallows: Not applicable

(e) Coral Reefs: Not applicable

(f) Riffle and Pool Complexes: Not applicable.

6) Threatened and Endangered Species: The proposed action may remove potential summer roosting habitat for the federally and state endangered Indiana bat and federally threatened northern long-eared bat. A tree clearing restriction from 15 April through 30 September will be implemented during construction to protect these species. Multiple endangered, threatened, and special concern bird species have been documented in the project area. A shrub and tree clearing restriction from 1 April through 31 August will be implemented to comply with the Migratory Bird Treaty Act will protect these species.

7) Other Wildlife: The project will mainly have temporary adverse impacts to wildlife. Minor adverse temporal impacts to wildlife will occur as a result of the removal of mature vegetation that is used for nesting, shelter and foraging. These impacts will be minimized through replanting of vegetation and the use of tree stock ranging from 8-14 ft in height as opposed to saplings in the replanting efforts.

8) Actions to Minimize Impacts: Measures to be implemented to minimize adverse impacts include: a) implementation of erosion and sediment control best management practices; b) use of wetland anti-tracking mats; c) installation of a temporary diversion in Casey's Creek so construction of the levee within the creek will occur in dry conditions; c) adhering to shrub and tree clearing restrictions from 1 April through 30 September to protect federal endangered and threatened bat species as well as migratory bird species; d) adhering to an in-water work restriction from 1 May – 30 June to protect spawning fish species.

f. Proposed Disposal Site Determinations

1) Mixing Zone: Not applicable

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: The Rahway River is used as a water supply for the City of Rahway. The location of the treatment plant is located approximately three miles upstream of the proposed levee. Therefore, there will be no significant adverse impacts to the water supply.

(b) Recreational and Commercial Fisheries: The portion of the Rahway River in which the project is located is designated as Essential Fish Habitat for smooth dogfish. In addition, the Rahway River approximately 0.75 miles downstream from the project area is designated as Essential Fish Habitat for smooth dogfish, summer flounder and inshore longfin squid. However, the proposed project will not adversely impact these species.

Regarding recreational fisheries, the portion of the Rahway River is not stocked with recreational fish species such as trout. In addition, there are no access points for recreational fishing within the proposed footprint of the levee. Therefore, no significant adverse impacts are expected. The wetlands and tidal creek impacted by the levee are being evaluated for potential restoration and will provide better habitat for this species. Therefore significant adverse impacts to recreational and/or commercial fisheries is not expected.

(c) Water Related Recreation: Water based recreation within the project area is limited to observing the Rahway River and associated wetlands from the land; there are no canoe/boat access ramps within the project area. Installation of a footpath on the levee and replacement of the existing wildlife observation deck will preserve the existing water based recreation within the project area. Therefore, there are no significant adverse impacts.

(d) Aesthetics: The proposed levee will block the view of the Rahway River and wetland complexes from park patrons and to approximately seven homes located immediately adjacent to the levee. The footpath on top of the levee, however, will facilitate access to view the river and wetland complexes.

The levee will provide coastal storm risk management to the homes with the blocked viewshed. Therefore, significant adverse impacts to aesthetics is not expected.

(e) Park, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves:

A portion of the levee is located within Joseph Medwick Memorial Park. Park features include a walking trail, playgrounds, tennis courts and athletic fields and wildlife observation decks. The levee overlies a segment of the walking trail and is within the footprint of one of the wildlife observation decks. To mitigate for the impact, a paved footpath will be created on top of the levee. The wildlife observation deck will be replaced after construction is completed.

Use of park facilities by park patrons, particularly the walking trail, may be limited during construction. The impacts to park use during construction will be minimized to the greatest extent practicable.

The levee will manage coastal storm risk for up to the 1% storm event for park facilities.

g. Determination of Cumulative Effects on the Aquatic Ecosystem: The proposed action will have negligible cumulative impacts on the aquatic ecosystem. Mitigation measures proposed in the above sections will minimize cumulative impacts.

h. Determination of Secondary Effects on the Aquatic Ecosystem: No secondary effects on the aquatic ecosystem are expected from this project.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE.

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

b. The objective of coastal storm risk management necessitates the construction of 3,520 ft of levee within a tidal tributary of the Rahway River and within a tidal wetland complex along the Rahway River.

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

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

e. The proposed discharge of fill material will not result in significant adverse effects on human health and welfare, including municipal and private waters supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be significantly affected.

f. 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.

Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Appendix A.3
USFWS Coordination

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Environmental Analysis Branch

14 April 2017

Mr. Eric Schrading
Field Supervisor
U.S. Fish and Wildlife Service
New Jersey Field Office
4 East Jimmie Leeds Road, Unit 4
Galloway, New Jersey 08205-4465

Dear Mr. Schrading:

The Army Corps of Engineers, New York District (District) is conducting a feasibility study to implement coastal storm risk management measures within the Rahway River Basin in the Cities of Rahway and Linden, the Township of Woodbridge and the Borough of Carteret, Middlesex and Union Counties. The Scope of Work for your office to prepare a Draft and Final Fish and Wildlife Coordination Act Report (FWCAR) based on the review of the Tentatively Selected Plan (TSP) was negotiated on 18 April 2016 (Enclosure 1) with the acceptance of a Government Order being transmitted to the District on 6 September 2016.

The Tentatively Selected Plan (TSP) has been identified and involves the construction of levee in the Township of Woodbridge and Borough of Carteret and the implementation of nonstructural measures to 136 homes in the Cities of Rahway and Linden and the Borough of Carteret.

The District is currently scheduled to release the integrated draft Feasibility Report/Environmental Assessment for public review near the end of May and will provide your office with a copy when it is available.

In the interim, enclosed is a presentation describing the Tentatively Selected Plan and other alternatives evaluated (Enclosure 2), an official Endangered Species list the District obtained from the Service (Enclosure 3) a summary of key environmental impacts and mitigation measures (Enclosure 4), and figures indicating habitat resources (Enclosures 4 through 6).

The District welcomes any initial feedback regarding the effects the TSP may have on fish and wildlife resources, including federally endangered and threatened species, along with any initial recommendations on how to minimize adverse effects to these resources.

The District will continue to coordinate with your agency closely to assist in your preparation of the report. Should any questions arise, or additional information is needed, please contact Ms. Kimberly Rightler at (917) 790-8722.

Sincerely,

for Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New Jersey Field Office
Ecological Services
4 E. Jimmie Leeds Road, Suite 4
Galloway, New Jersey 08205
Tel: 609-646-9310 Fax: 609-646-0352
http://www.fws.gov/northeast/njfieldoffice

IN REPLY REFER TO:
16-CPA-0124

Nancy Brighton, Section Chief
Environmental Analysis Branch
New York District, U.S. Army Corps of Engineers
Jacob K. Javits Federal Building
26 Federal Plaza
New York, New York 10278-0090
Attn: Kimberly Rightler

APR 18 2016

Dear Ms. Brighton:

This letter responds to your February 4, 2016 request to the U.S. Fish and Wildlife Service (Service) to provide a Fiscal Year 2016 (FY2016) scope of work (SOW) for services pursuant to the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401; 16 U.S.C. 661 *et seq.*) regarding the U.S. Army Corps of Engineers, New York District's Rahway River Coastal Storm Risk Management Feasibility Study, Cities of Rahway and Linden, Union County; Woodbridge Township and Borough of Carteret, Middlesex County, New Jersey.

Enclosed please find a draft FY2016 SOW including the Service's staff time and cost for services, estimated at $18,228. The Service will provide draft and final FWCA 2(b) reports pursuant to Section 2(b) of the FWCA. The reports will contain updated information regarding wildlife resources and an assessment of impacts and benefits to these resources from the proposed project.

If you are in agreement with the draft SOW and the estimated cost for services, please prepare the appropriate transfer funding agreement and send via e-mail to Laura_Perlick@fws.gov.

The Service looks forward to working cooperatively with you and your staff to assess and minimize wildlife impacts from the project. If you have any questions regarding the cost estimate or any other aspect of this SOW, please contact Ron Popowski by email at Ron_Popowski@fws.gov.

Sincerely,

Eric Schrading
Field Supervisor

Enclosure

Fiscal Year 2016 Draft Scope of Work
U.S. Fish and Wildlife Service / U.S. Army Corps of Engineers
Rahway River Coastal Storm Risk Management Study
Cities of Rahway and Linden, Union County;
Woodbridge Township and Borough of Carteret,
Middlesex County, New Jersey

I. SUBJECT:

The scope of work (SOW) between the U.S. Fish and Wildlife Service (Service)'s New Jersey Field Office (Service) and the U.S. Army Corps of Engineers, New York District (Corps) to prepare a draft and final 2(b) reports pursuant to Section 2(b) of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401; 16 U.S.C. *et seq.*) for the Corps' Rahway River Coastal Storm Risk Management Feasibility Study (CSRM), Cities of Rahway and Linden, Union County; Woodbridge Township and Borough of Carteret, Middlesex County, New Jersey (Study Area). Transfer funding from the Corps to the Service is authorized pursuant to the Economy Act (96 Stat. 933; 31 U.S.C. 1535).

Agency Financial Information

Service:
DUNS: 151157950
Tax ID: 53-0201504
Agency Locator Code: 14160006

Corps:
DUNS: 068112791
Tax ID: 62-1642142
Agency Locator Code: 00008736
Business Event Type Code: DISB
Treasury Account Symbol: To be determined

If the Corps cancels the agreement, the Service may collect costs incurred prior to the cancellation of the agreement plus any termination costs.

II. PROJECT NAME:

Rahway River Coastal Storm Risk Management Feasibility Study (CSRM)

III. CORPS DISTRICT AND CONTACTS:

U.S. Army Corps of Engineers New York District,
26 Federal Plaza
New York, New York, 10278-0090

Chief, Watershed Section:	Nancy Brighton	Nancy.Brighton@usace.army.mil
Project Biologist:	Kimberly Rightler	Kimberly.A.Rightler@usace.army.mil
Financial Point of Contact:	Rifat Salim	Rifat.Salim@usace.army.mil

IV. SERVICE OFFICE AND CONTACTS:

U.S. Fish and Wildlife Service
New Jersey Field Office
Ecological Services
4 E. Jimmie Leeds Road, Suite 4
Galloway, New Jersey 08205

Field Supervisor	Eric Schrading	Eric_Schrading@fws.gov
Project Biologist	Dennis Hamlin	Dennis_Hamlin@fws.gov
Financial Point of Contact	Laura Perlick	Laura_Perlick@fws.gov

V. DESCRIPTION OF PROJECT:

The proposed study involves formulating and evaluating the feasibility of implementing coastal storm risk management measures within the 500 year floodplain of the tidally influenced portion of the Rahway River located in the Study Area.

Alternatives to be evaluated include the following:
1) No Action
2) Non-Structural Measures
3) Levee/Floodwalls
4) Tidal/Closure Gate with Levee/Floodwalls

Alternatives will be evaluated to identify the Tentatively Selected Plan (TSP) which is the plan that maximizes net benefits relative to the other alternatives.

VI. STATUS OF STUDY:

The Corps is conducting a feasibility study to evaluate Federal participation in CSRM in the lower Rahway River Basin, New Jersey as authorized by the Disaster Relief Appropriations Act of 2013 passed by Congress and signed into law by the President on January 29, 2013 as Public Law 113-2. The legislation provides supplemental appropriations to address damages caused by Hurricane Sandy and to reduce future flood risk in ways that will support the long-term sustainability of the coastal ecosystem and communities, and reduce the economic costs and risks associated with large-scale flood and storm events.

Based on the Disaster Relief Appropriations Act of 2013, this CSRM study in the Rahway River Basin was initiated by separating CSRM from the existing and ongoing

fluvial flood risk management study for the Rahway River Basin, New Jersey. The Corps has determined that fluvial and tidal flooding are distinct from one another.

The Corps is currently evaluating CSRM alternatives to determine the TSP. Identification of a TSP is anticipated to occur in August 2016 with the Draft Integrated Feasibility Report and Environmental Assessment being issued for public/agency review in December 2016.

VII. COORDINATING AND SCOPING:

The Corps and the Service will coordinate routinely as necessary.

VIII. DATA AND INFORMATION NEEDED FROM THE CORPS:

1. Signed SOW

2. Completed and signed transfer funding agreement via Military Interdepartmental Purchase Request (MIPR).

IX. SPECIFIC WORK TO BE ACCOMPLISHED BY THE SERVICE:

1. Review the conceptual plan of the TSP and any other supplemental information provided by the Corps.

2. Provide Corps with information on fish and wildlife resources (including endangered and threatened species) in the Study Area.

3. Conduct a site visit.

4. Coordinate with the Corps and the New Jersey Department of Environmental Protection (NJDEP), including New Jersey Division of Fish and Wildlife (NJDFW), and other agencies/organizations regarding project area resources, project related impacts, and means and measures that should be adopted to prevent the loss of or damage to fish and wildlife resources, as well as to provide for the development and improvement of such resources.

5. Conduct a technical review of the preliminary alternatives that have been developed to date to evaluate impacts of the alternatives on fish and wildlife resources.

6. For any alternatives proposed by the Service that deviate significantly from the proposed plan or include experimental techniques, the Service shall provide a discussion of benefits gained by the proposed alternative, along with case studies, photographs and/or typical details in order to assist the Corps in considering incorporation of the alternative into the overall alternative evaluation process.

7. Provide a draft FWCA 2(b) report addressing the overall potential impacts to fish and wildlife resources from the CSRM project, including recommended measures that should be adopted to prevent the loss or damage to those resources.

8. Provide a final FWCA 2(b) report addressing and incorporating comments received from Corps, NJDEP, and NJDFW on the draft FWCA 2(b) report.

X. CORPS INPUT TO SERVICE:

The Corps will provide project documents and technical information developed during the course of study, secure and provide other existing Corps documents that the Service may request, and coordinate routinely as project plans are refined.

The Corps will provide comments or concurrence with the Service's written products within 30 days of submission. Once any comments are addressed and the Corps provides concurrence, Service products will become public documents available to outside parties upon request.

XI. SERVICE INPUT TO CORPS:

Service submits Draft FWCA 2(b) report	October 31, 2016
Service submits Final FWCA 2(b) report	February 25, 2017

XII. CORPS AND SERVICE SUBMISSION SCHEDULE:

	Target Date
Corps provides current plans, documents and information; and transmits funding.	Within 7 days after receipt of MIPR.
Service submits draft FWCA 2(b) report to the Corps, NJDEP and NJDFW.	Within 60 days after receipt of project plans.
Corps, NJDEP and NJDFW provide comments on draft FWCA 2(b) report.	Within 30 days after receipt of draft FWCA 2(b) report
Service addresses Corps, NJDEP, and NJDFW comments and submits final FWCA 2(b) report.	Within 20 days after receipt of Corps, NJDEP, and NJDFW comments.

XIII. SERVICE EFFORTS AND COSTS

Service Effort	Task Days
Investigate fish and wildlife resources within the vicinity of the project area, including review of available literature and coordination with the NJDEP and NJDFW	4
Conduct a site visit	1
Provide section 7 consultation pursuant to the Endangered Species Act (87 Stat.884; 15 U.S.C. 1551 et seq.) (not charged to project transfer funds)	—
Conduct technical review of the preliminary alternatives that have been developed to date	6
Prepare draft FWCA 2(b) report	8
Prepare final FWCA 2(b) report	2
Total Service Task Days	**21***
***Biologist Day Rate ($629) x Overhead Rate (38% or $239)**	**$868**
21 Service Task Days x $868	**$18,228**
Total:	**$18,228**

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Environmental Analysis Branch

4 February, 2016

Mr. Eric Schrading
Field Supervisor
U.S. Fish and Wildlife Service
New Jersey Field Office
4 East Jimmie Leeds Road, Unit 4
Galloway, New Jersey 08205-4465

Dear Mr. Schrading:

The Army Corps of Engineers, New York District (District) is submitting a revised Scope of Work (SOW) for development of a Fish and Wildlife Coordination Act Report (Enclosure 1) for the Rahway River Coastal Storm Risk Management Study located in the Cities of Rahway and Linden, Woodbridge Township, and the Boroughs of Carteret, Middlesex and Union Counties, New Jersey. The revised SOW reflects changes to the initial SOW (Enclosure 2), including removal of the preparation of a Planning Aid Letter and adjustments to the schedule, that were discussed between Ms. Kimberly Rightler and Mr. Dennis Hamlin on 2 February 2016.

Please review the revised SOW and provide a time and cost estimate for your services. The District will coordinate with your agency closely, to assist in your preparation of the report. Should any questions arise, or additional information is needed, please contact Ms. Kimberly Rightler at (917) 790-8722.

Sincerely,

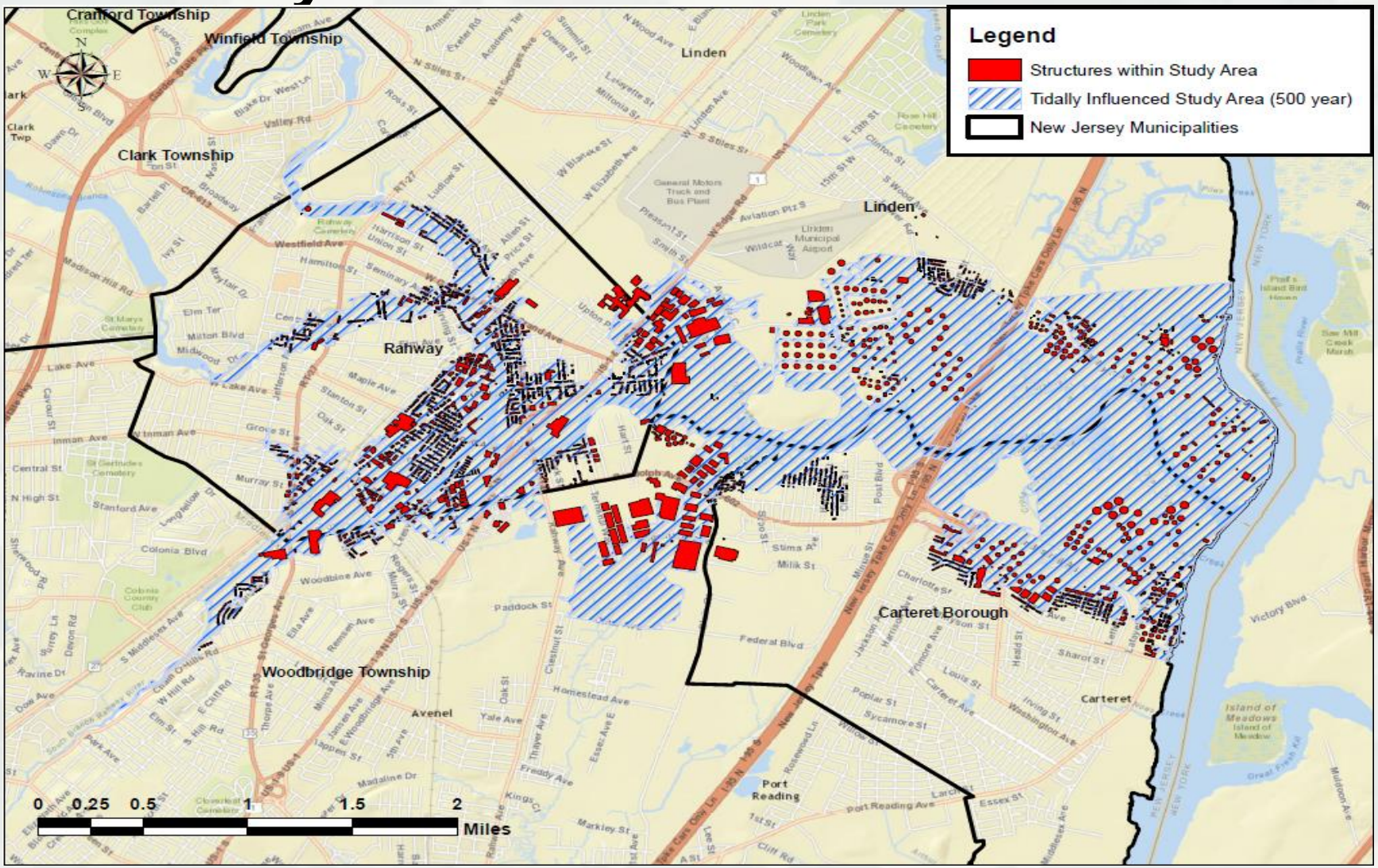
Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

Rahway River Basin Coastal Storm Risk Management Study Background & History

- March 1998 – Rahway River Basin Flood Risk Management Study authorized.
- July 1999 – Reconnaissance Report completed.
- March 2002 – A Feasibility Cost Sharing Agreement (FCSA) executed with NJDEP, non-Federal sponsor.
- April 2006 – Initial screening report narrowed study focus to Township of Cranford and Robinson's Branch area within the City of Rahway.
- October 2012 – Hurricane Sandy caused damage in the tidal areas (lower basin).
- January 2013 – Disaster Relief Appropriations Act (DRAA) - Public Law 113-2.
  - DRAA 13' Second Interim Report to Congress included Rahway River Basin for $2M
- October 2014 – FCSA amended, initiating Rahway River (Tidal) Coastal Storm Risk Management Feasibility Study (100% Federally funded).
  - January 2015 - Initiated work on the study.

Study Area & Affected Structures



USACE Formulation Process

- Formulate Storm Risk Management Alternatives
- Evaluate Alternatives
  - Plans are screened for completeness, effectiveness, efficiency, and acceptability.
  - Compare reduced damages of proposed alternatives against without project conditions to determine benefits.
  - Perform initial evaluation of environmental impacts.
  - Compare benefits to costs for each alternative. To be economically justified a plan must have a Benefit-to-Cost Ratio (BCR) greater than one.

USACE Formulation Process

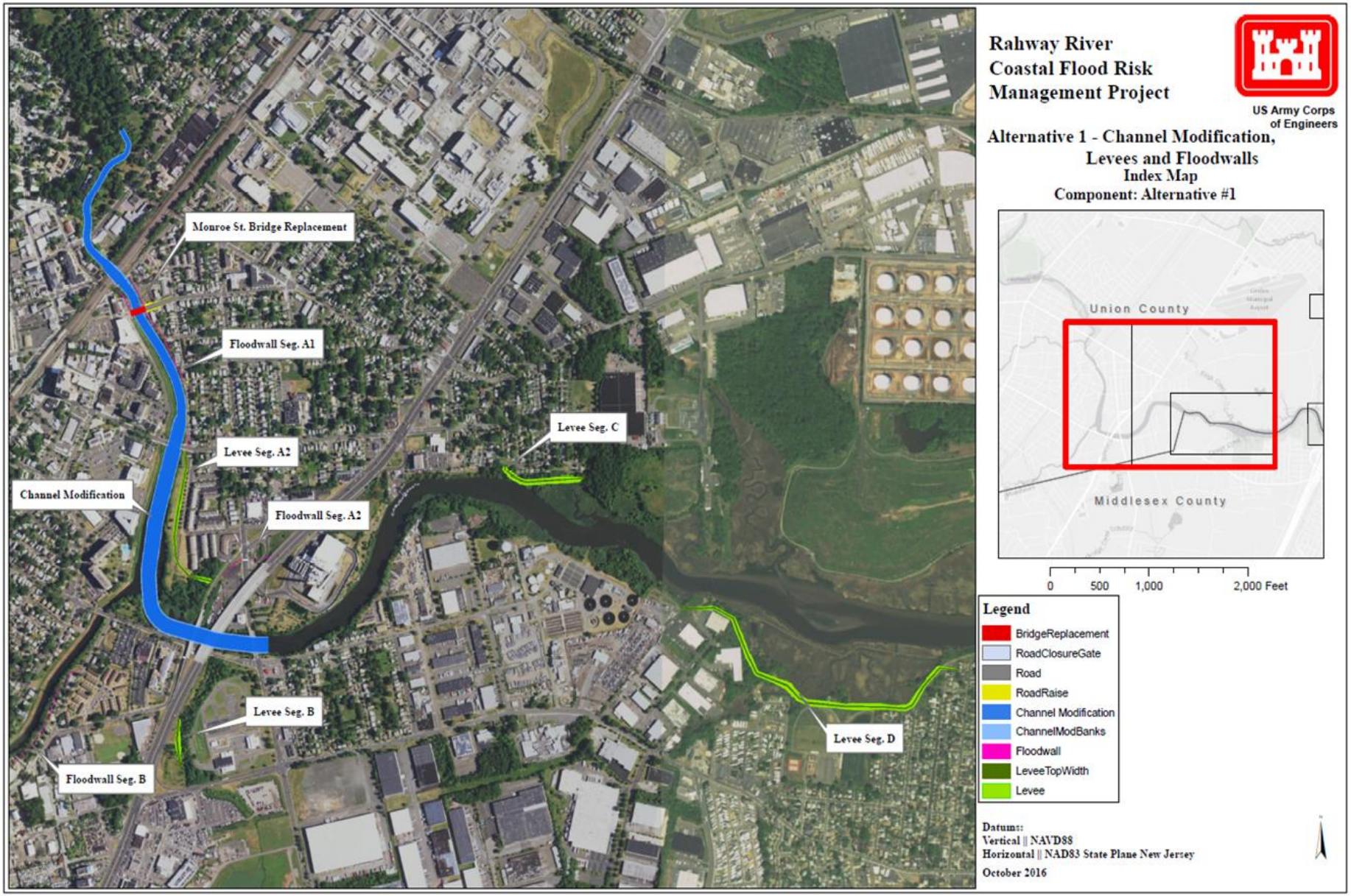
- Determine Tentatively Selected Plan (TSP)
  - The alternative that maximizes net benefits relative to other alternatives is identified as the Tentatively Selected Plan (TSP).
- The non-Federal sponsor can request a Locally Preferred Plan (LPP).
- A TSP or a LPP must have a BCR >1.
- Optimize & Select a plan.
  - The TSP size that maximizes net benefits relative to other TSP sizes is identified as the National Economic Development Plan (NED Plan).
- Establish the Recommended Plan – NED Plan, LPP or other.
- No Action would be recommended if all alternatives have a BCR < 1.
- Project Cost must be shared (Fed & Non-Fed sponsor).

Alternatives Overview

- No Action (Without Project)
  - Baseline against which the project benefits are measured
  - No additional Federal action would be taken if all alternatives have a BCR<1.
  - Compliance with National Environmental Policy Act (NEPA).
- Alternative #1: Levees and Floodwalls
- Alternative #2: Surge Barrier
- Alternative #3a & 3b: Nonstructural Measures
- Alternative # 4 & 4a: Levee Segment D + Nonstructural Measures

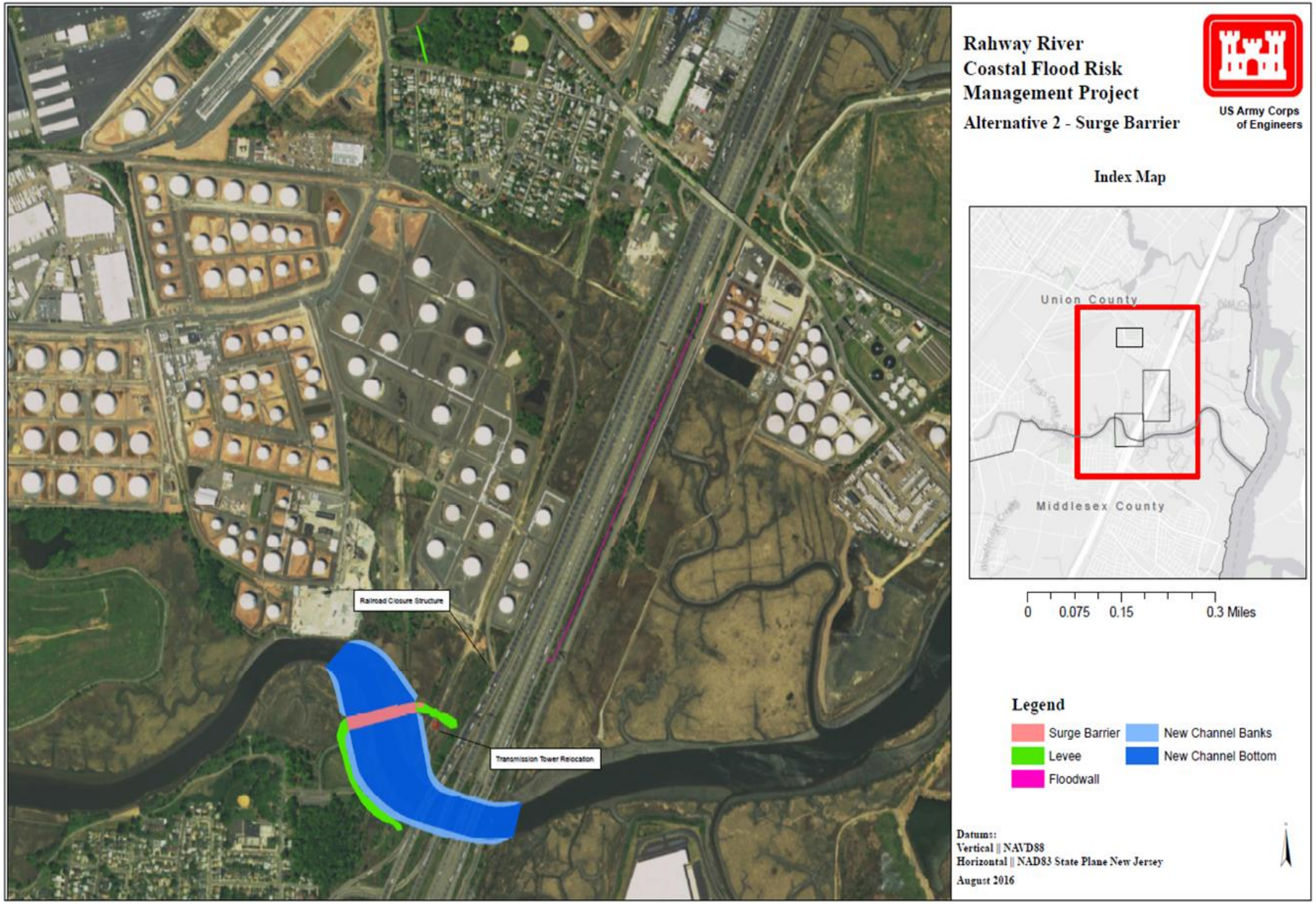
Alternative #1: Levee/Floodwall

- Coastal Storm Risk Measures include:
  - Four (4) levee/floodwall segments,
  - Two (2) closure gates, interior drainage structures,
  - 6,450 feet of Channel modification to mitigate for the impact (induced flooding) of bank encroachments caused by proposed levees.
- The improvements are located in Clark, Carteret, and Linden Townships. This alternative, would likely provide storm risk management to the 1% (100-yr) chance of annual exceedance in the protected areas.


Rahway River
Coastal Flood Risk
Management Project
US Army Corps
of Engineers
Alternative 1 - Channel Modification,
Levees and Floodwalls
Index Map
Component: Alternative #1
Monroe St. Bridge Replacement
Floodwall Seg. A1
Levee Seg. A2
Channel Modification
Floodwall Seg. A2
Levee Seg. C
Levee Seg. B
Floodwall Seg. B
Levee Seg. D
Union County
Middlesex County
0
500
1,000
2,000 Feet
Legend
BridgeReplacement
RoadClosureGate
Road
RoadRaise
Channel Modification
ChannelModBanks
Floodwall
LeveeTopWidth
Levee
Datum:
Vertical || NAVD88
Horizontal || NAD83 State Plane New Jersey
October 2016

Alternative #2: Surge Barrier

- Located approximately 775 ft upstream of the New Jersey Turnpike with a design elevation of 13 feet NAVD ‘88. It includes:
  - Six tainter gates allowing navigable passage,
  - A pumping station with four pumps at a total capacity of 2.7 million gpm,
  - Levee tie-ins to high ground (the turnpike) on the left and right banks, and
  - Channel modification at the surge barrier for a length of approximately 2,000 ft.
- This alternative is likely to provide storm risk management to the 1% (100-yr) chance of annual exceedance.


Rahway River
Coastal Flood Risk
Management Project
Alternative 2 - Surge Barrier
US Army Corps
of Engineers
Index Map
Union County
Middlesex County
0
0.075
0.15
0.3 Miles
Railroad Closure Structure
Transmission Tower Relocation
Legend
Surge Barrier
Levee
Floodwall
New Channel Banks
New Channel Bottom
Datums:
Vertical || NAVD88
Horizontal || NAD83 State Plane New Jersey
August 2016

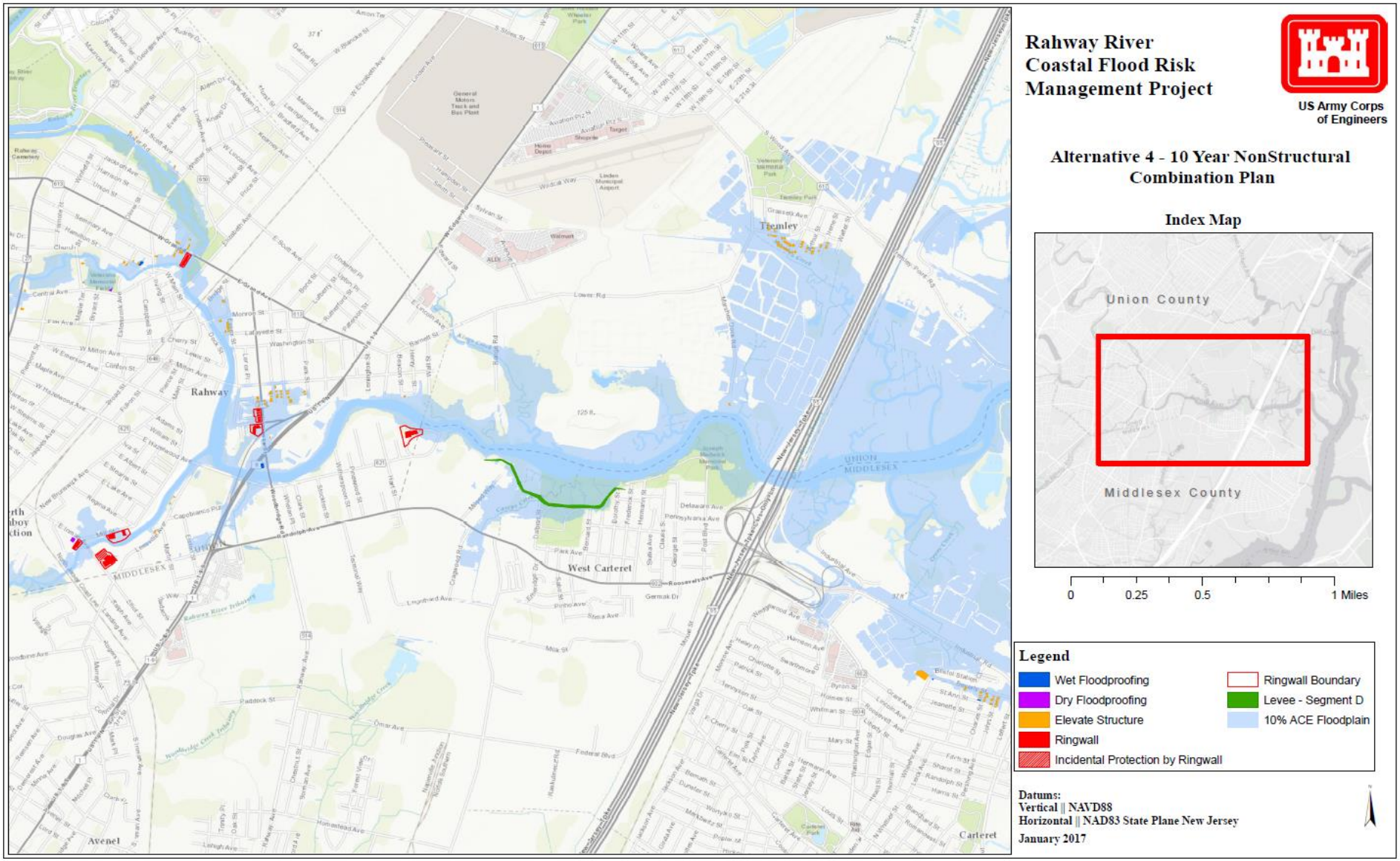
Alternative #3a/b: Nonstructural Alternative (10% & 2%, respectively)

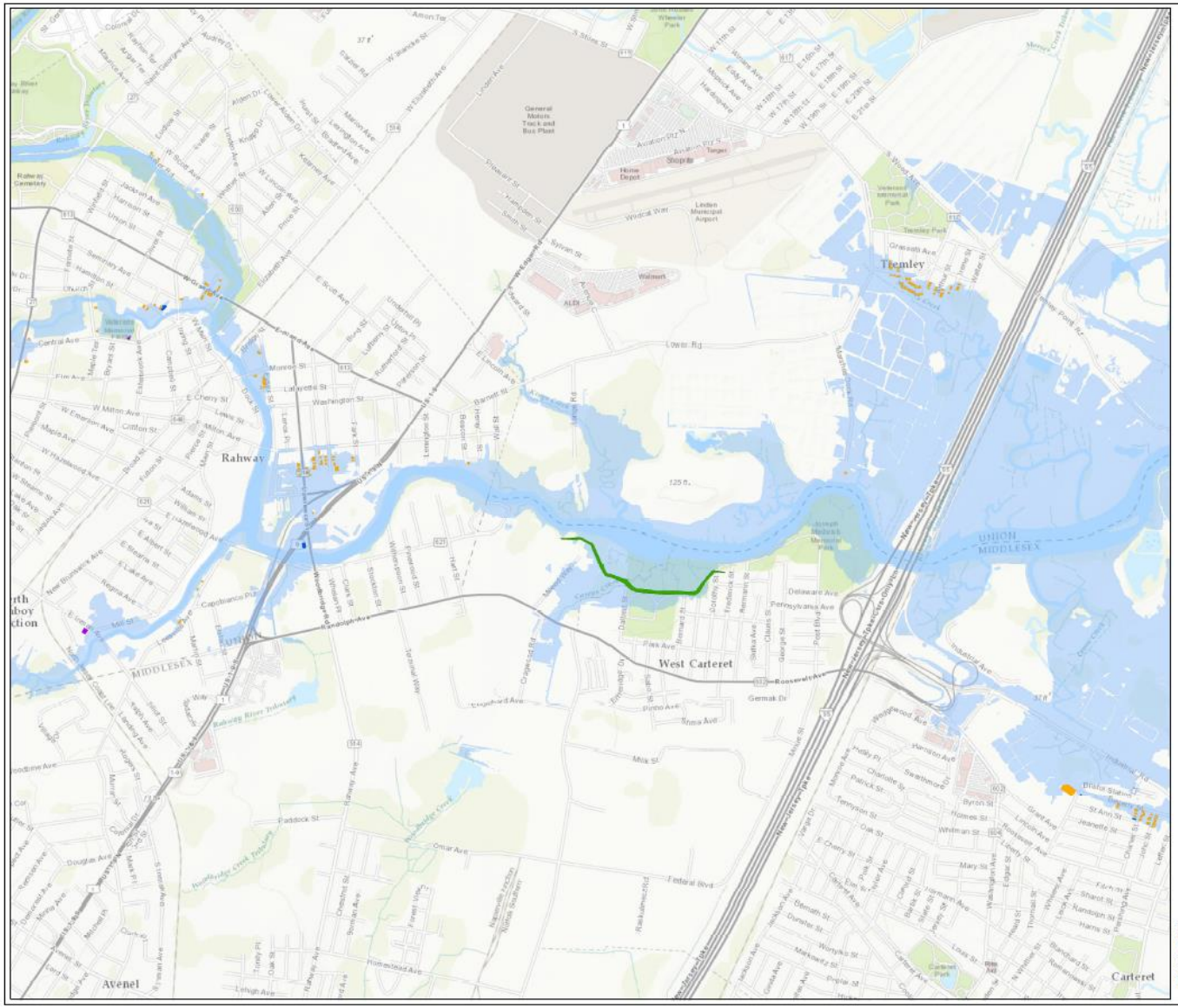
- Non-structural measures have been developed for structures contained in the 10% & 2% (10-yr & 50-yr, respectively) annual chance exceedance flood inundation areas.
- The non-structural measures considered:
  - Dry flood proofing,
  - Wet flood proofing,
  - Elevation, barriers, and pump replacements.
  - Relocations and acquisitions (buyouts) were not considered in this analysis. Buyouts are considered where the cost of the treatment exceeds the cost of the buyout. This evaluation occurs in the later design stages.
- All structures will be treated to an elevation of one foot above the 1% annual exceedance event (100 year).
- Non-structural measures were be developed in the project area where damages are greatest.

Nonstructural Flood Proofing Measure	10% Annual Exceedance (10-yr)			2% Annual Exceedance (50-yr)		
	Residential	Non-Residential	Total	Residential	Non-Residential	Total
Dry Flood proofing	0	2	**2**	12	34	**46**
Dry Flood Proofing with Tank Anchoring	0	0	**0**	0	3	**3**
Wet Flood proofing	10	1	**11**	66	1	**67**
Elevation	138	3	**141**	292	4	**296**
Pump Replacement	0	3	**3**	0	3	**3**
Ringwalls*	47	53	**100**	92	90	**182**
Total of Structures	**195**	**62**	**257**	**462**	**135**	**597**

Alternative #4/4a: Nonstructural Alternative (10% & 2%, respectively)

- The first element consists of Levee Segment D, approximately 3,360 ft. long with a 12 ft. top width and one vertical to three horizontal (1:3) side slopes.
- Approximately 136 structures within the 10% ACE floodplain will be treated with nonstructural measures to manage flood risk to the 1% storm event plus one foot.
- Alt. #4 included seven (7) ringwalls that provided flood risk management to 13 structures are included as part of Alternative 4. The ringwalls were found to all lack incremental justification.
- Alternative 4A was formulated by removing the ringwalls.


Rahway River
Coastal Flood Risk
Management Project
US Army Corps
of Engineers
Alternative 4 - 10 Year NonStructural
Combination Plan
Index Map
Union County
Middlesex County
0
0.25
0.5
1 Miles
Legend
Wet Floodproofing
Dry Floodproofing
Elevate Structure
Ringwall
Incidental Protection by Ringwall
Ringwall Boundary
Levee - Segment D
10% ACE Floodplain
Datums:
Vertical || NAVD88
Horizontal || NAD83 State Plane New Jersey
January 2017
Rahway
Tremley
West Carteret
Carteret
Avenel

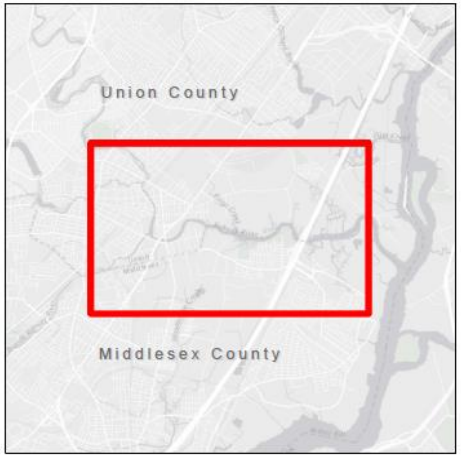


Rahway River Coastal Flood Risk Management Project

US Army Corps of Engineers

Alternative 4a - 10 Year NonStructural Plan with Levee Segment

Index Map



Legend

- Wet Floodproofing
- Levee
- Dry Floodproofing
- 10% ACE Floodplain
- Elevate Structure

Datums:
Vertical || NAVD88
Horizontal || NAD83 State Plane New Jersey
March 2017

Economic Analysis – All Alternatives

	Equivalent Annual Damages		Equivalent		Equivalent		
	Without Project	With Project	Annual Benefits	First Costs	Annual Costs	Net Benefits	BCR
Alternative 1: Levee/Floodwall with Channel Modification	$17,526,500	$11,940,300	$5,586,200	$106,506,651	$4,760,697	$825,503	1.2
Alternative 2: Tidal Surge Barrier	$17,526,500	$11,181,100	$6,345,400	$988,808,637	$47,012,307	-$40,666,907	0.1
Alternative 3A: Nonstructural Treament (10% Annual Chance Exceedance Floodplain)	$17,526,500	$8,849,000	$8,677,500	$623,323,356	$26,920,198	-$18,242,698	0.3
Alternative 3B: Nonstructural Treatment (2% Annual Chance Exceedance Floodplain)	$17,526,500	$7,840,000	$9,686,500	$973,143,314	$45,395,226	-$35,708,726	0.2
Alternative 4: Levee Segment D & Nonstructural Treatment (10% Annual Chance Exceedance Floodplain)	$17,526,500	$11,756,600	$5,769,900	$180,535,678	$7,636,672	-$1,866,772	0.8
Alternative 4A: Levee Segment D & Nonstructural Treatment without Ringwalls (10% Annual Chance Exceedance Floodplain)	$17,526,500	$13,138,400	$4,388,100	$65,604,298	$2,653,292	$1,734,808	1.7

Economic Analysis – Levee Segment Incremental Justification

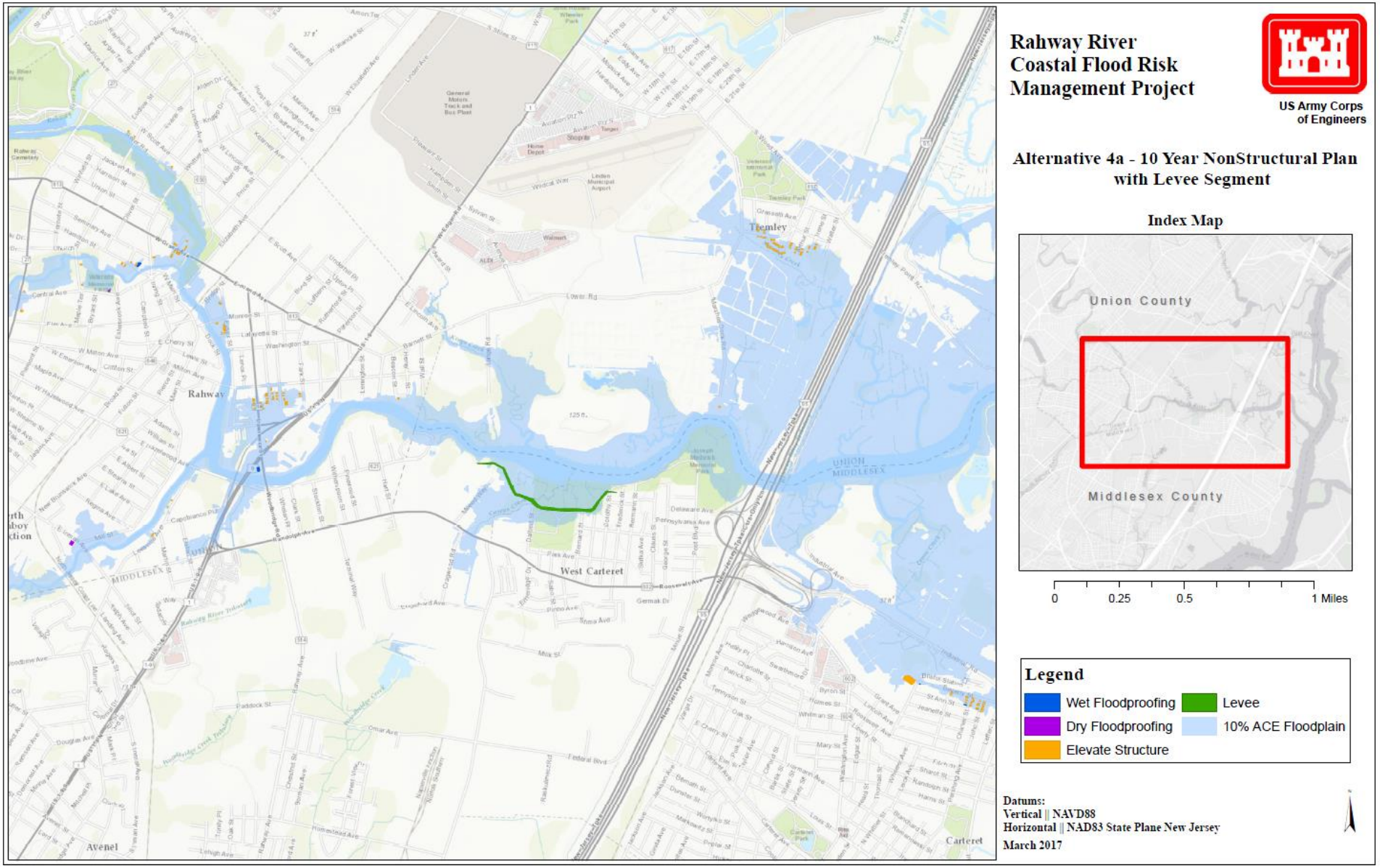
	Equivalent Annual Damages		Equivalent		Equivalent		
	Without Project	With Project	Annual Benefits	First Costs	Annual Costs	Net Benefits	BCR
Segment A	$17,526,500	$14,632,600	$2,893,900	$71,406,967	$3,225,110	-$331,210	0.90
Segment B	$17,526,500	$17,464,100	$62,400	$11,958,487	$522,185	-$459,785	0.12
Segment C	$17,526,500	$17,481,500	$45,000	$4,938,263	$212,027	-$167,027	0.21
Segment D	$17,526,500	$15,182,900	$2,343,600	$18,202,934	$801,376	$1,542,224	2.92
Total	$17,526,500	$12,181,600	$5,344,900	$106,506,651	$4,760,698	$584,202	1.12

Tentatively Selected Plan – Economic Analysis

	Equivalent Annual Damages		Equivalent		Equivalent		
	Without Project	With Project	Annual Benefits	First Costs	Annual Costs	Net Benefits	BCR
Nonstructural Treament (10% Annual Chance Exceedance Floodplain)	$17,526,500	$15,488,600	$2,037,900	$47,712,151	$1,850,455	$187,445	1.10
Segment D Levee/Floodwall	$17,526,500	$15,176,200	$2,350,300	$17,892,147	$808,837	$1,541,463	2.91
Total	$17,526,500	$13,138,300	$4,388,200	$65,604,298	$2,659,292	$1,728,908	1.65

Tentatively Selected Plan

- Levee Segment D: approximately 3,360 ft. long with a 12 ft. top width, an average height of 7.5 ft and one vertical to three horizontal (1:3) side slopes.
  - 15 ft permanent easement for inspection and operations/maintenance on either side of the levee.
- Approximately 136 structures within the 10% ACE floodplain will be treated with nonstructural measures to manage flood risk to the 1% storm event plus one foot.
- The number of structures receiving nonstructural treatment and the size of Levee Segment D may change as the plan is optimized.



Feasibility Study Schedule

Milestones	
Milestones	**Dates**
30 Day Public Review of Draft Feasibility Report/Environmental Assessment (Draft FR/EA)	May 2017
Closure of Public Review of Draft FR/EA	June 2017
Final Report	April 2018
Chiefs Report	December 2018

Rahway River Basin Coastal Storm Risk Management Feasibility Study Contacts

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  Rifat.Salim@usace.army.mil
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  917-790-8703
  Nancy.J.Brighton@usace.army.mil
- Kimberly Rightler, Project Biologist
  917-790-8722
  Kimberly.A.Rightler@usace.army.mil

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
4 EAST JIMMIE LEEDS ROAD UNIT 4
GALLOWAY, NJ 08205
PHONE: (609)382-5273 FAX: (609)646-0352
URL: www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2017-SLI-0612 March 05, 2017
Event Code: 05E2NJ00-2017-E-00992
Project Name: Rahway Tidal Flood Risk Management Study Tentatively Selected Plan

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA

is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably forseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment

Official Species List

Provided by:

New Jersey Ecological Services Field Office
4 EAST JIMMIE LEEDS ROAD UNIT 4
GALLOWAY, NJ 08205
(609) 382-5273
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

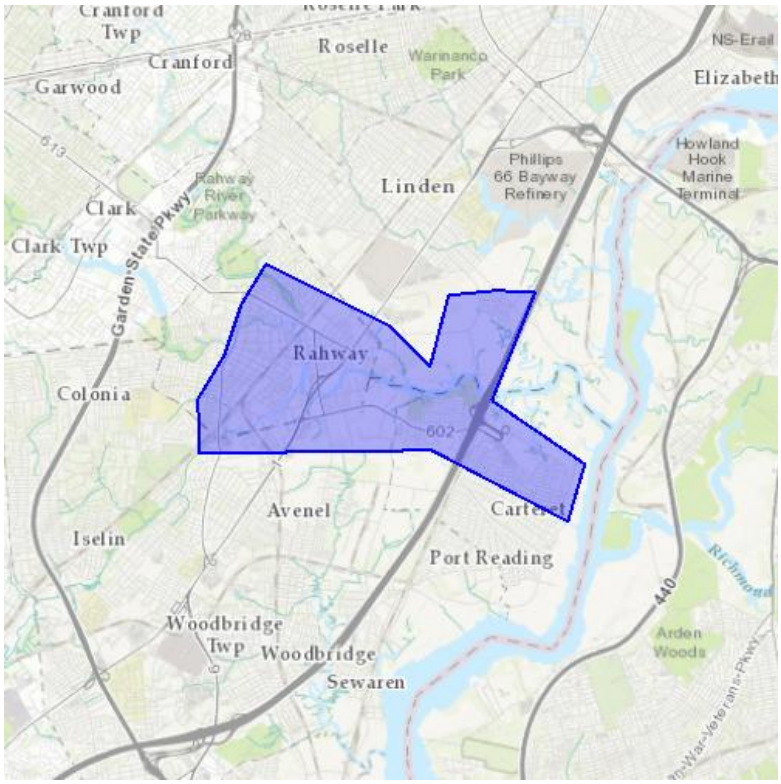
Consultation Code: 05E2NJ00-2017-SLI-0612
Event Code: 05E2NJ00-2017-E-00992

Project Type: LAND - FLOODING

Project Name: Rahway Tidal Flood Risk Management Study Tentatively Selected Plan
Project Description: Tentatively Selected Plan identified includes nonstructural treatments (dry/wet floodproofing, elevations) for 136 structures and a levee 3,360 ft long and 7.5ft high along the Rahway River in the City of Rahway and Carteret Borough. Project is in the study phase and has not been authorized for construction therefore the timing of implementation is still several years out.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-74.23024177551271 40.61629798630162, -74.24036979675294 40.61551614707258, -74.24466133117677 40.603722295622156, -74.25350189208986 40.61040138975998, -74.28028106689455 40.62085853278464, -74.285945892334 40.61421306135907, -74.28963661193849 40.60554689492075, -74.29538726806642 40.598443710044194, -74.29512977600099 40.58938442513793, -74.24414634704591 40.5899058561196, -74.21436309814455 40.578172675638, -74.210844039917 40.58768974636819, -74.23110008239748 40.59824819886966, -74.22174453735353 40.61603737424187, -74.23024177551271 40.61629798630162)))

Project Counties: Middlesex, NJ | Union, NJ

Endangered Species Act Species List

There are a total of 2 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Mammals	**Status**	**Has Critical Habitat**	**Condition(s)**
Indiana bat *(Myotis sodalis)* Population: Wherever found	Endangered		
Northern long-eared Bat *(Myotis septentrionalis)* Population: Wherever found	Threatened		

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Appendix A: FWS National Wildlife Refuges and Fish Hatcheries

There are no refuges or fish hatcheries within your project area.

Appendix B: FWS Migratory Birds

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no otherwise lawful activities. For more information regarding these Acts see:
http://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php
http://www.fws.gov/birds/policies-and-regulations/laws-legislations/bald-and-golden-eagle-protection-act.php

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to:
http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php

For information about conservation measures that help avoid or minimize impacts to birds, please visit:
http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php

To search and view summaries of year-round bird occurrence data within your project area, go to the Avian Knowledge Network Histogram Tools at:
http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php

Migratory birds that may be affected by your project:

There are 29 birds on your migratory bird list. The list may include birds occurring outside this FWS office jurisdiction.

Species Name	Bird of Conservation Concern (BCC)	Seasonal Occurrence in Project Area
American bittern *(Botaurus lentiginosus)*	Yes	On Land: Breeding
American Oystercatcher *(Haematopus palliatus)*	Yes	On Land: Year-round
Bald eagle *(Haliaeetus leucocephalus)*	Yes	On Land: Year-round
Black Skimmer *(Rynchops niger)*	Yes	On Land: Breeding
Black-billed Cuckoo *(Coccyzus erythropthalmus)*	Yes	On Land: Breeding
Blue-winged Warbler *(Vermivora pinus)*	Yes	On Land: Breeding
Canada Warbler *(Wilsonia canadensis)*	Yes	On Land: Breeding
Fox Sparrow *(Passerella liaca)*	Yes	On Land: Wintering
Golden-Winged Warbler *(Vermivora chrysoptera)*	Yes	On Land: Breeding
Gull-billed Tern *(Gelochelidon nilotica)*	Yes	On Land: Breeding
Hudsonian Godwit *(Limosa haemastica)*	Yes	At Sea: Migrating
Kentucky Warbler *(Oporornis formosus)*	Yes	On Land: Breeding
Least bittern *(Ixobrychus exilis hesperis)*	No	On Land: Breeding
Least tern *(Sterna antillarum)*	Yes	On Land: Breeding
Loggerhead Shrike *(Lanius ludovicianus)*	Yes	On Land: Year-round

Peregrine Falcon *(Falco peregrinus)*	Yes	On Land: Wintering
Pied-billed Grebe *(Podilymbus podiceps)*	Yes	On Land: Year-round
Prairie Warbler *(Dendroica discolor)*	Yes	On Land: Breeding
Purple Sandpiper *(Calidris maritima)*	Yes	On Land: Wintering
Red Knot *(Calidris canutus rufa)*	Yes	On Land: Wintering
Rusty Blackbird *(Euphagus carolinus)*	Yes	On Land: Wintering
Saltmarsh Sparrow *(Ammodramus caudacutus)*	Yes	On Land: Breeding
Seaside Sparrow *(Ammodramus maritimus)*	Yes	On Land: Year-round
Short-eared Owl *(Asio flammeus)*	Yes	On Land: Wintering
Snowy Egret *(Egretta thula)*	Yes	On Land: Breeding
Upland Sandpiper *(Bartramia longicauda)*	Yes	On Land: Breeding
Willow Flycatcher *(Empidonax traillii)*	Yes	On Land: Breeding
Wood Thrush *(Hylocichla mustelina)*	Yes	On Land: Breeding
Worm eating Warbler *(Helmitheros vermivorum)*	Yes	On Land: Breeding

Appendix C: NWI Wetlands

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Exclusions - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Precautions - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of

this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

The following NWI Wetland types intersect your project area in one or more locations. To understand the NWI Classification Code, see https://ecos.fws.gov/ipac/wetlands/decoder. To view the National Wetlands Inventory on a map go to http://www.fws.gov/wetlands/Data/Mapper.html.

Wetland Types	NWI Classification Code
Estuarine and Marine Deepwater	E1UBL
Estuarine and Marine Deepwater	E1UBLh
Estuarine and Marine Wetland	E2EM5P
Estuarine and Marine Wetland	E2EM1Pd
Estuarine and Marine Wetland	E2EM5Pd
Estuarine and Marine Wetland	E2EM1P
Estuarine and Marine Wetland	E2EM5/1Pd
Estuarine and Marine Wetland	E2EM1Ph
Estuarine and Marine Wetland	E2EM5Ph
Estuarine and Marine Wetland	E2EM5Px
Freshwater Emergent Wetland	PEM1E
Freshwater Emergent Wetland	PEM5E
Freshwater Emergent Wetland	PEM1Ah
Freshwater Emergent Wetland	PEM1A
Freshwater Emergent Wetland	PEM1C

Freshwater Emergent Wetland	PEM5Fx
Freshwater Forested/Shrub Wetland	PFO1A
Freshwater Forested/Shrub Wetland	PSS1/EM1A
Freshwater Forested/Shrub Wetland	PFO1/SS1A
Freshwater Forested/Shrub Wetland	PFO1R
Freshwater Forested/Shrub Wetland	PFO1Bd
Freshwater Forested/Shrub Wetland	PSS1/FO1A
Freshwater Forested/Shrub Wetland	PSS1E
Freshwater Forested/Shrub Wetland	PFO1Ed
Freshwater Pond	PUBFh
Freshwater Pond	PUBHx
Freshwater Pond	PUBFx
Freshwater Pond	PUBHh
Riverine	R1UBV
Riverine	R2UBH

Enclosure 4: Summary of Key Impacts and Mitigation for the Rahway River Basin Coastal Storm Risk Management Feasibility Study

1.0 Summary of Impacts

1.1. Water Resources: Approximately 200 linear ft of Casey's Creek, a tidally influenced tributary of the Rahway River and 0.14 acres of mudflat habitat associated with levee construction.

1.2. Wetlands: Approximately 2.3 of low marsh wetlands, 1.8 acres of phragmites dominated wetlands, 0.50 acres of deciduous scrub shrub wetlands and 0.40 acres of managed wetlands (maintained lawn) associated with levee construction.

1.3. Uplands Vegetation: Approximately 0.70 acres associated levee construction

2.0 Summary of Mitigation

2.1. Water Resources:

- On-site restoration of 200 linear ft of tidal creek
- On-site restoration of 0.14 acres of mudflat habitat
- On-site restoration of 4 acres of low marsh wetland.

2.2. Uplands:

- On-site restoration/enhancement of 0.70 acres of upland forest.

On-site water resource mitigation within the wetland complex impacted by the levee will be evaluated during optimization of the TSP.

On-site restoration/enhancement of upland forest within the Joseph Medwick Memorial Park and/or within the overall levee project area will be evaluated during optimization of the TSP.

All mitigation will be monitored for a minimum period of five years. Adaptive management measures will be implemented as necessary to achieve mitigation goals.

2.3. Fish and Wildlife

2.3.1. Fish

- Per NJDEP requirements, will implement an in-water restriction from 1 May through 30 June to protect spawning species;

2.4. Endangered and Threatened Species

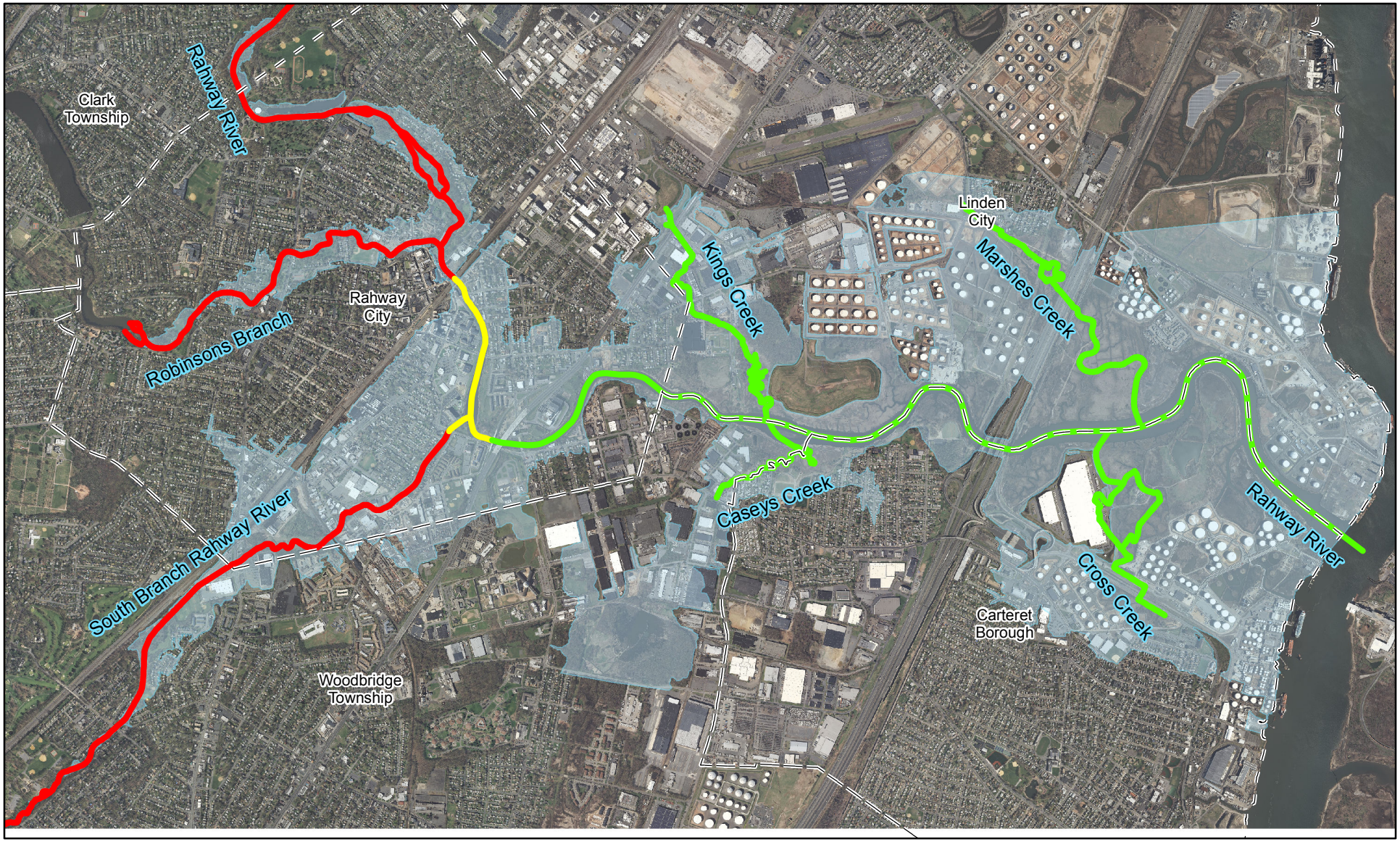
2.4.1. Indiana and Northern Long Eared Bat:

- Implementation of tree clearing restriction from 1 April through 30 September

- Conduct presence/abasence surveys if the tree clearing restriction cannot be implemented.
- Utilize tree species preferred by these species for summer roosting as part of upland mitigation.

2.4.2. American Bald Eagle

- Implementation of shrub and tree clearing restriction from 1 April through 31 August in accordance with the Migratory Bird Treaty Act
- Continue coordination with USFWS during construction and implement additional protective measures as outlined in the National Bald Eagle Management Guidelines as necessary.



Significant Rivers/Streams within Project Study Area & Applicable NJDEP Surface Water Quality Standards (SWQS)

Rahway River (Tidal) Basin Coastal Storm Risk Management

US Army Corps of Engineers
New York District

0 0.5 1 1.5 2 Miles

N W E S

Legend

New Jersey Municipal Boundaries

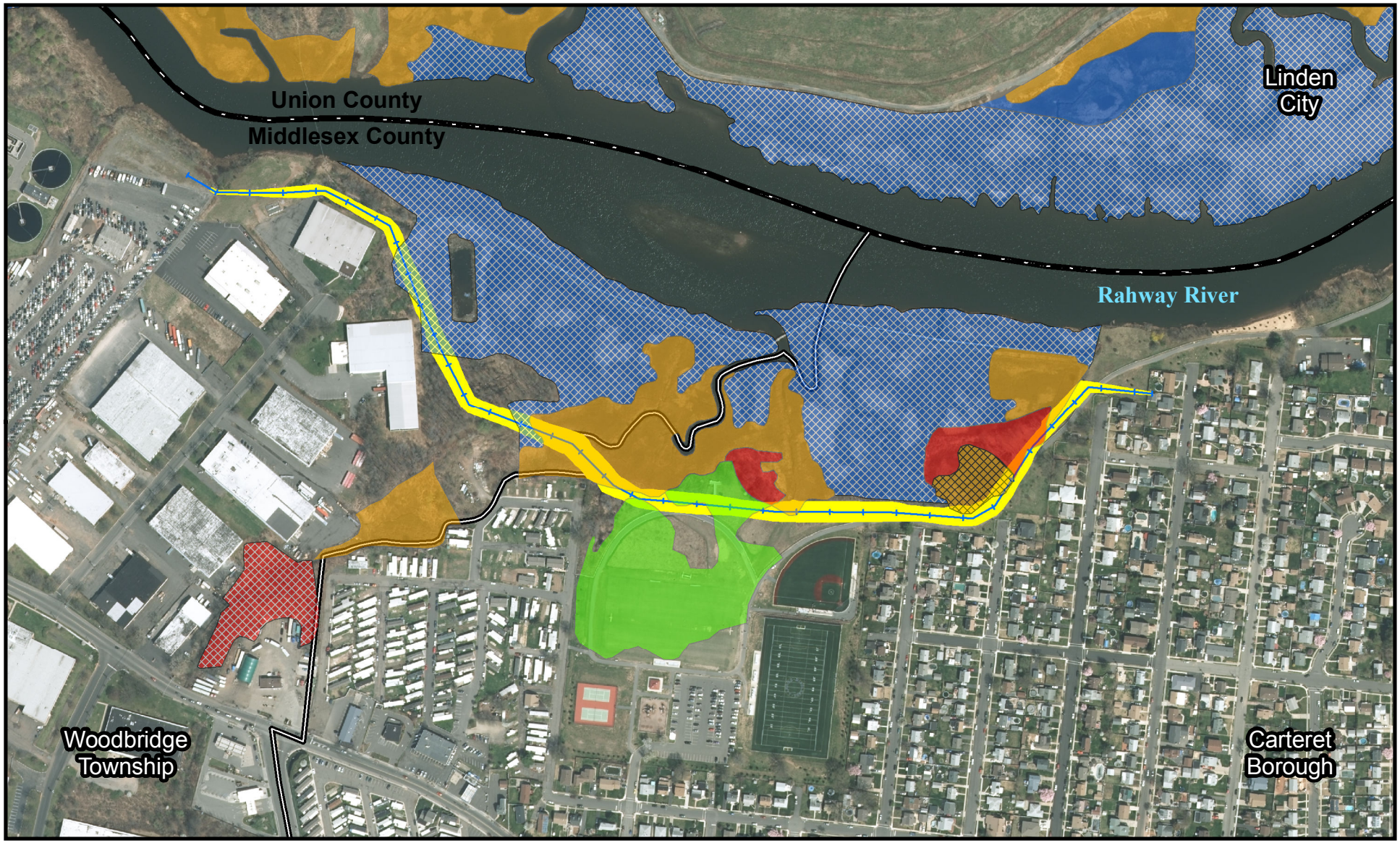
Project Study Area

SWQS CATEGORY

FW2-NT

SE2

SE3



April 2017

Wetlands (NJDEP 2012) in Proximity of TSP Levee D
Rahway River Basin (Tidal)
Coastal Storm Risk Management Study

US Army Corps of Engineers
New York District

0 500 1,000 Feet

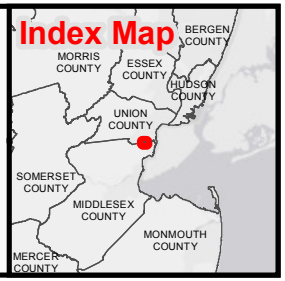
N W E S

Legend

- USACE TSP - Levee Segment D
- New Jersey County Boundaries
- New Jersey Municipal Boundaries

Types of Wetlands

- DECIDUOUS SCRUB/SHRUB WETLANDS
- DECIDUOUS WOODED WETLANDS
- MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA
- PHRAGMITES DOMINATE COASTAL WETLANDS
- PHRAGMITES DOMINATE INTERIOR WETLANDS
- SALINE MARSH (HIGH MARSH)
- SALINE MARSH (LOW MARSH)



Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Appendix A.4
Section 106 Coordination
Case Report and Programmatic Agreement

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 24, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Ms. Kim Penrod
Cultural Preservation Director
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Dear Ms. Penrod:

The U.S. Army Corps of Engineers, New York District (District) is undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure).

The study is progressing and a Tentatively Selected Plan (TSP) has recently been identified. The TSP consists of a 3,360 foot long levee along the right bank of the Rahway River in the Township of Woodbridge and Borough of Carteret, in Middlesex County, New Jersey and nonstructural measures for 136 structures within select areas in the Cities of Rahway and Linden and Boroughs of Carteret and Woodbridge in Union and Middlesex Counties, New Jersey. Because the details of the plan are not finalized at this time and additional investigations are required the District has elected to develop a Programmatic Agreement (PA) for the project that would outline the steps required to carry out the District's remaining Section 106 responsibilities including conducting additional surveys, consultation with participating parties, determining adverse effects, and, if necessary, mitigation for adverse effects. The enclosed preliminary case report includes a summary of the project and the investigations undertaken to date as well as a discussion of known affected resources, documented archaeological sites and the potential for adverse effects. The draft PA is appended to the preliminary case report. The preliminary case report and draft Programmatic Agreement will be included in the draft Feasibility Report and Environmental Assessment for the project which is scheduled to be released for public review in the coming weeks.

As a tribe with significant cultural heritage in the region, I would like to invite you to review and comment upon the draft PA for the Rahway River Coastal Storm Risk Management Feasibility Study. At a minimum, the PA is intended to be entered into by the U.S. Army Corps of Engineers and the New Jersey State Historic Preservation Office. We would also like invite the Delaware Nation to participate in the PA as a signatory, or if signatory is not preferred, as a concurring party which would provide the Delaware Nation with the opportunity to consult on the project and receive status updates as it proceeds. Please provide a written response within 30

days to the project archaeologist, Ms. Carissa Scarpa by mail (US Army Corps of Engineers, CENAN-PL-EA, 26 Federal Plaza, Room 2131, New York, NY 10278) or by email to Carissa.a.scarpa@usace.army.mil. If you feel it would be beneficial to schedule a meeting or conference call amongst the consulting parties, please include that with your comments. If you or your staff require additional information or have any questions, please contact Ms. Scarpa at (917) 790-8612.

Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 24, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Ms. Susan Bachor
Delaware Tribe
Historic Preservation Representative
P.P. Box 64
Pocono Lake, PA 18347

Dear Ms. Bachor:

The U.S. Army Corps of Engineers, New York District (District) is undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure).

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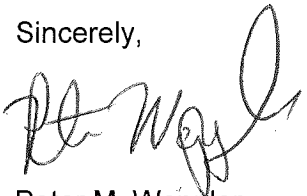
days to the project archaeologist, Ms. Carissa Scarpa by mail (US Army Corps of Engineers, CENAN-PL-EA, 26 Federal Plaza, Room 2131, New York, NY 10278) or by email to Carissa.a.scarpa@usace.army.mil. If you feel it would be beneficial to schedule a meeting or conference call amongst the consulting parties, please include that with your comments. If you or your staff require additional information or have any questions, please contact Ms. Scarpa at (917) 790-8612.

Sincerely,



Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 24, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Mr. Robin Dushane
Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma
7050 East 128 Road
Wyandote, OK 74370

Dear Mr. Dushane:

The U.S. Army Corps of Engineers, New York District (District) is undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure).

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As a tribe with significant cultural heritage in the region, I would like to invite you to review and comment upon the draft PA for the Rahway River Coastal Storm Risk Management Feasibility Study. At a minimum, the PA is to be entered into by the U.S. Army Corps of Engineers and the New Jersey State Historic Preservation Office. We would also like invite the Eastern Shawnee Tribe to participate in the PA as a signatory, or if signatory is not preferred, as a concurring party, which would provide the Eastern Shawnee Tribe with the opportunity to

consult on the project and receive status updates as it proceeds. Please provide a written response within 30 days to the project archaeologist, Ms. Carissa Scarpa by mail (US Army Corps of Engineers, CENAN-PL-EA, 26 Federal Plaza, Room 2131, New York, NY 10278) or by email to Carissa.a.scarpa@usace.army.mil. If you feel it would be beneficial to schedule a meeting or conference call amongst the consulting parties, please include that with your comments. If you or your staff require additional information or have any questions, please contact Ms. Scarpa at (917) 790-8612.

Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 24, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Ms. Dolores Capraro Gioffre
Woodbridge Township Historic Preservation Commission
582 Rahway Avenue
Woodbridge, NJ 07095

Dear Ms. Capraro Gioffre:

The U.S. Army Corps of Engineers, New York District (District) is undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure).

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As a party with significant interest in the preservation of historic resources in the project area I would like to take this opportunity to invite the Woodbridge Township Historic Preservation Commission to review and comment upon the draft PA for the Rahway River Coastal Storm Risk Management Feasibility Study. At a minimum, the PA is to be entered into by the U.S. Army Corps of Engineers and the New Jersey State Historic Preservation Office. The document has been coordinated with a number of Federally Recognized Tribes who have extensive cultural heritage in the region. These are the Delaware Nation, the Shawnee Tribe of Oklahoma, the Eastern Shawnee Tribe of Oklahoma, and the Delaware Tribe of Indians. In

additional to yourselves and the Tribes, the District is coordinating with the Union County Department of Parks and Heritage Affairs, the Middlesex County Division of Historic Sites and History Services, the Carteret Historical Committee, and the Linden Society for Historic Preservation. Should there be any other groups who your organization feels should participate in this process please include that information with your comments.

If you have comments on the materials presented here please provide a written response within 30 days to the project archaeologist, Ms. Carissa Scarpa by mail (US Army Corps of Engineers, CENAN-PL-EA, 26 Federal Plaza, Room 2131, New York, NY 10278) or by email to Carissa.a.scarpa@usace.army.mil. If you feel it would be beneficial to schedule a meeting or conference call amongst the consulting parties, please include that with your comments. If you or your staff require additional information or have any questions, please contact Ms. Scarpa at (917) 790-8612.

Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 24, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Linden Society for Historic Preservation
301 North Wood Avenue
Linden, NJ 07036

To Whom it May Concern:

The U.S. Army Corps of Engineers, New York District (District) is undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure).

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As a party with significant interest in the preservation of historic resources in the project area I would like to take this opportunity to invite the Linden Society for Historic Preservation to review and comment upon the draft PA for the Rahway River Coastal Storm Risk Management Feasibility Study. At a minimum, the PA is to be entered into by the U.S. Army Corps of Engineers and the New Jersey State Historic Preservation Office. The document has been coordinated with a number of Federally Recognized Tribes who have extensive cultural heritage in the region. These are the Delaware Nation, the Shawnee Tribe of Oklahoma, the Eastern Shawnee Tribe of Oklahoma, and the Delaware Tribe of Indians. In additional to yourselves and the Tribes, the District is coordinating with the Union County Department of Parks and Heritage

Affairs, the Middlesex County Division of Historic Sites and History Services, the Merchants and Drovers Tavern Museum Association, the Woodbridge Township Historic Preservation Commission, and the Carteret Historical Committee. Should there be any other groups who your organization feels should participate in this process please include that information with your comments.

If you have comments on the materials presented here please provide a written response within 30 days to the project archaeologist, Ms. Carissa Scarpa by mail (US Army Corps of Engineers, CENAN-PL-EA, 26 Federal Plaza, Room 2131, New York, NY 10278) or by email to Carissa.a.scarpa@usace.army.mil. If you feel it would be beneficial to schedule a meeting or conference call amongst the consulting parties, please include that with your comments. If you or your staff require additional information or have any questions, please contact Ms. Scarpa at (917) 790-8612.

Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 24, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Mr. John Prescott
Union County Department of Parks and Heritage Affairs
Office of Culture and Heritage
633 Pearl Street
Elizabeth, NJ 07202

Dear Mr. Prescott:

The U.S. Army Corps of Engineers, New York District (District) is undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure).

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Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 24, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Ms. Kim Jumper
Tribal Historic Preservation Officer
Shawnee Tribe of Oklahoma
29S HWY69A
Miami, OK 74355

Dear Ms. Jumper:

The U.S. Army Corps of Engineers, New York District (District) is undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure).

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Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 26, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Mr. Alex Shipley
Director of Museum Operations
Merchants and Drovers Tavern Museum Association
P.O. Box 1842
1632 St. George Avenue
Rahway, NJ 07065

Dear Mr. Shipley:

The U.S. Army Corps of Engineers, New York District (District) is undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure 1).

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As a party with significant interest in the preservation of historic resources in the project area I would like to take this opportunity to invite the Merchants and Drovers Tavern Museum Association to review and comment upon the draft PA for the Rahway River Coastal Storm Risk Management Feasibility Study. At a minimum, the PA is to be entered into by the U.S. Army Corps of Engineers and the New Jersey State Historic Preservation Office. The document has been coordinated with a number of Federally Recognized Tribes who have extensive cultural

heritage in the region. These are the Delaware Nation, the Shawnee Tribe of Oklahoma, and the Delaware Tribe of Indians. In additional to yourselves and the Tribes, the District is coordinating with the Union County Department of Parks and Heritage Affairs, the Middlesex County Division of Historic Sites and History Services, the Woodbridge Township Historic Preservation Commission, the Carteret Historical Committee, and the Linden Society for Historic Preservation. Should there be any other groups who your organization feels should participate in this process please include that information with your comments.

If you have comments on the materials presented here please provide a written response within 30 days to the project archaeologist, Ms. Carissa Scarpa by mail (US Army Corps of Engineers, CENAN-PL-EA, 26 Federal Plaza, Room 2131, New York, NY 10278) or by email to Carissa.a.scarpa@usace.army.mil. If you feel it would be beneficial to schedule a meeting or conference call amongst the consulting parties, please include that with your comments. If you or your staff require additional information or have any questions, please contact Ms. Scarpa at (917) 790-8612.

Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

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U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 26, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Ms. Katherine Marcopul
Deputy State Historic Preservation Officer
State of New Jersey Department of Environmental Protection
Historic Preservation Office
PO Box 420
Trenton, NJ 08625-0420

Dear Ms. Marcopul:

The U.S. Army Corps of Engineers, New York District (District) is currently undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has recently prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure).

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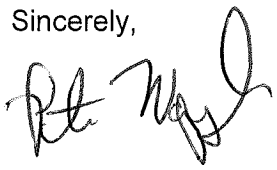
I would like to take this opportunity to invite the New Jersey State Historic Preservation Office to comment upon the draft PA for the Rahway River Coastal Storm Risk Management Feasibility Study. At a minimum, the PA is to be entered into by the U.S. Army Corps of Engineers and the New Jersey State Historic Preservation Office. The document is also being coordinated with a number of Federally Recognized Tribes who have extensive cultural heritage in the region. These are the Delaware Nation, the Shawnee Tribe of Oklahoma, the Eastern

Shawnee Tribe of Oklahoma, and the Delaware Tribe of Indians. In addition, the District is coordinating with the Middlesex County Division of Historic Sites and History Services, the Union County Department of Parks and Heritage Affairs, the Linden Society for Historic Preservation, the Merchants and Drovers Tavern Museum Association of the City of Rahway, the Woodbridge Township Historic Preservation Commission, and the Carteret Historical Committee. Should there be any other groups who you feel should participate in this process please include that information with your comments.

Please review the case report and draft PA and provide any comments within 30 days of your receipt of this letter. If you feel it would be beneficial to schedule a meeting or conference call amongst the consulting parties, please include that with your comments. If you or your staff require additional information or have any questions, please contact Ms. Carissa Scarpa at (917) 790-8612. We look forward to working with you on the Rahway River Coastal Storm Risk Management Project.

Sincerely,



Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 24, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Ms. Isha Vyas, Division Director
Union County Department of Parks and Heritage Affairs
Office of Culture and Heritage
1050 River Road
Piscataway, NJ 08854

Dear Ms. Vyas:

The U.S. Army Corps of Engineers, New York District (District) is undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure).

The study is progressing and a Tentatively Selected Plan (TSP) has recently been identified. The TSP consists of a 3,360 foot long levee along the right bank of the Rahway River in the Township of Woodbridge and Borough of Carteret, in Middlesex County, New Jersey and nonstructural measures for 136 structures within select areas in the Cities of Rahway and Linden, the Borough of Carteret and Woodbridge Township in Union and Middlesex Counties, New Jersey. Because the details of the plan are not finalized at this time and additional investigations are required the District has elected to develop a Programmatic Agreement (PA) for the project that would outline the steps required to carry out the District's remaining Section 106 responsibilities including conducting additional surveys, consultation with participating parties, determining adverse effects, and, if necessary, mitigation for adverse effects. The enclosed preliminary case report includes a summary of the project and the investigations undertaken to date as well as a discussion of known affected resources, documented archaeological sites and the potential for adverse effects. The draft PA is appended to the preliminary case report. The preliminary case report and draft Programmatic Agreement will be included in the draft Feasibility Report and Environmental Assessment for the project which is scheduled to be released for public review in the coming weeks.

As a party with significant interest in the preservation of historic resources in the project area I would like to take this opportunity to invite the Department of Cultural and Heritage Affairs to review and comment upon the draft PA for the Rahway River Coastal Storm Risk Management Feasibility Study. At a minimum, the PA is to be entered into by the U.S. Army Corps of Engineers and the New Jersey State Historic Preservation Office. The document has been coordinated with a number of Federally Recognized Tribes who have extensive cultural heritage in the region. These are the Delaware Nation, the Shawnee Tribe of Oklahoma, the

Eastern Shawnee Tribe of Oklahoma, and the Delaware Tribe of Indians. In additional to yourselves and the Tribes, the District is coordinating with the Middlesex County Division of Historic Sites and History Services, the Linden Society for Historic Preservation, the Merchants and Drovers Tavern Museum Association, the Woodbridge Township Historic Preservation Commission, and the Carteret Historical Committee. Should there be any other groups who your organization feels should participate in this process please include that information with your comments.

If you have comments on the materials presented here please provide a written response within 30 days to the project archaeologist, Ms. Carissa Scarpa by mail (US Army Corps of Engineers, CENAN-PL-EA, 26 Federal Plaza, Room 2131, New York, NY 10278) or by email to Carissa.a.scarpa@usace.army.mil. If you feel it would be beneficial to schedule a meeting or conference call amongst the consulting parties, please include that with your comments. If you or your staff require additional information or have any questions, please contact Ms. Scarpa at (917) 790-8612.

Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

April 24, 2017

Reply to the Attention of

Environmental Assessment Section
Environmental Analysis Branch

Ms. Susan Wentzel
Carteret Historical Committee
61 Cooke Avenue
Carteret, NJ 07008

Dear Ms. Wentzel:

The U.S. Army Corps of Engineers, New York District (District) is undertaking the Rahway River Coastal Storm Risk Management Feasibility Study. The District has prepared a preliminary case report in accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation Guidelines for the Protection of Cultural and Historic Properties (36 CFR Part 800) to initiate identification of historic properties within the study area and to address potential adverse effects resulting from the proposed project (Enclosure).

The study is progressing and a Tentatively Selected Plan (TSP) has recently been identified. The TSP consists of a 3,360 foot long levee along the right bank of the Rahway River in the Township of Woodbridge and Borough of Carteret, in Middlesex County, New Jersey and nonstructural measures for 136 structures within select areas in the Cities of Rahway and Linden, the Borough of Carteret and Woodbridge Township in Union and Middlesex Counties, New Jersey. Because the details of the plan are not finalized at this time and additional investigations are required the District has elected to develop a Programmatic Agreement (PA) for the project that would outline the steps required to carry out the District's remaining Section 106 responsibilities including conducting additional surveys, consultation with participating parties, determining adverse effects, and, if necessary, mitigation for adverse effects. The enclosed preliminary case report includes a summary of the project and the investigations undertaken to date as well as a discussion of known affected resources, documented archaeological sites and the potential for adverse effects. The draft PA is appended to the preliminary case report. The preliminary case report and draft Programmatic Agreement will be included in the draft Feasibility Report and Environmental Assessment for the project which is scheduled to be released for public review in the coming weeks.

As a party with significant interest in the preservation of historic resources in the project area I would like to take this opportunity to invite the Carteret Historical Committee to review and comment upon the draft PA for the Rahway River Coastal Storm Risk Management Feasibility Study. At a minimum, the PA is to be entered into by the U.S. Army Corps of Engineers and the New Jersey State Historic Preservation Office. The document has been coordinated with a number of Federally Recognized Tribes who have extensive cultural heritage in the region. These are the Delaware Nation, the Shawnee Tribe of Oklahoma, and the Delaware Tribe of Indians. In additional to yourselves and the Tribes, the District is coordinating

with the Union County Department of Parks and Heritage Affairs, the Middlesex County Division of Historic Sites and History Services, the Merchants and Drovers Tavern Museum Association, the Woodbridge Township Historic Preservation Commission, and the Linden Society for Historic Preservation. Should there be any other groups who your organization feels should participate in this process please include that information with your comments.

If you have comments on the materials presented here please provide a written response within 30 days to the project archaeologist, Ms. Carissa Scarpa by mail (US Army Corps of Engineers, CENAN-PL-EA, 26 Federal Plaza, Room 2131, New York, NY 10278) or by email to Carissa.a.scarpa@usace.army.mil. If you feel it would be beneficial to schedule a meeting or conference call amongst the consulting parties, please include that with your comments. If you or your staff require additional information or have any questions, please contact Ms. Scarpa at (917) 790-8612.

Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosure

U.S. Army Corps of Engineers
New York District

Cultural Resources Summary and Preliminary Case Report
Rahway River Basin, New Jersey
Coastal Storm Risk Management Project

Prepared by
U.S. Army Corps of Engineers
New York District
Planning Division
26 Federal Plaza,
New York, NY 10278-0090

DRAFT
April 14, 2017

Carissa Scarpa
Project Archaeologist

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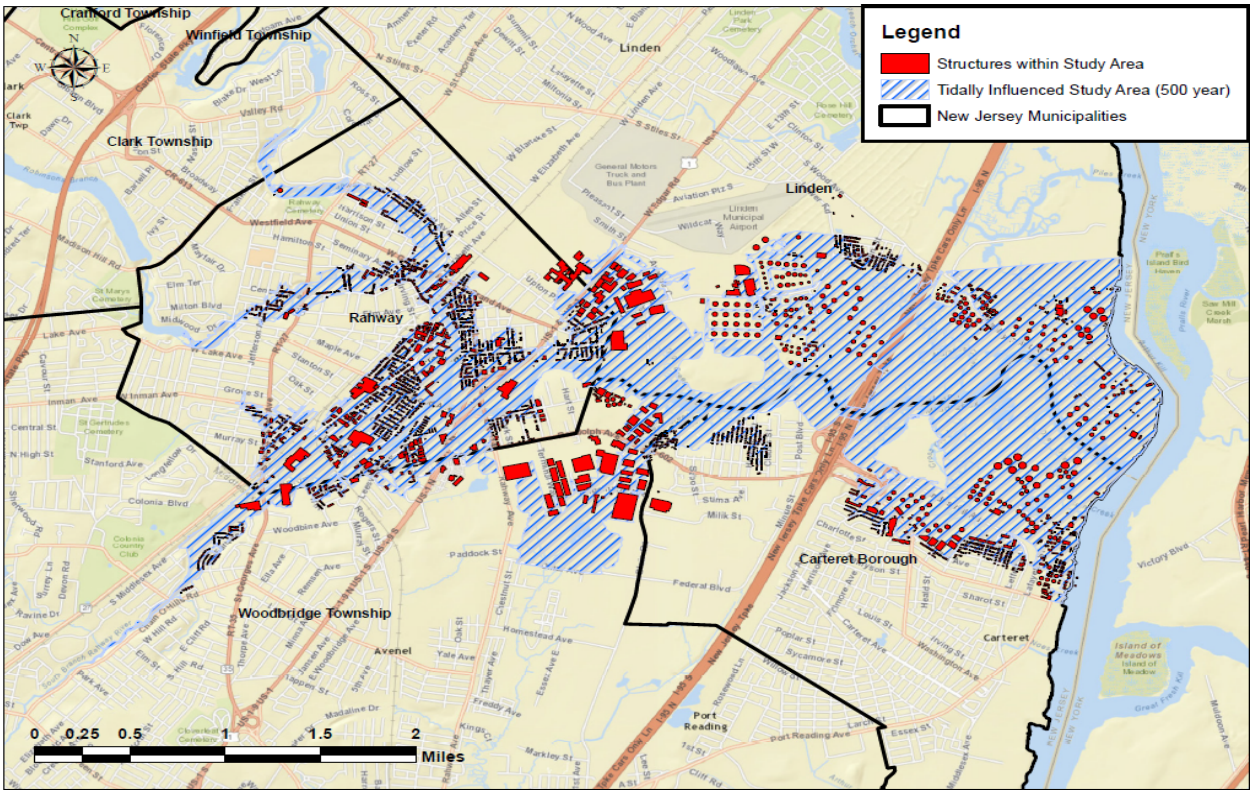
Appendices

I. Introduction

The U.S. Army Corps of Engineers, New York District (District) is currently undertaking a feasibility study to evaluate federal interest in coastal storm risk management for coastal and inland areas within the tidally affected portion of the Rahway River Basin in New Jersey (Figure 1). Tidal flooding on the Rahway River has been a problem in the study area for some time. During flooding events access through low-lying areas is limited. Portions of the New Jersey Turnpike, Routes 1 and 9 and the New Jersey Transit rail lines are affected, blocking transit. Numerous local roads are also subject to tidal inundation. This study has been authorized under the Disaster Relief Appropriations Act of 2013. This coastal storm risk management study in the Rahway River Basin was initiated by separating coastal storm risk management from the existing and ongoing fluvial flood risk management study for the Rahway River Basin, New Jersey. The District has been evaluating the feasibility of a number of alternatives consisting of such measures as floodwalls, levees, tide gates, and non-structural measures including buy-outs, elevations, ring walls, and flood-proofing.

As an agency of the federal government, the U.S. Army Corps of Engineers has certain responsibilities concerning the protection and preservation of historic properties. Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing

Figure 1 – Rahway River Coastal Storm Risk Management Project Study Area



regulations, the Advisory Council on Historic Preservation's Procedures for the Protection of Historic and Cultural Properties (36 CFR 800), and Executive Order 11593 direct federal agencies to take into account the effect of any undertaking on historic properties included on, or eligible for, the National Register of Historic Places (NRHP). To ensure this study is in compliance with these regulations the District prepared this preliminary case report and has begun coordination with local interested parties. The work undertaken for this phase of the project represents only partial identification of significant resources and determination of adverse effects under the National Environmental Policy Act. The current investigation included a review of previously completed survey reports and historic properties on file at the New Jersey Historic Preservation Office (NJHPO), historic maps and local histories located at the Rahway, Linden and Woodbridge Libraries, and archaeological site files held at the New Jersey State Museum.

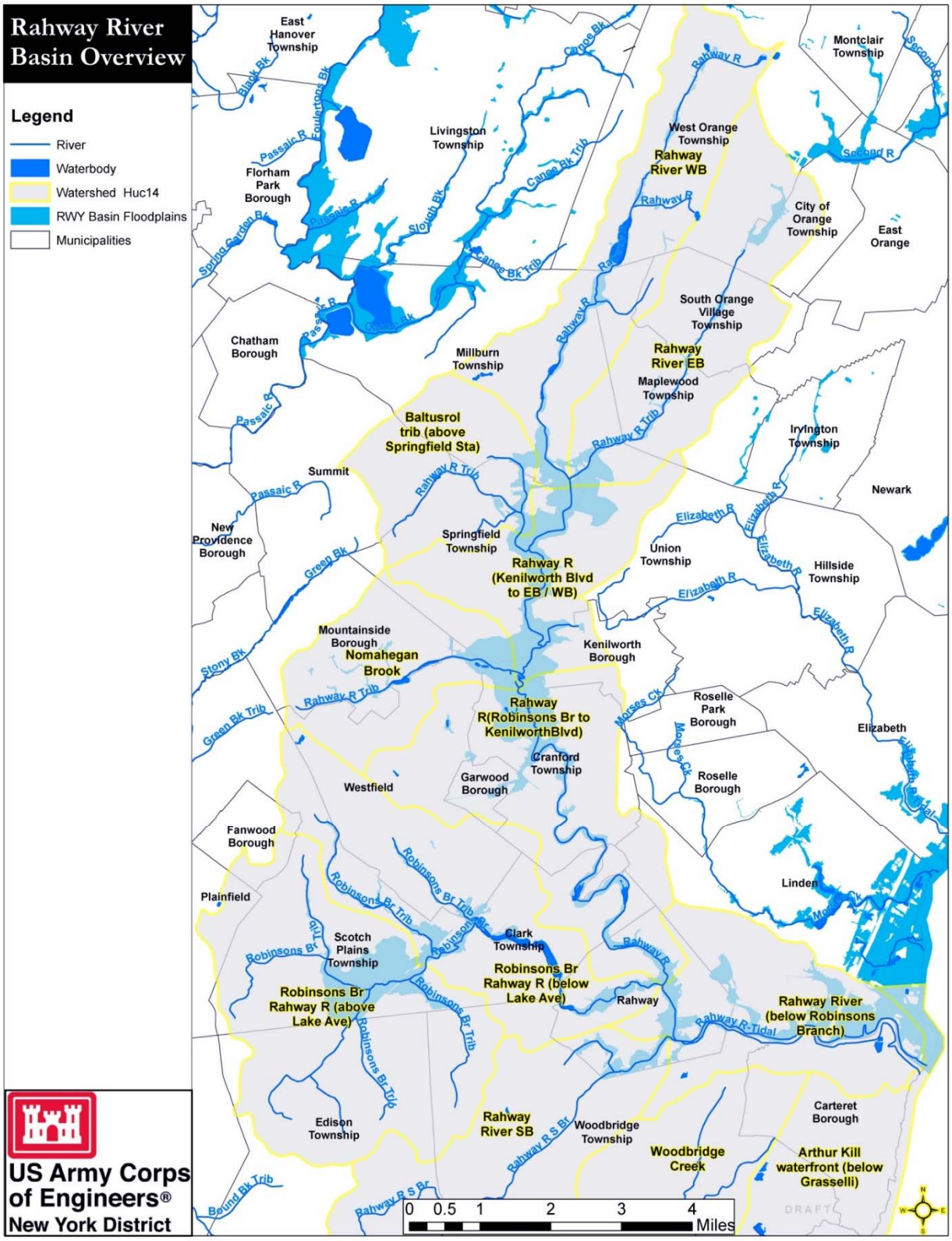
Approximately thirty-five cultural resources investigations were reviewed to collect background information for the study area and were referenced when identifying historic properties, determining archaeological sensitivity for the study area and identifying areas that have not been surveyed in the past. Histories of the Middlesex and Union Counties and of the municipalities were reviewed to provide historical context during the alternative development and impacts assessment stages of the study, however, a historical account of the study area was not prepared as part of this report. Field reconnaissance consisted of a series of site visits through the study area to become familiar with the project area, to determine the current status of certain historic properties, and to determine the need for architectural and archaeological sensitivity assessments in the next phase of the project when the plan is further developed.

II. Study Area

The Rahway River Basin is located in northeastern New Jersey. It consists of the main stem of the Rahway River and four branches. The West Branch flows south from Verona through South Mountain Reservation and downtown Millburn. The East Branch originates in West Orange and Montclair and travels through South Orange and Maplewood. These two branches converge near Route 78 in Springfield to form the Rahway River which flows through the municipalities of Springfield, Union, Cranford and Clark. The Rahway River then travels through Rahway, entering Clark at Rahway River Park. The River receives the waters of Robinsons Branch at Elizabeth Avenue between West Grand Avenue and West Main Street and the waters of the South Branch at East Hazelwood Avenue and Leesville Avenue. Finally the River leaves Rahway to enter the city limits of Linden and Carteret before flowing into the Arthur Kill (Figure 2).

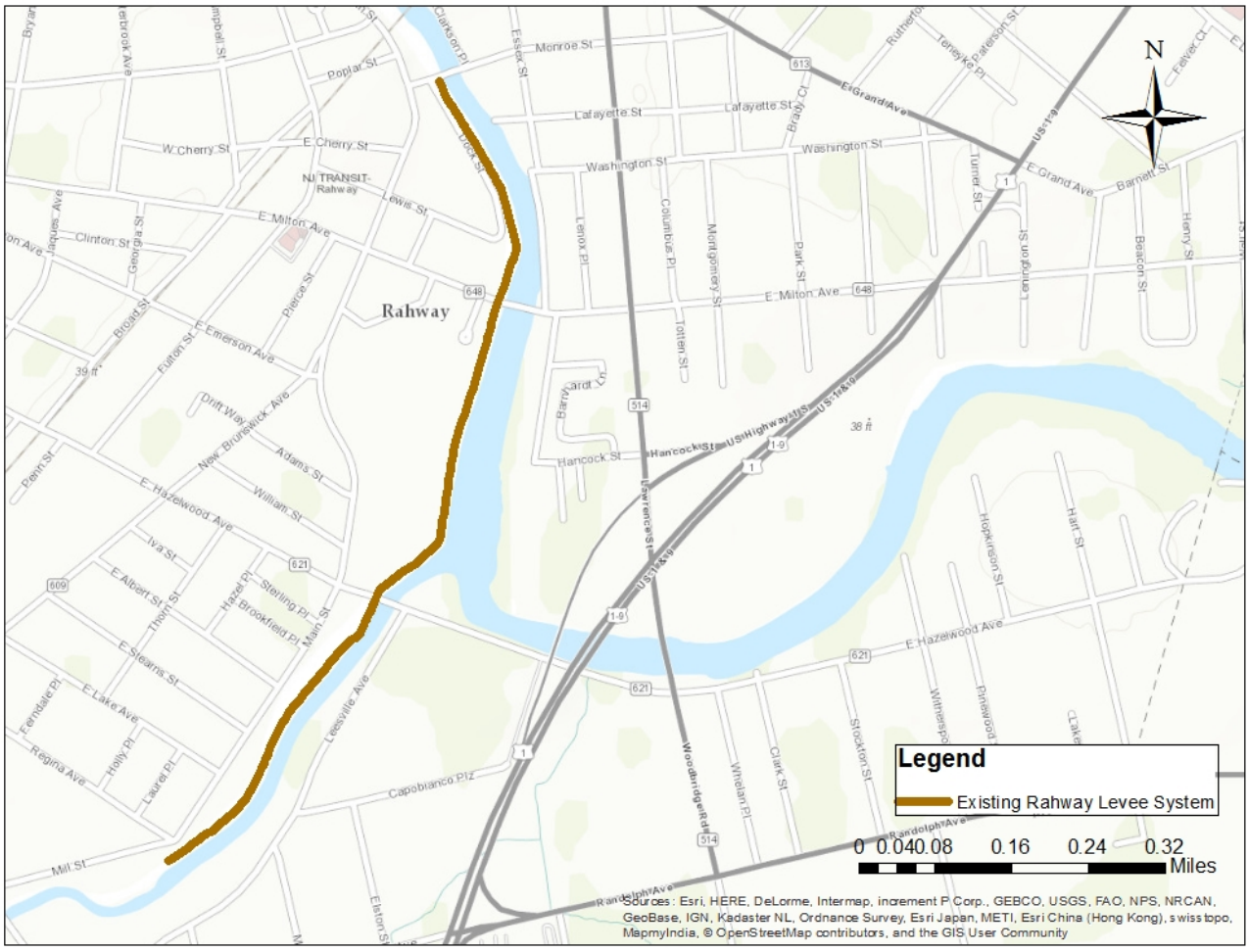
The study area is the tidally influenced portion of the Rahway River. The study area encompasses portions of the Cities of Linden and Rahway in Union County and the Borough of Carteret and Woodbridge Township in Middlesex County. The tidal influence on the Rahway River extends roughly five miles from the Arthur Kill into the City of Rahway (see Figure 1). There are riverine parks located along the Rahway River and the Robinsons Branch at the northern or upstream end of the study area but most of the study area does not contain parkland and is heavily developed containing many residential,

Figure 2 – Rahway River Basin Overview



commercial, and industrial structures within the floodplain. The study area is largely suburban and urban and is convenient to major population centers through a network of modern highways and railways. Routes 1 and 9, the Garden State Parkway, and the New Jersey Turnpike cross through the study area and the area is also served by the busy Northeast Corridor and North Jersey Coast New Jersey Transit rail lines, linking Rahway with Newark, Manhattan, Trenton and the Jersey Shore. A significant part of the tidal portion of the Rahway River is navigable by small boat. The U.S. Army Corps of Engineers completed construction on a flood risk management project within the City of Rahway on 31 August 1966. The project consists of 2,040 feet of protective levee, 1,740 feet of closure levee and one wall, two aluminum stop log structures, two pump stations, miscellaneous interior drainage facilities, land fill and road raising. The project elements are still in place today and run along the right bank of the River from Monroe Street to East Hazelwood Avenue (Figure 3).

Figure 3 – Existing Levee System, Rahway River, City of Rahway



III. Existing Conditions

A review of the study area, defined as the tidally affected portion (500 year level) was carried out as project alternatives were formulated to identify previously documented historic properties and archaeological sites that should be considered and to determine the need for additional surveys in the next phase of the project. Cultural resources surveys and site records were reviewed at the New Jersey State Historic Preservation Office and the New Jersey State Museum. Local histories and historic maps were reviewed at the Rahway, Linden and Woodbridge Libraries. Approximately 35 cultural resources investigations have been carried out within the study area. Survey reports provided useful background data and were referenced when identifying historic resources and determining archaeological sensitivity for the study area (See Appendix A).

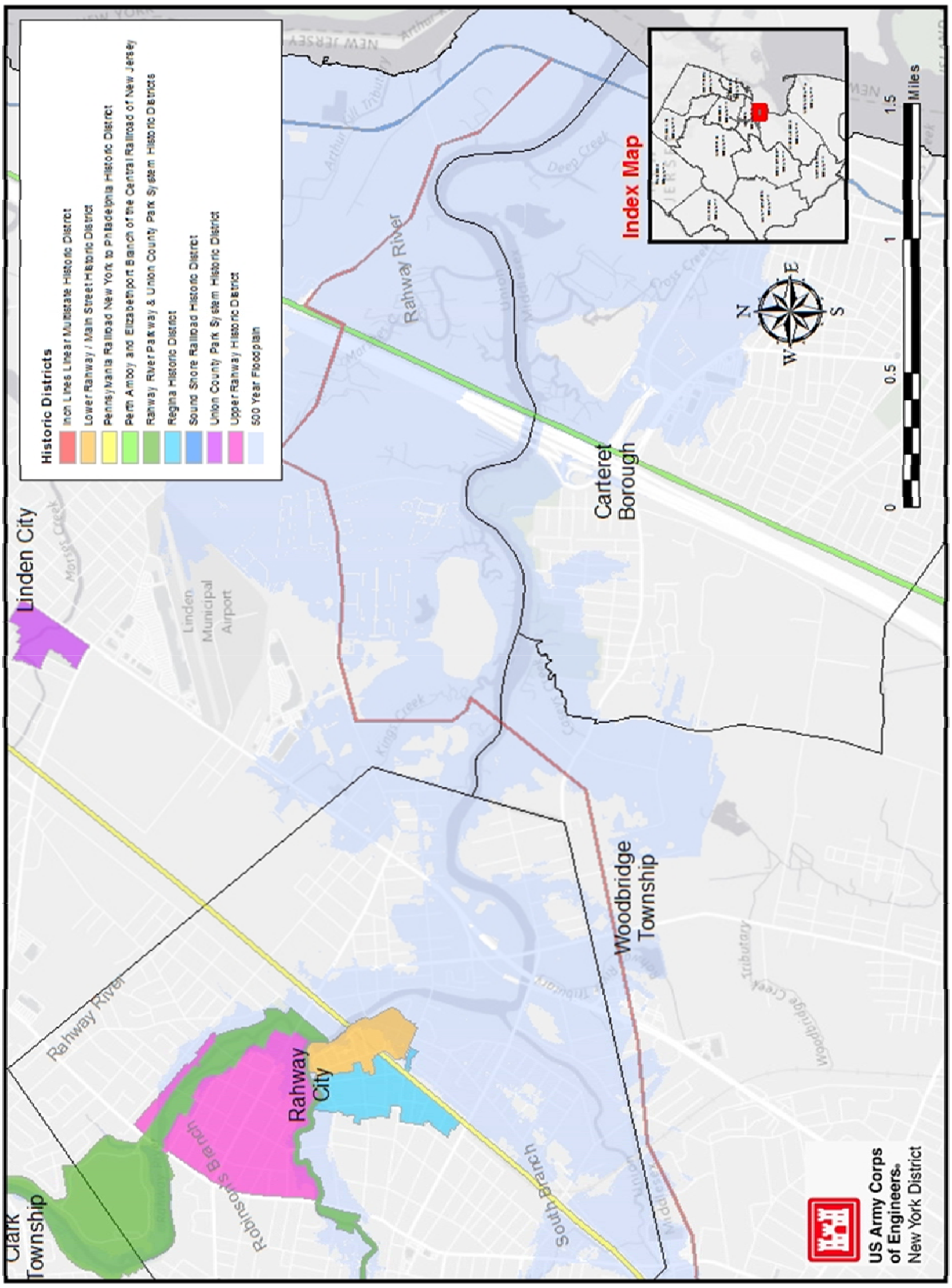
There are seven archaeological sites documented within the study area, three contained pre-contact materials but all seven contained a historic component as well (See Table 1).

Table 1: Archaeological Sites in the Study Area

Site #	Site Name	Muni.	Period	Source
28-UN-13	Edgar Farm Site	Rahway	19th Cent. and Prehistoric	NJDOT, 1984
28-UN-38	River View Manor, historically known as the Dolbier-Housman House	Rahway	1800's	Maser Consulting, 2006
28-UN-51	King's Creek	Linden	Pre-contact and Post-contact	PAL, Inc., 2011
28-UN-53	Tremley Site	Linden	Middle to Late Woodland and early-mid twentieth century	PAL, Inc. 2011
28-UN-40	Rahway City Hall-Municipal Building Historic Site	Rahway	1800-20th Century	CRCG, 2007
28-UN-41	Historic House Site Lot 3	Rahway	1800-20th Century	CRCG, 2007
28-UN-42	The Peace Tavern-Woodruff Historic House Site	Rahway	1800-20th Century	CRCG, 2007

Nine historic districts have been documented within the study area: 1) the Upper Rahway Historic District; 2) the Rahway River Parkway Historic District; 3) the Union County Park System Historic District; 4) the Lower Rahway/Main Street Historic District; 5) the Regina Historic District; 6) the Pennsylvania Railroad New York to Philadelphia Historic District; 7) the Perth Amboy and Elizabethport Branch of the Central Railroad of New Jersey Historic District; 8) the Sound Shore Railroad Historic District; and 9) the Inches Line Linear Multistate Historic District (See Figure 4)

Figure 4: Historic Districts in the Study Area



The **Upper Rahway Historic District** is comprised of approximately 30 blocks and more than 600 eighteenth-century and nineteenth-century structures. The district lies within the City of Rahway east and south of St. Georges Avenue stretching to the Rahway River and the Robinsons Branch. Although much of the district is comprised of residential buildings the district also contains six churches, a nineteenth-century firehouse, the original Rahway Library, three stone arch bridges, a number of early concrete bridges, and the Rahway River Scenic Trail (Mc Teague 1982; Nolte et. al. 2013).

The **Rahway River Parkway Historic District (RRPHD)** is a riverine greenway designed by the Olmstead Brothers Landscape Architects for the Union County Parks Commission. The district borders the Rahway River and the Robinsons Branch having its upstream boundary at Springfield Avenue in Springfield Township and continuing uninterrupted through Cranford and the City of Rahway and then following the Robinson's Branch upstream to Madison Hill Road (Tingey 2002). The RRPHD is a contributing element to the **Union County Parks System Historic District**. The district includes many historic bridges and parks that are located within the study area including Rahway River Park, the Rahway River Scenic Trail, Wheatena Park and Begeza Park/Union/Allen Conservation Area, and Milton Lake Park. Additional documented district elements within the study area are Veteran's Memorial Field, Rahway Kiwanis Park, and Berzinec Park (Nolte et. al. 2013).

The **Lower Rahway/Main Street Historic District** is located south of the Upper Rahway Historic District abutting the Rahway River. It is considered the commercial center of the City of Rahway. The portion of the district that joins with the southern edge of the Upper Rahway Historic District and the eastern edge of the Regina Historic District forms the "Arts District." This section includes Irving Street, Main Street, and all of Coach Street. The centerpiece of the Arts District is the NRL Rahway Theater (PRN 51; ID #2714; NR #86001509), now the Union County Arts Center (Shipley 1982a; Nolte et. al 2013).

The **Regina Historic District** is a nineteenth century manufacturing and residential district bounded on the north by the Upper Rahway Historic District, the east by the Lower Rahway/Main Street Historic District and the south by the Pennsylvania Railroad New York to Philadelphia Historic District. Its western boundary roughly follows Jacques Avenue. The district contains nearly 200 structures including several churches, schools and civic buildings (Shipley 1982b; Nolte et. al. 2013).

The **Pennsylvania Railroad New York to Philadelphia Historic District** intersects the study area at Grand Avenue and Clarkson Place where it crosses the Rahway River. It is a linear district that crosses through many counties and municipalities in New Jersey and includes multiple individually eligible components including the Overhead Contact System which is located within the study area along the upstream portion of the South Branch. The district includes many historic bridges including the bridge between Grand Avenue and Clarkson Place where it crosses the Rahway River (Walsh 2003; Nolte et. al. 2013).

The **Perth Amboy and Elizabethport Branch of the Central Railroad of New Jersey Historic District** intersects the study area in the vicinity of the New Jersey Turnpike. This linear district follows the Turnpike alignment on its east side within the study area.

The **Sound Shore Railroad Historic District** (ID#5427) intersects the study area near the mouth of the Rahway River at the easternmost limit of the study area.

The **Inches Line Linear Multistate Historic District** is a linear district that intersects with the study area in the vicinity of Joseph Medwick Park in the City of Carteret. The district runs from Longview, Texas to Linden, New Jersey and includes the pipeline itself as well as a number of above-ground World War II-era structures including pump houses, garages, well houses, and crude oil sample houses among others (Berger 1998; 2000). One above-ground contributing element to the district, the alignment crosses under the Rahway River on its course from southwest to northeast. Originally referred to as the Big and Little Inch Pipeline, the historic district is now a natural gas pipeline that has been in use since its construction in 1942-1943 for the transport of crude oil and refined petroleum products from the Gulf Coast to refining and distribution areas near New York City and Philadelphia. The linear district touches upon four counties and 12 municipalities in New Jersey. Linden Station (Station 27), is located within the study area in Linden, NJ.

IV. Alternatives Analysis

The following alternatives were analyzed during the feasibility phase of the study (See Appendix B for Alternative Layouts):

- No Action (Without Project)

- Alternative #1: Levees and Floodwalls - a combination of four levee/floodwall segments, two closure gates, road raisings, interior drainage structures, and channel modification. The improvements are located in the City of Rahway, Clark, Carteret, and Linden Townships.

- Alternative #2: Surge Barrier - a surge barrier consisting of tide gates and a pumping station upstream of the New Jersey Turnpike Bridge. Includes approximately 2,000 feet of channel modification, levee tie-ins on the left and right banks and a pumping station. Also includes a 3,090 ft. long, 13 ft. high floodwall along New Jersey Turnpike northbound side between the Turnpike and the railroad.

- Alternative #3a & 3b: Nonstructural Measures - Two nonstructural alternatives were considered with a 2% and 10% chance of annual exceedance (50-yr and 10-

yr) within the study area. These alternatives included wet and dry flood proofing, structure elevation, demolition and reconstruction, and ring walls.

- Alternative #4: Nonstructural treatment to a subset of structures within the 10% ACE floodplain (149 structures) and levee segment D from Alternative #1. Included 7 ring walls.

- Alternative #4a: Nonstructural plan found in Alternative #4 in combination with levee segment D from Alternative #1, without ringwalls.

V. The Tentatively Selected Plan (TSP)

The tentatively selected plan (TSP) is Alternative #4a which consists of levee segment D from Alternative #1 and the nonstructural plan from Alternative #4 with the ringwalls and associated structures removed (Table 2 and Figure 5).

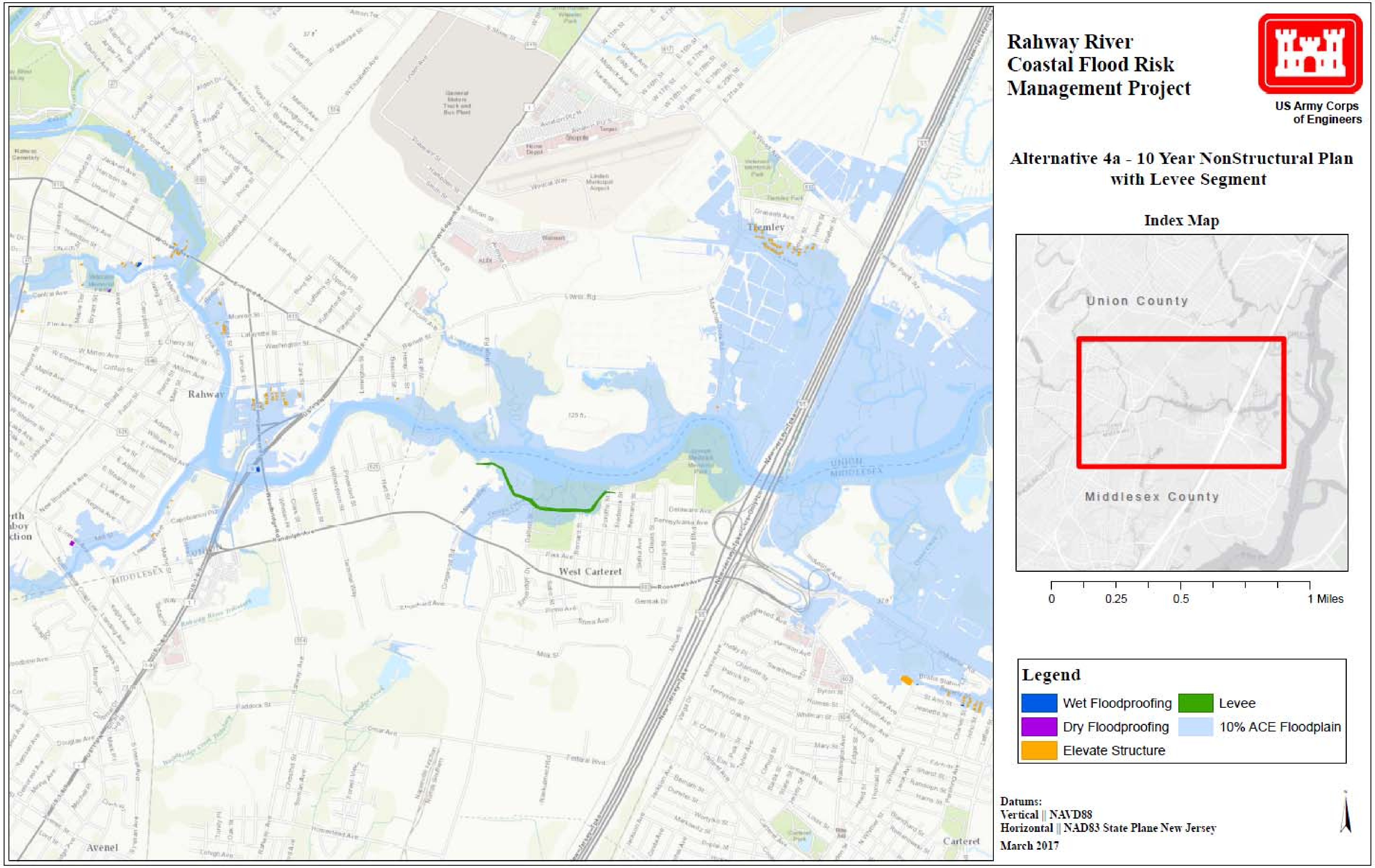
Levee Segment D is 3,360 ft. long with a 12 ft. top width and an average height of 7.5 ft. The levee is located near the right bank of the Rahway River, approximately 1.2 miles downstream of the confluence with the South Branch. The upstream end is located at the industrial/commercial area by Ardemore Avenue, continuing downstream to Dorothy Street.

Approximately 136 structures will be treated with nonstructural measures to manage flood risk (Table 2). Nonstructural measures include wet and dry flood proofing, elevation and reconstruction. The majority, approximately 90% of the structures, will be elevated. The number of structures receiving nonstructural flood proofing measures and the size of Levee Segment D may change as the plan is optimized.

Table 2: Summary of the TSP

Nonstructural Flood Proofing Measure	**10% ACE Combination Plan**		
	Residential	**Non-Residential**	**Total**
Dry Flood Proofing	0	2	**2**
Wet Flood Proofing	1	3	**4**
Elevation	123	4	**127**
Elevation - Demolish and Rebuild	1	2	**3**
Total of Structures	**125**	**11**	**136**

Figure 5: The Tentatively Selected Plan (TSP), Alternative 4A



VI. Potential for Adverse Effects

Section 106 of the National Preservation Act of 1966 (NHPA), as amended, requires that all federal agencies consider the effects of proposed undertakings on historic properties. The Area of Potential Effect (APE) is the geographic extent to which an undertaking may directly or indirectly cause changes in the character or use of historic properties (NHPA, 36 CFR 800.16[d]).

A. The Area of Potential Effect

The Area of Potential Effect (APE) for the TSP is broadly defined at this time based on the current level of the design. Because the plan is in an early phase of development the number of structures receiving nonstructural treatment and the size of the levee has not been finalized and is likely to change as the plan is further developed. The APE is currently defined, therefore, as the 136 structures receiving non-structural measures and their immediate vicinity, the proposed levee segment, and all staging, easement, and mitigation areas which are to be determined during the next phase of the project, the Project Engineering and Design (PED) phase.

B. Identification of Resources Within the APE

1. Non-Structural Measures

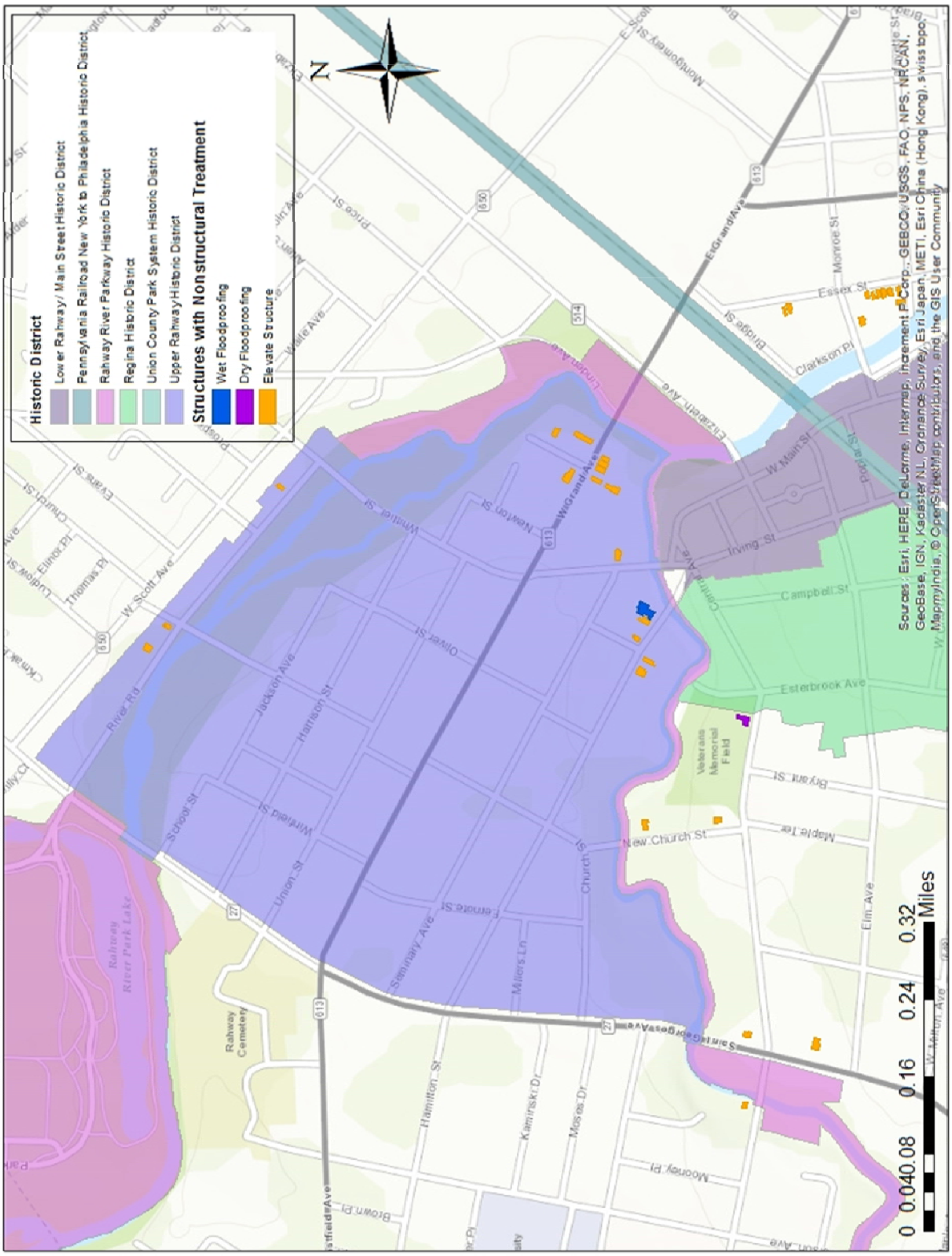
There are no documented archaeological sites within the APE for non-structural measures associated with the proposed undertaking. Three historic districts are identified within or adjacent to the APE for non-structural measures. These are the Rahway River Parkway Historic District, the Union County Parks System Historic District and the Upper Rahway Historic District (McTeague 1982, Tingey 2002). As described above, the Upper Rahway Historic District is comprised of approximately 30 blocks and more than 600 eighteenth-century and nineteenth-century structures (Nolte et. al. 2013). Of the structures identified for treatments, eighteen have been documented as part of the Upper Rahway Historic District (Figure 6). Those eighteen structures are listed in Table 3 below along with their recorded eligibility status at the time of the districts identification in 1982.

The Rahway River Parkway Historic District is contained within the boundaries of the Union County Parks System Historic District. Certain structures identified for nonstructural measures are located within a short distance from the district boundaries in what is potentially part of the historic viewshed of the Rahway River Parkway and Union County Parks System Historic Districts (Nolte et. al. 2013). The structures located along River Road, West Grand Avenue, and Irving Street are most likely to lie within the viewshed.

Table 3: Structures within the Upper Rahway Historic District

Property Name	**Eligibility Status (McTeague 1982)**
173 West Grand Avenue	Contributing element of the Upper Rahway Historic District
182 West Grand Avenue	Contributing element of the Upper Rahway Historic District
188 West Grand Avenue	Contributing element of the Upper Rahway Historic District
194 West Grand Avenue	Non-Contributing element of the Upper Rahway Historic District
204-206 West Grand Avenue	Unknown
211 West Grand Avenue	Non-Contributing element of the Upper Rahway Historic District
433 River Road	Non-Contributing element of the Upper Rahway Historic District
671 River Road	Contributing element of the Upper Rahway Historic District
629 River Road	Contributing element of the Upper Rahway Historic District
1819 Allen Street	Unknown
1667 Irving Street	Contributing element of the Upper Rahway Historic District
St. Mark's Church and Rectory - 287 Hamilton Street	Contributing element of the Upper Rahway Historic District
309 Hamilton Street	Contributing element of the Upper Rahway Historic District
318 Hamilton Street	Non-Contributing element to the Upper Rahway Historic District
332 Hamilton Street	Contributing element to the Upper Rahway Historic District

Figure 6: Location of Structures in relation to Historic Districts



2. Levee

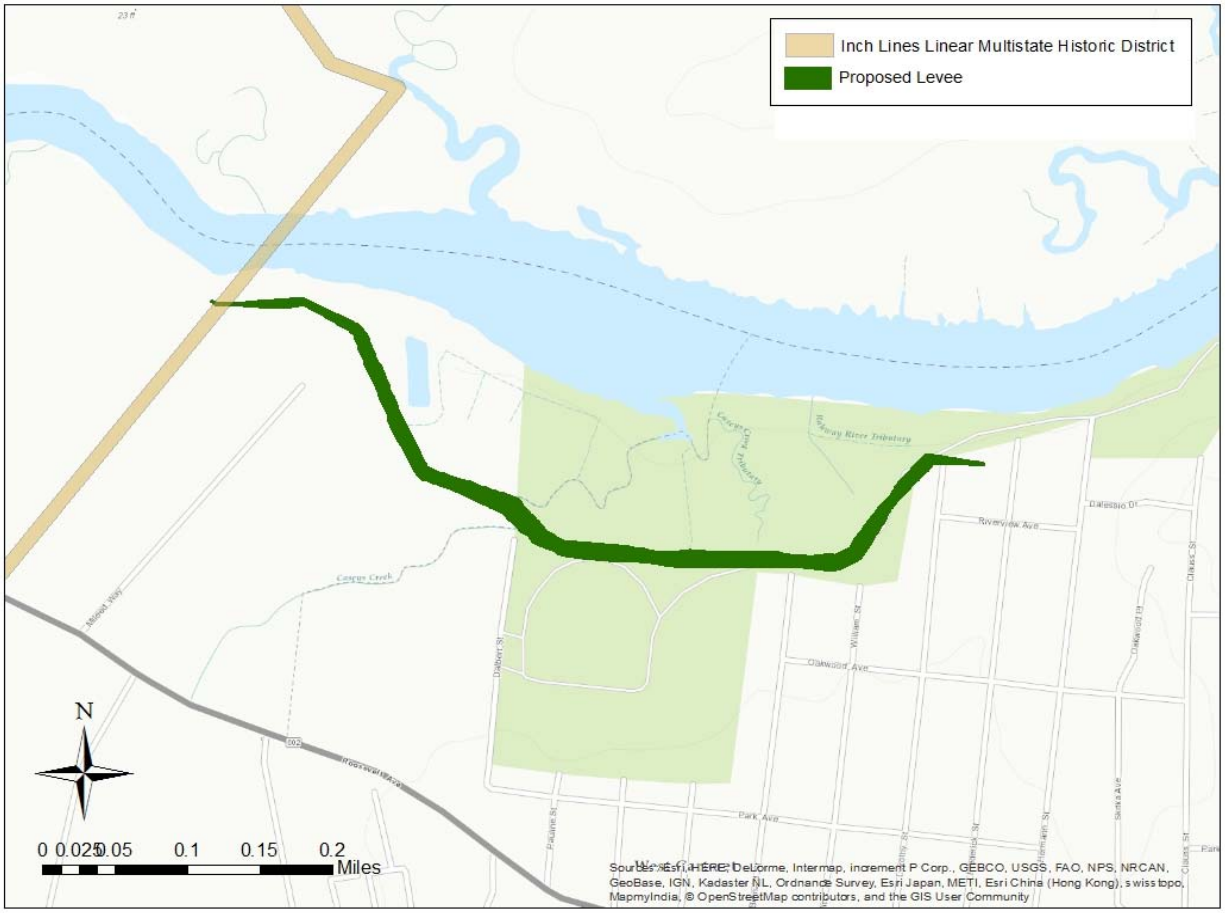
The alignment for the proposed levee runs along the right side of the Rahway River separating the River from nearby residential and commercial properties and certain Joseph Medwick Park facilities within the Borough of Carteret and the Township of Woodbridge. There is one historic property recorded within the APE for the levee, the Inch Lines Linear Multistate Historic District (Figure 7). The pipeline, which is underground, is a contributing element to the district. There are no additional archaeological sites or historic properties documented within the APE for the levee.

A review of survey reports, including an 1998 inventory of the pipeline confirmed that there are no above-ground contributing elements to the historic district located within the APE. The closest above-ground element is the Linden Station (Station 27), located in Linden, NJ, approximately 1 mile northeast of the proposed levee (Berger 1998). The elements of the historic district that are expected to be encountered within the APE are the pipeline itself and associated components lying underground.

The 1998 inventory survey posited that large portions of the pipeline in the east have been replaced over the years as segment wear out or become damaged (Berger 1998). However, an archaeological monitoring survey completed in 2013 for replacement of a section of the pipeline in Linden, NJ referenced schematic maps provided by FERC that showed much of the pipeline was actually original (PAL). Confirmation of the status of the pipeline in that particular location was achieved through monitoring. In the end, the archaeologist performing the monitoring found that much of the pipeline and components had not been replaced and were, in fact, original. The results of the monitoring work in Linden suggests that there is potential for original below-ground pipeline and associated components to exist within the current APE.

There is also potential for deeply buried prehistoric archaeological remains within the APE for the levee as well as moderate potential for historic archaeological sites to exist based on the historical record and documentation from archaeological sites in the area. However, development of Joseph Medwick Park is likely to have significantly disturbed historic and prehistoric deposits if they exist within the APE. Archaeological testing in 2010 along a portion of the levee alignment in association with park development revealed areas with high levels of disturbance within the first two feet to four feet (Maser Consulting 2010).

Figure 7: Levee Segment D and the Inch Lines Linear Multistate Historic District



C. Potential for Adverse Effects

1. Non-Structural Measures

Elevations and Floodproofing of structures has the potential to cause adverse effects to the structures as well as to associated outbuildings and archaeological sites that may exist within the APE. Impacts to historic districts are also possible should the non-structural measures result in the loss of contributing resources or alter the historic character of a neighborhood.

There are no documented archaeological sites within the APE for non-structural measures associated with the proposed undertaking, however, information collected from archaeological sites recorded within the study area and from cultural resources surveys indicates that the study area possesses a rich past with both Native American and later Euro-American communities who have heavily utilized the River for transportation and

power (CRCG 2006, 2007a&b, 2008 and Nolte et. al. 2013). Evidence suggests that although development has led to loss of some resources within these communities and disturbances to the ground within the APE, much of the study area along the River may be sensitive for prehistoric and historic archaeological sites. Portions of the study area designated as historic districts should be considered particularly sensitive to impacts. There is also potential for archaeological sites associated with both the Upper Rahway Historic District and the Rahway River Parkway Historic District to exist within the APE. Historic maps show that a number of structures have been removed over the years as part of a century-long effort to acquire land along the River for development of the Parkway.

Additional structures identified for nonstructural measures may also be eligible for the National Register of Historic Places but have not been subject to architectural survey. Many of the documented historic structures were last evaluated in the 1980's and should be evaluated again to determine whether they have retained their qualifying characteristics or have been significantly altered or demolished in the intervening time resulting in a loss of integrity. The Upper Rahway Historic District and the Rahway River Parkway Historic District should be re-evaluated as well to determine the status of their contributing resources and to better define their physical and viewshed boundaries within the APE

2. Segment D Levee

Construction of the levee is likely to cause adverse effects to the Inch Lines Linear Multistate Historic District as well as to potentially deeply-buried archaeological sites. The extent of adverse effects is not known at this time. Most of the APE has not been subject to archaeological and architectural survey. Surveys will help to identify previously undocumented historic properties and archaeological sites and will be critical in determining the extent of the adverse effect to the Inch Lines Linear Multistate Historic District.

VII. Conclusions

Further refinement of the APE will occur as the plan is optimized. Optimization refers to a process by which the plan is further analyzed and calibrated to achieve the maximum net benefits from the undertaking. Following optimization a more detailed design will be prepared. Architectural and archaeological investigations will be necessary to complete identification of significant resources in the APE for the proposed non-structural measures and levee. The historic districts may have to be evaluated to update their resource inventories and their boundaries. Additional investigations will be required to determine the level of adverse effect the levee may have upon the Inch Lines Multistate Historic District.

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended and its implementing regulations, 36 CFR 800, a Programmatic Agreement (PA) is being prepared as part of the Draft Integrated Feasibility Report and Environmental Assessment that will be a binding agreement between the NJHPO and the District that outlines the activities and tasks that must be carried out to conclude identification of significant resources, determine adverse effects, and mitigate for those adverse effects. These activities include carrying out additional archaeological and architectural investigations based on the locations of project elements, coordination and consultation with the NJHPO, interested parties and federally recognized Tribes and preparation of National Register of Historic Places nomination forms. The PA also stipulates that, depending upon the results of surveys, treatment plans or a standard mitigation agreement will be prepared to outline the specific mitigation measures that will be taken to address adverse effects on structures and archaeological sites that cannot be avoided. Treatment plans or mitigation agreements would include but not be limited to specialized design guidelines for historic structures to ensure that flood protection measures are consistent with the historic fabric of the buildings, the design of the project elements along the River to fit the character of the historic districts, and data recovery for archaeological sites that cannot be avoided.

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ARCH2

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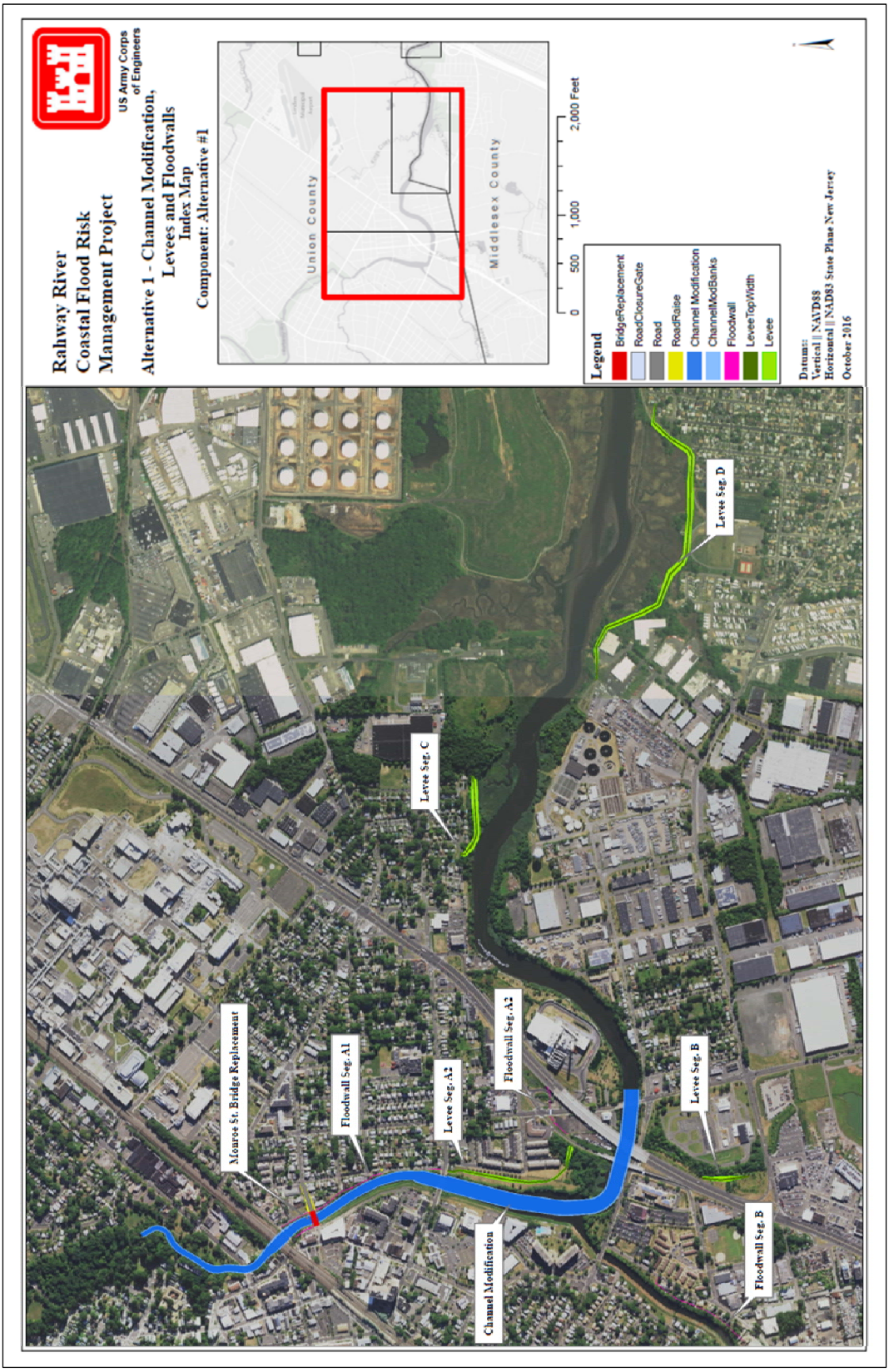

Rahway River
Coastal Flood Risk
Management Project
US Army Corps of Engineers
Alternative 1 - Channel Modification,
Levees and Floodwalls
Index Map
Component: Alternative #1
Union County
Middlesex County
0
500
1,000
2,000 Feet
Legend
BridgeReplacement
RoadClosureGate
Road
RoadRaise
Channel Modification
ChannelModBanks
Floodwall
LeveeTopWidth
Levee
Datums:
Vertical || NAVD88
Horizontal || NAD83 State Plane New Jersey
October 2016
Mounce St. Bridge Replacement
Floodwall Seg. A1
Levee Seg. A2
Floodwall Seg. A2
Channel Modification
Levee Seg. C
Levee Seg. D
Levee Seg. B
Floodwall Seg. B

Nonstructural Flood Proofing Measure	Alt #3a: 10% ACE Floodplain			Alt #3b: 2% ACE Floodplain		
	Residential	Non-Residential	Total	Residential	Non-Residential	Total
Dry Flood proofing	0	2	**2**	12	34	**46**
Dry Flood Proofing with Tank Anchoring	0	0	**0**	0	3	**3**
Wet Flood Proofing	10	1	**11**	66	1	**67**
Pump Replacement	0	3	**3**	0	3	**3**
Elevation	138	3	**141**	292	4	**296**
Ringwalls	47	53	**100**	92	90	**182**
Total of Structures	**195**	**62**	**257**	**462**	**135**	**597**

Rahway River
Coastal Flood Risk
Management Project
Alternative 2 - Surge Barrier
US Army Corps of Engineers
Index Map
Union County
Middlesex County
0
0.075
0.15
0.3 Miles
Legend
Surge Barrier
Levee
Floodwall
New Channel Banks
New Channel Bottom
Datum:
Vertical || NAVD88
Horizontal || NAD83 State Plane New Jersey
August 2016
Railroad Closure Structure
Transmission Tower Relocation

Rahway River
Coastal Flood Risk
Management Project
US Army Corps of Engineers
Alternative 4 - 10 Year NonStructural
Combination Plan
Index Map
Union County
Middlesex County
0
0.25
0.5
1 Miles
Legend
Wet Floodproofing
Dry Floodproofing
Elevate Structure
Ringwall
Incidental Protection by Ringwall
Ringwall Boundary
Levee - Segment D
10% ACE Floodplain
Datums:
Vertical || NAVD88
Horizontal || NAD83 State Plane New Jersey
January 2017
West Carteret
Rahway

US Army Corps of Engineers
Rahway River Coastal Flood Risk Management Project
Alternative 4a - 10 Year NonStructural Plan with Levee Segment
Index Map
Union County
Middlesex County
0
0.25
0.5
1 Miles
Legend
Wet Floodproofing
Dry Floodproofing
Elevate Structure
Levee
10% ACE Floodplain
Datum:
Vertical || NAVD88
Horizontal || NAD83 State Plane New Jersey
March 2017
Rahway
West Carteret
Carteret
Avenel

Appendix C – Project Area Images

The Rahway from the Grand Avenue Bridge over the Rahway River, just northeast of the confluence with Robinson's Branch, facing southwest (Nolte et. al. 2013).

The Rahway River Scenic Trail section of the Rahway River Parkway Historic District, northwest of the intersection of River Road and Whittier Street (Nolte et. al. 2013)

Bezega Park / Union-Allen Conservation Area, part of the Rahway River Parkway Historic District, northeast of Grand Avenue, facing northeast (Nolte et. al. 2013).

The confluence of Robinson's Branch and the Rahway within the Rahway River Parkway Historic District, facing northwest (Nolte et. al. 2014).

View facing southeast along Hamilton Street showing a recently constructed large building on the southwest side of the road, within the Upper Rahway Historic District (Nolte et. al. 2013).

Bridge Street Pedestrian Bridge and Pennsylvania Railroad Bridge view north from Monroe Street Bridge (Scarpa 2014).

Rahway River from Monroe Street Bridge, note levee along the west bank of the River, view south (Scarpa 2014).

Joseph Medwick Park Trail in the vicinity of the proposed levee, view northwest (Scarpa 2014).

Joseph Medwick Memorial Park, levee alignment location, view northeast (Scarpa 2014).

Appendix D – Draft Programmatic Agreement

DRAFT
PROGRAMMATIC AGREEMENT
AMONG
THE U. S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
AND
THE NEW JERSEY STATE HISTORIC PRESERVATION OFFICE
REGARDING
THE RAHWAY RIVER COASTAL STORM RISK MANAGEMENT PROJECT
UNION COUNTY AND MIDDLESEX COUNTY, NEW JERSEY

WHEREAS, the U.S. Army Corps of Engineers, New York District, (New York District) plans to carry out the Rahway River Coastal Storm Risk Management Project (Undertaking) pursuant to the U.S. House of Representatives Resolution Docket 2548, adopted 24 March 1998; and the Disaster Relief Appropriations Act of 2013; and

WHEREAS, the Undertaking was initiated by separating coastal storm risk management from the existing and ongoing flood risk management study for the Rahway River Basin; and

WHEREAS, the Undertaking, the details of which are not finalized at this time, consists of nonstructural measures including flood-proofing and elevation of approximately 136 structures, and construction of a 3,360-foot long levee along the right bank of the Rahway River (Attachment 1); and

WHEREAS, the New York District has defined the "Area of Potential Effect" (APE) for this Undertaking as the structures receiving nonstructural measures and their immediate vicinity as well as the levee footprint. The APE also includes construction staging areas and mitigation areas, the location of which will be determined at a later date; and

WHEREAS, the New York District is applying the National Register of Historic Places (NRHP) Criteria to properties identified within the APE on a phased basis, and to date has completed a baseline survey within the APE with the recognition that additional identifications and evaluations are required for project actions which have not yet been finalized; and

WHEREAS, the APE for nonstructural measures overlaps with portions of the Upper Rahway Historic District and may be within the view shed boundaries for the Rahway River Parkway Historic District, which is an element of the Union County Park System Historic District (Attachment 2 and 3); and

WHEREAS; the alignment of the proposed levee intersects with the Inch Lines Linear Multistate Historic District (Attachment 4); and

WHEREAS, the New York District has determined that the Undertaking has the potential to have an adverse effect on the identified historic properties and districts within the APE; and

WHEREAS, the New York District has not carried out the surveys necessary to conclude identification of historic properties for the project; and

WHEREAS, the New York District has invited the Advisory Council on Historic Preservation (ACHP), the Delaware Nation, The Delaware Tribe of Indians, the Eastern Shawnee Tribe and the Shawnee Tribe of Oklahoma to participate in the Section 106 process; and

WHEREAS; the New York District has initiated consultation with the following interested parties: The Linden Society for Historic Preservation, the Carteret Historical Committee, the Woodbridge Township Historic Preservation Commission, the Merchants and Drovers Tavern Museum Association in the City of Rahway, the Union County Department of Cultural and Heritage Affairs, the Union County Department of Parks and Recreation, the Middlesex County Division of Historic Sites and History Services, and the Middlesex County Department of Parks and Recreation; and

WHEREAS the New York District plans to make this Draft PA available for public review in the Draft Environmental Assessment prepared under the National Environmental Policy Act which will serve as the District's Section 106 public coordination for this undertaking; and

WHEREAS, the New York District shall implement the provisions of this PA as funding for the Undertaking is appropriated in future years; and

WHEREAS, in accordance with 36 CFR Part 800.14, the New York District and the NJSHPO have determined that execution of this PA will establish alternative procedures to streamline the coordination of the Project as plans are developed and the project moves forward; and

NOW, THEREFORE, the New York District and the signatories agree that the Undertaking shall be administered in accordance with the following stipulations to satisfy the New York District's Section 106 responsibilities for all individual actions of the Undertaking.

Stipulations

The New York District shall ensure that the following measures are carried out:

I. IDENTIFICATION AND EVALUATION

A. During the Project Engineering and Design (PED) phase of the project the New York District, in consultation with the NJSHPO, and consulting parties will design and carry out surveys to complete the identification of historic properties and archaeological sites within the APE. The survey design will be informed by the most recent archaeological and architectural documentation that is available

including reports on file at the NJSHPO, NJ State Museum, and additional local and regional repositories that house relevant documentation.

1. Archaeological Sites

    a. The New York District shall ensure that archaeological surveys within the uninvestigated portions of the APE are conducted in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Identification (48 FR 44720-23) and the New Jersey Historic Preservation Office Guidelines for Phase I Archaeological Investigations: Identification of Archaeological Resources (N.J.A.C. 7:4-8.4).

    b. All phases of survey reporting will be in keeping with the New Jersey Historic Preservation Office Requirements for Archaeological Survey Reports – Standards for Report Sufficiency (N.J.A.C. 7:4-8.5) and will be submitted to the NJSHPO and other consulting parties for review and consultation.

2. Traditional Cultural Properties

    a. The New York District will ensure that future surveys within the APE include procedures to identify Traditional Cultural Properties and to consult with Federally Recognized Tribes and other affected parties in accordance with the guidelines provided by National Park Service Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties.

    b. In the event that a Federally Recognized Tribe or affected group contacts the New York District regarding its recognition of a Traditional Cultural Property located within the APE, the New York District will notify the NJSHPO to initiate discussions to evaluate whether the property is a Traditional Cultural Property that meets the Criteria.

3. Buildings and Structures

    a. The New York District will ensure that architectural surveys are conducted for all buildings and structures within the APE in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Identification (48 FR 44720-23) and which takes into account the statewide historic contexts developed by the NJSHPO. The survey will be conducted following consultation with the NJSHPO and other consulting parties, and a report of the survey, consistent with the NJSHPO's Guidelines for Architectural Survey, will be submitted to the NJSHPO and all other consulting parties for review and consultation.

b. The New York District, in consultation with the NJSHPO and consulting parties, will identify and evaluate buildings and structures that are located adjacent to listed or eligible Historic Districts to determine whether such properties should be considered as part of the Historic District or an expanded District.

4. Historic Landscapes and Viewsheds

a. The New York District will consult with the NJSHPO and participating historical societies to identify and evaluate historic landscapes and viewsheds located within the APE. The New York District will consult National Park Service Bulletins 18, How to Evaluate and Nominate Designed Historic Landscapes, and 30 Guidelines for Evaluating and Documenting Rural Historic Landscapes, National Park Service Preservation Brief 36, Protecting Cultural Landscapes, and other publications and materials made available by the NJSHPO to assist in defining the criteria that should be applied to such properties.

b. The objective in conducting the surveys is to identity NRHP listed or potentially eligible historic landscapes and affected viewsheds within the project area that may be adversely affected by the Undertaking, and to determine whether they meet the NRHP criteria set forth in 36 CFR Part 60.4.

B. The New York District will ensure that qualified professionals meeting the National Park Service professional qualifications for the appropriate discipline [National Park Service Professional Qualification Standards, Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44738-39) are used to complete all identification and evaluation efforts related to this undertaking, to include geomorphological, palynological, and archaeological surveys and testing, and architectural survey.

C. The New York District and the NJSHPO shall consider the views of the public and consulting parties in completing its identification and evaluation responsibilities. See Stipulation VIII, below, for review periods.

II. EVALUATION AND EFFECTS DETERMINATION

A. Application of Criteria: The New York District, in consultation with the NJSHPO, shall evaluate historic properties using the Criteria established for the NRHP [36 CFR 800.4(c)(1)]:

1. If the New York District and the NJSHPO agree that the Criteria apply or do not apply, in evaluating the NRHP eligibility of a property, the property shall be treated accordingly for purposes of this PA.

2. If the New York District and the NJSHPO disagree regarding NRHP eligibility, or if the ACHP so requests, prior to the start of any project-related work at the site or in the vicinity of the property, the New York District shall obtain a formal Determination of Eligibility (DOE) from the Keeper of the National Register (Keeper), National Park Service, whose determination shall be final.

2. The New York District shall ensure that the identification and evaluation of historic properties that may be affected by each phase of the Undertaking is completed prior to the initiation of any formal action by the Corps including rehabilitation, relocation, demolition, etc.

3. Disagreements on effect determinations. Should the New York District and NJHPO disagree as to whether the criteria of adverse effect apply to the effects of the Undertaking on particular historic properties, the New York District will request the ACHP to review the finding and request their written opinion within 30 days, in accordance with 36 CFR 800.5(c). The New York District will take the ACHP's opinion into account when reaching a final decision.

4. The New York District shall maintain records of all decisions it makes related to the NRHP eligibility and determination of effects on properties.

III. TREATMENT OF HISTORIC PROPERTIES

A. The New York District, in consultation with the NJSHPO and consulting parties, shall develop appropriate treatment plans for NRHP-eligible historic properties identified within the APE which may be affected by the Undertaking. Unless the NJSHPO and consulting parties object within 30 days of receipt of any plan, the New York District shall ensure that treatment plans are implemented by the New York District or its representative(s). The New York District shall revise Plans to address comments and recommendations provided by the NJSHPO and consulting parties.

B. The New York District shall ensure that qualified professionals meeting the NPS professional qualifications for the appropriate discipline [National Park Service Professional Qualification Standards, Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44738-39) are used to develop and implement all treatment plans.

C. The New York District will adhere to the following treatment strategies in order to avoid or reduce adverse effects to historic properties that have been determined eligible for the NRHP.

1. Avoidance. The preferred treatment is avoidance of effects to historic properties. The New York District will, to the extent feasible, avoid historic properties that have been determine eligible for the NRHP either through

project design changes, use of temporary fencing or barricades, realignments, landscaping, or other measures that will protect historic properties. The New York District, the NJSHPO, and participating historical societies shall consult to develop plans for avoiding effects to historic properties. The New York District shall incorporate feasible avoidance measures into project activities as part of the implementation of the Undertaking. If avoidance is determined to be infeasible, the New York District will develop and implement treatment/mitigation plans. Unless the NJSHPO and other consulting parties object within 30 days of receipt of any plan, the New York District will ensure that treatment plans are implemented by the New York District or its representative(s). The New York District will revise plans to address comments and recommendations provided by the NJSHPO and other consulting parties.

2. Minimization. When the New York District, the NJSHPO, and participating historical societies agree that complete avoidance of historic properties is infeasible, the New York District will explore preservation in place, if appropriate. Preservation in place may entail partial avoidance or protection of historic properties against project-related activities in proximity to the property. The New York District will preserve properties in place through project design, i.e incorporating color, texture, scale, and/or materials which are compatible with the architectural or historic character of the historic property; use of fencing, berms or barricades; and/or preservation of vegetation including mature trees, landscaping and planting which screen the property.

3. Mitigation. If the New York District, in consultation with the NJSHPO and other consulting parties, determines that preservation in place is infeasible, the New York District shall develop and implement mitigation plans consistent with Stipulation IV of this PA.

IV. RESOLUTION OF ADVERSE EFFECTS

A. When the New York District, in consultation with the NJSHPO and other consulting parties, determines that the Undertaking-related activities cannot adhere to treatment plans developed in accordance with Stipulation III or would otherwise have an adverse effect, the New York District shall:

1. Develop a Standard Mitigation Agreement (SMA) in coordination with the NJSHPO and other consulting parties; or

2. Consult with the ACHP to develop a Memorandum of Agreement (MOA) in accordance with 36 CFR Part 800.6 (c).

B. The New York District will invite the ACHP to participate in consultation when:

1. The New York District, other consulting parties, and NJSHPO determine that an agreement or a SMA cannot be reached;

2. a National Historic Landmark is involved;

3. human remains have been identified; or

4. there is widespread public interest in a historic property or properties.

C. Development of Standard Mitigation Agreements (SMA).

1. The New York District, in consultation with the NJSHPO and other consulting parties, as appropriate, will develop SMAs for NRHP-eligible or listed historic properties that will be adversely affected by the Undertaking. The New York District will submit the SMA to the NJSHPO and consulting parties for review and approval by certified mail. The NJSHPO shall have 30 days from receipt of adequate information in which to review and comment on the SMA(s). If the NJSHPO fails to respond within 30 days, or if there is disagreement, the New York District shall notify the ACHP and consult to develop the proposed SMA into an MOA and submit copies of background information and the proposed SMA to facilitate consultation to develop an MOA in accordance with 36 CFR Part 800. After signing by the New York District, the NJSHPO, and other PA signatories as appropriate, the New York District shall file all SMAs with the ACHP.

2. SMAs developed between the New York District, the NJSHPO, and other consulting parties, may include one or more of the following stipulations which address routine adverse effects that may occur to historic properties as a result of project implementation. This is not a complete list of potential mitigation stipulations, methods of mitigation should be tailored to the Undertaking and the individual resources impacted:

   a. Recordation. The New York District will consult with the NJSHPO or Historic American Building Survey/Historic American Engineering Record (HABS/HAER) to determine the appropriate level and type of recordation for affected resources. For historic properties with state and/or local significance, recordation will be consistent with the requirements and standards of the Department of the Interior (April 2003). All documentation must be submitted to NJSHPO and HABS/HAER for acceptance, prior to the initiation of project activities, unless otherwise agreed to by the NJSHPO.

b. Salvage and Donation of Significant Architectural Elements. Prior to demolition, partial demolition, or substantial alteration of historic properties, the New York District, in consultation with the NJSHPO and participating historical societies, will develop a salvage and donation plan to identify appropriate parties willing and capable of receiving and preserving the salvaged significant architectural elements. The New York District shall submit the plans to the NJSHPO and consulting parties for review and approval.

c. Alternative Treatments or Design Plan which meet the Standards. Prior to demolition, partial demolition, or substantial alteration of historic properties, the New York District, in consultation with the NJSHPO and participating historical societies, will identify protocols treatment guidelines and/or design standards for new construction within historic districts that is in keeping with the Secretary's Standards. The New York District will submit the plans to the NJSHPO and the consulting parties for review and approval.

d. Data recovery for archaeological sites eligible under Criterion D and others and data recovery and treatment of archaeological sites where data recovery will not result in a finding of no adverse effect. The New York District will conduct data recovery on archaeological sites following agreement on the prospective data recovery and treatment plans between the New York District, the NJSHPO, and other consulting parties as appropriate, when the archaeological sites are eligible for National Register inclusion under additional Criteria than Criterion D (for the information which they contain) or when the full informational value of the site cannot be substantially preserved through the conduct of appropriate research to professional standards and guidelines. To the maximum extent feasible, data recovery and treatment plans will be developed prior to construction to take into account and mitigate for the fullest range of archaeological site values and significance. The New York District will submit the plans to the NJSHPO and other consulting parties for review and approval.

V. DISCOVERY

A. If previously unidentified properties are discovered during Undertaking implementation, the New York District shall cease all work in the vicinity of the discovered property until it can be evaluated pursuant to the guidelines in Stipulation I of this PA. If the property is determined to be eligible, the New York District will consult with the NJSHPO, and other consulting parties to develop a treatment plan or SMA in accordance with Stipulations III and IV of this PA.

B. The New York District shall implement the treatment plan or SMA once approved by the NJSHPO and consulting parties.

VI. TREATMENT OF HUMAN REMAINS:

A. If any human remains and/or grave-associated artifacts are encountered, the New York District, the NJSHPO, other consulting parties, and Tribes as appropriate shall consult to develop a treatment plan that is responsive to the ACHP's "Policy Statement Regarding Treatment of Burial Sites, Human Remains and Funerary Objects" (February 23, 2007), the Native American Grave Protection and Repatriation Act, As Amended (PL 101-601, 25 U.S.C. 3001 et seq.) and the U.S. Army Corps of Engineers, Tribal Consultation Policy (October 2013).

B. Human remains must be treated with the utmost respect and dignity. All work must stop in the vicinity of the find and the site will be secured.

C. The medical examiner/coroner, local law enforcement, the NJSHPO, and Tribes will be notified. The coroner and local law enforcement will determine if the remains are forensic or archaeological in nature.

D. If the remains are determined to be archaeological in nature a physical anthropologist will be employed to investigate the site to determine whether the remains are Native American or of some other origin.

E. If the human remains are determined to be Native American they shall be left in place and protected from further disturbance until a treatment plan has been developed and approved by the New York District, NJSHPO and Tribes.

F. If human remains are determined to be non-Native American, the remains will be left in place and protected from further disturbance until a plan for avoidance or removal is developed and approved by the New York District, NJSHPO, Federally Recognized Tribes and other parties, as appropriate.

G. Avoidance of human remains is the preferred treatment.

VII. CURATION AND DISSEMINATION OF INFORMATION

A. The New York District shall maintain all decision records on identification, evaluation, effects determination and mitigation of historic properties for this Undertaking.

B. The New York District or its designee, in consultation with the NJSHPO shall ensure that all materials and records resulting from the survey, evaluation, and data recovery conducted for the Undertaking will be curated in accordance with 36 CFR Part 79 "Curation of Federally-Owned and Administered Archaeological Collections" and ER 1130-2- 433 "Project Operations: Collections Management and Curation of Archaeological and Historical Data." All material and records

recovered from non-Federally owned land shall be maintained in accordance with 36 CFR Part 79 until their analysis is complete and, if necessary, are returned to their owner(s).

VIII. COORDINATION OF REVIEWS FOR STUDY ACTIVITIES

A. All plans, documents, reports, and materials shall be submitted by the New York District to the NJSHPO and other consulting parties as appropriate by certified mail, for a 30 day review period unless otherwise stipulated in this PA. If the NJHPO and other consulting parties fail to comment within the specified time the New York District shall assume the agencies' concurrence. As appropriate, the New York District shall submit the comments of consulting parties to the NJSHPO to facilitate further consultation.

B. Should the activities relating to the undertaking change in any way following review by the NJSHPO and other consulting parties the New York District shall submit new plans, documents, reports, and materials to allow the NJSHPO and other consulting parties an opportunity to comment within a 30 day review period on the revisions.

C. If after consulting with the NJSHPO and other consulting parties for a period of 90 days on any action or activity provided for in this PA, the New York District or NJSHPO concludes there is no progress in developing treatment/mitigation plans or other documents required by this PA, the New York District or NJSHPO may notify the ACHP and request its involvement to expedite completion of the consultation process.

D. The New York District shall ensure that all submissions to the NJSHPO, consulting parties, and the ACHP include all relevant information to facilitate their review. The New York District shall provide all additional information requested by NJSHPO, consulting parties, or ACHP within a timely manner unless the signatories to this PA agree otherwise.

E. The New York District shall ensure that all draft and final reports resulting from actions pursuant to the Stipulations of this PA will be provided to the NJSHPO, all other consulting parties to this PA, and will identify the Principal Investigator responsible for the report. All reports will be responsive to contemporary standards, and as appropriate to the Department of the Interior's Format Standards for Final Reports of Data Recovery Programs (42 FR 5377-79) and HPO report standards. Precise locational data may be provided only in a separate appendix if it appears that its release could jeopardize archaeological sites consistent with National Register Bulletin Number 29, Guidelines for Restricting Information about Historic and Prehistoric Resources.

F. If the District proposes revisions or addenda to approved treatment/mitigation plans or other documents, the New York District, the NJSHPO, and other participating parties shall consult to determine whether additional conditions or mitigation measures are appropriate.

G. The New York District shall certify in writing that all requirements for identification and evaluation, and the implementation of treatment/mitigation plans have been satisfactorily completed prior to the initiation of construction activities for a specified portion of the navigation improvements recommended in the Study. The New York District shall submit a copy of this certification to the NJSHPO and all other consulting parties by certified mail. The NJSHPO and other consulting parties shall have 30 days to object to the certification based on a finding of incomplete compliance or inadequate compliance with the terms of this PA. If the NJSHPO or consulting parties do not object, the District may proceed with construction for the specified segment of the Study.

IX. ADMINISTRATIVE TERMS

A. DISPUTE RESOLUTION

1. The New York District will attempt to resolve any disagreement arising from implementation of this PA. If there is a determination that the disagreement cannot be resolved, the New York District will request the ACHP`s recommendations or request the comments of the ACHP in accordance with 36 CFR Part 800.6(b).

2. Any ACHP recommendations or comments provided in response will be considered in accordance with 36 CFR Part 800.6(b), with reference only to the subject of the dispute. The New York District will respond to ACHP recommendations or comments indicating how the New York District has taken the ACHP's recommendations or comments into account and complied with same prior to proceeding with undertaking’s activities that are subject to dispute. Responsibility to carry out all other actions under this PA that are not the subject of the dispute will remain unchanged.

3. If the ACHP does not provide its advice regarding the dispute within the thirty (30) calendar day time period, the New York District may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the New York District will prepare a written response that takes into account any timely comments regarding the dispute from the consulting parties to the MOA, and provide them and the ACHP with a copy of such written response.

B. Public Involvement

1. In consultation with the NJSHPO and other consulting parties, the New York District will inform potential interested parties of the existence of this Agreement, and the New York District's plan for meeting the terms of this PA. Copies of this Agreement and relevant documentation prepared pursuant to the terms of this PA shall be made available for public inspection (information regarding the locations of archaeological sites will be withheld in accordance with the Freedom of Information Act and National Register Bulletin 29, if it appears that this information could jeopardize archaeological sites). Any comments received from the public under this Agreement shall be taken into account by the New York District.

2. Public Objections. The New York District will review and resolve timely substantive public objections. Public objections shall be considered timely when they are provided within the review periods specified in this PA. The New York District shall consult with the NJSHPO and other participating historical societies or Tribes, and as appropriate with the ACHP, to resolve objections. Study actions which are not the subject of the objection may proceed while the consultation is conducted.

C. Monitoring

1. The New York District will prepare annual reports summarizing the status of compliance with the terms of this PA and a summary of the completed activities and the exempt activities for the past year and proposed activities for the next fiscal year. Reports shall be submitted by January 31 of every year. The Annual Reports shall be provided to the ACHP, the NJSHPO, and all other consulting parties until the Study-related activities are complete.

2. The ACHP, the NJSHPO, and other consulting parties may request a site visit to follow up on information in the annual report or to monitor activities carried out pursuant to this PA. The ACHP, the NJSHPO, or other consulting parties will provide the New York District with 30 days written notice when requesting a site visit unless otherwise agreed. The New York District may also schedule a site visit with the NJSHPO, other consulting parties, and the ACHP at its discretion.

D. Amendments

Any signatory to this PA may request that it be amended, whereupon all the parties will consult in accordance with 36 CFR Part 800.6(b) to consider such amendment.

E. Termination

Any signatory to this PA may terminate it by providing thirty (30) days' notice to the signatories, provided that the signatories will consult during the period prior to

termination by certified mail to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the New York District will comply with 36 CFR Parts 800.4 through 800.6 with regard to individual Undertaking actions covered by this Agreement.

F. Sunset Clause

This PA will continue in full force and effect until the construction of the Undertaking is complete and all terms of this PA are met. After a period of seven (7) years from execution of the PA, unless the Project has been terminated or authorization rescinded, the consulting parties will coordinate to decide whether to extend the agreement as it is written or to update it provided all signatories concur.

G. Anti-Deficiency Act

All requirements set forth in this PA requiring expenditure of funds by the New York District are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 U.S.C. 1341). No obligation undertaken by the New York District under the terms of this PA shall require or be interpreted to require a commitment to extend funds not appropriated for a particular purpose. If the New York District cannot perform any obligation set forth in this PA because of unavailability of funds, that obligation must be renegotiated among the New York District and the consulting parties as necessary.

Execution and implementation of this PA evidences that the New York District has satisfied its Section 106 responsibilities for all individual Undertakings of the Project, and that the New York District has afforded the ACHP an opportunity to comment on the undertaking and its effects on historic properties.

U.S. ARMY CORPS OF ENGINEERS

By: _____ Date: _____
David A. Caldwell
Colonel, U.S. Army
Commander

NEW JERSEY STATE HISTORIC PRESERVATION OFFICE

By: _____ Date: _____
Katherine Marcopul, Deputy State Historic Preservation Officer

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: _____ Date: _____

DELAWARE NATION

By: _____ Date: _____

DELAWARE TRIBE OF INDIANS

By: _____ Date: _____

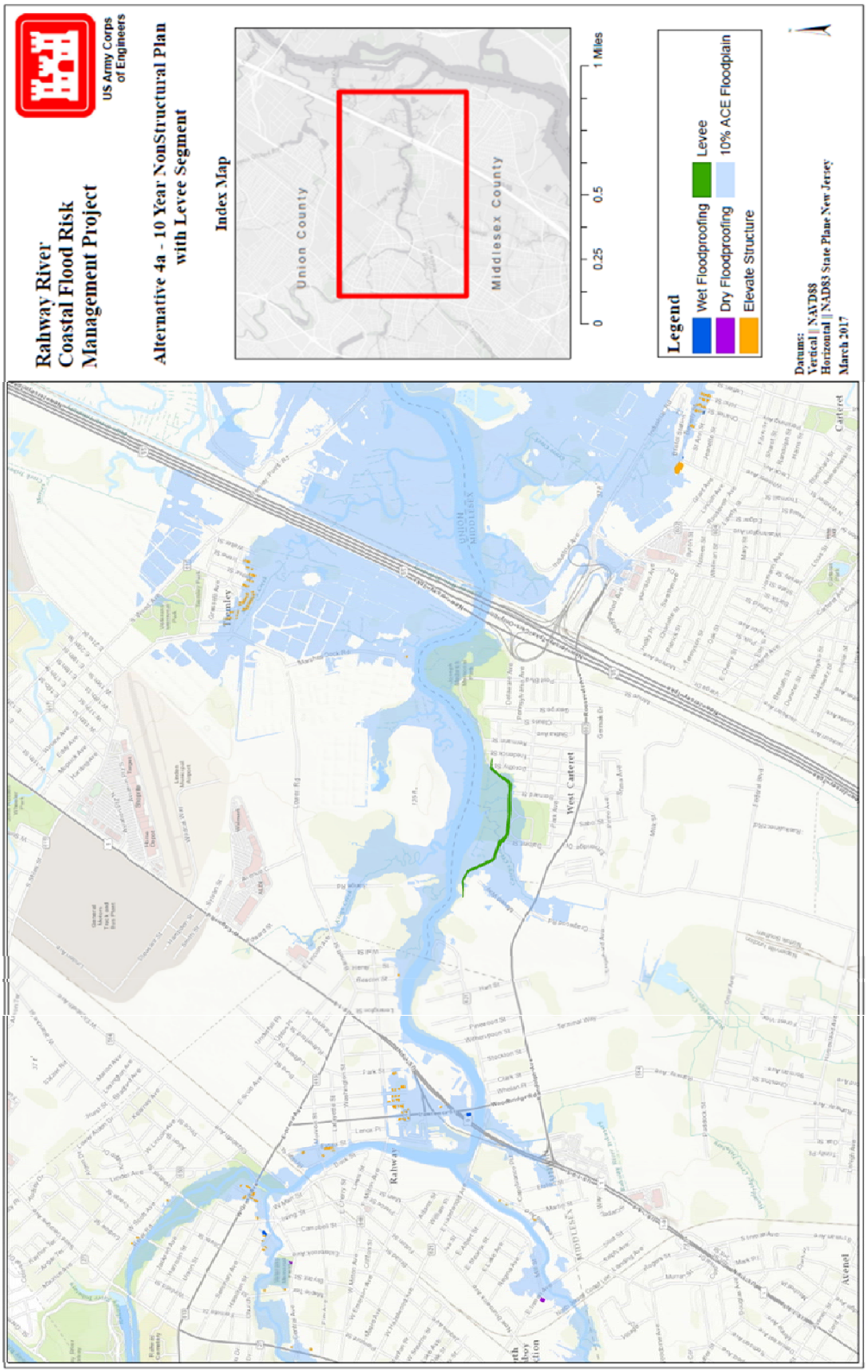
EASTERN SHAWNEE TRIBE OF OKLAHOMA

By:_____Date:_____

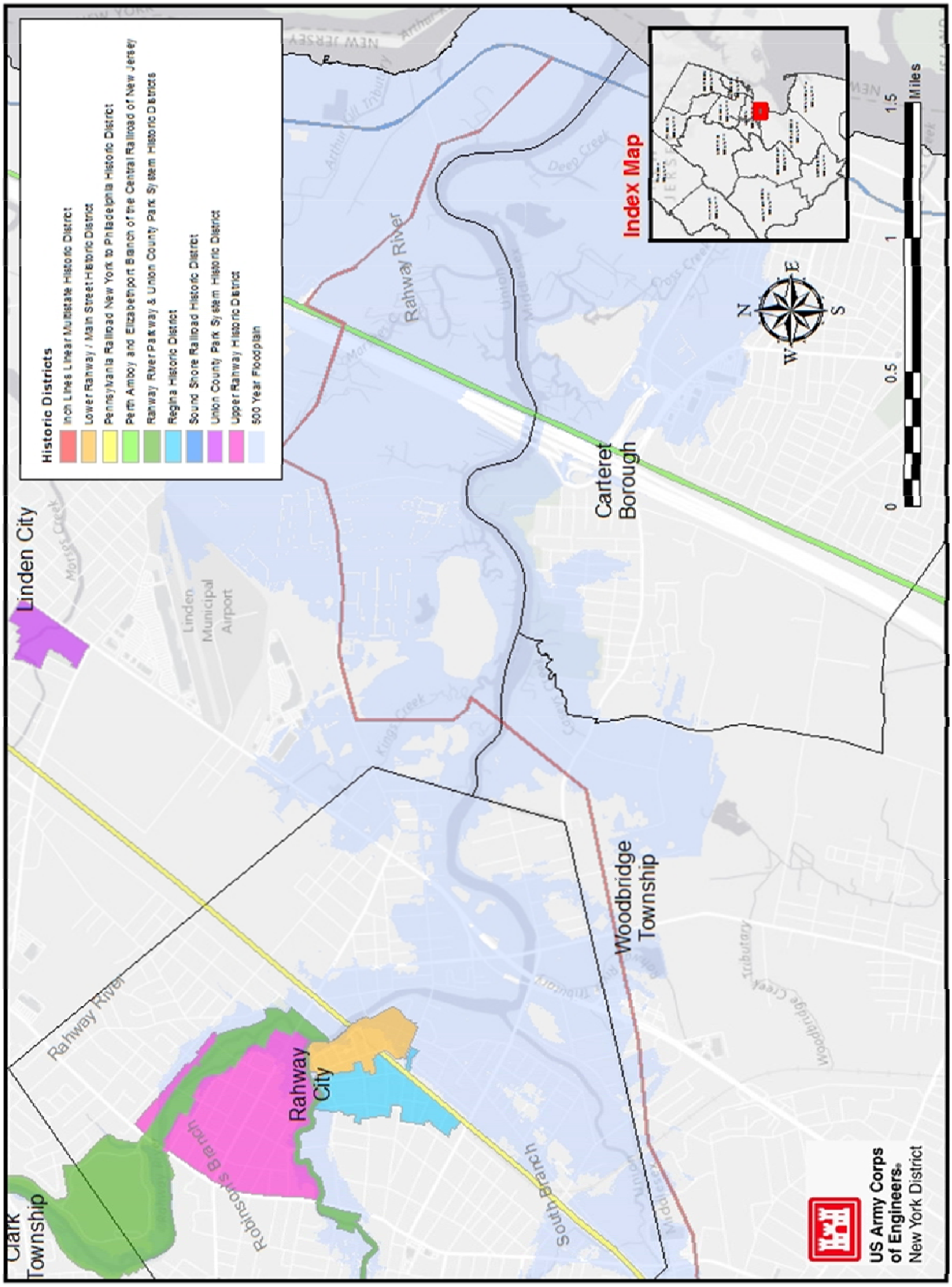
SHAWNEE TRIBE OF OKLAHOMA

By: _____ Date: _____

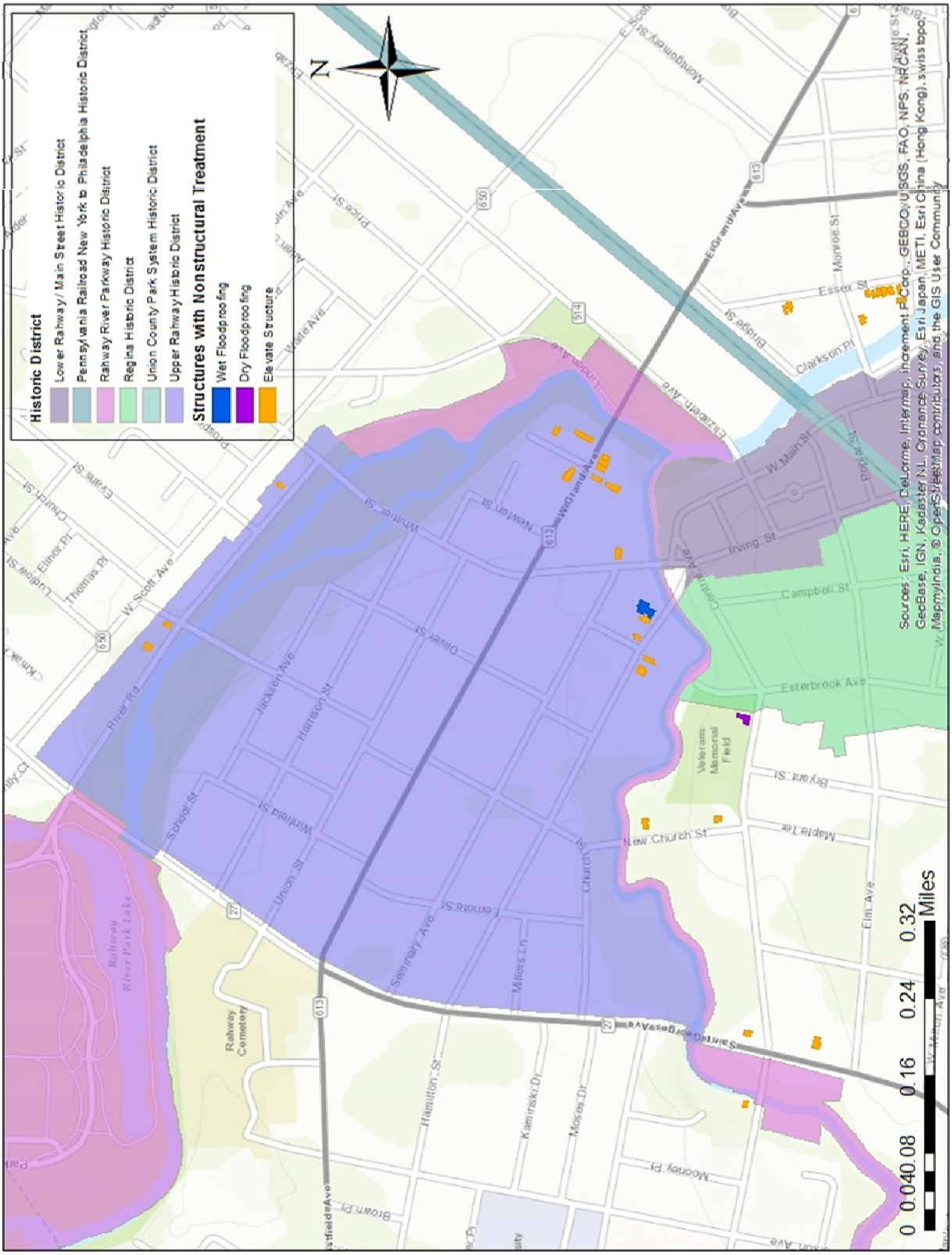
Attachment 1: Rahway River Coastal Storm Risk Management Plan



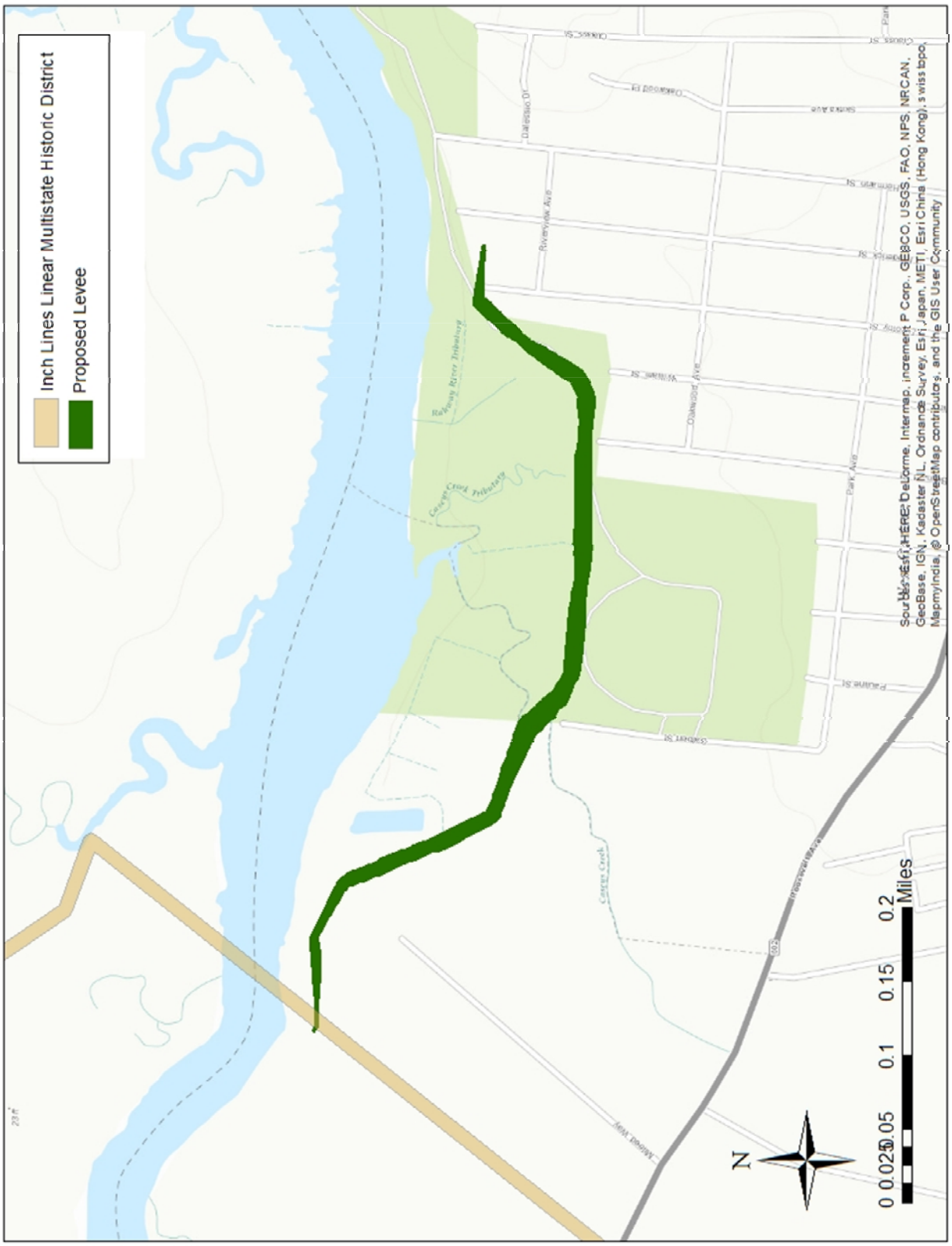
Attachment 2: The Project Area and Historic Districts



Attachment 3: Structures located within the Upper Rahway Historic District



Attachment 4: Inch Lines Linear Multistate Historic District



Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Appendix A.5: Essential Fish Habitat Assessment

1.0 Essential Fish Habitat

This Essential Fish Habitat (EFH) assessment has been prepared to demonstrate that the proposed project would be in compliance with the requirements of 50 Code of Federal Regulations Part 660.920 implementing the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). This assessment is applicable to the proposed work within the Rahway River and associated tributaries.

EFH is defined in the Magnuson-Stevens Act as those waters and substrates necessary for spawning, breeding, or growth to maturity of managed fish species. As required by the Magnuson-Stevens Act, the National Marine Fisheries Service (NMFS) promulgated regulations to provide guidance to the regional fishery management councils for EFH designation. The regulations further clarify EFH by defining waters, to include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, which may encompass a substrate to include sediment, hard bottom, structures underlying the waters, and associated biological contribution to a healthy ecosystem; and areas used for spawning, breeding, feeding, or growth to maturity to cover a species' full life cycle.

The Rahway River is designated as Essential Fish Habitat for smooth dogfish (*Mustelus canis*), summer flounder (*Paralichthys dentatus*) and inshore longfin squid (*Loligo pealeii*) (Figure 1).

1.1 Proposed Action

The U.S. Army Corps of Engineers (Corps), New York District (District), is currently conducting a feasibility study to evaluate federal interest in implementing coastal storm risk management measures within the lower portion of the Rahway River. The following alternatives were evaluated: a). No Action; b) Alternative #1: Levees and floodwalls; c) Alternative #2: Surge Barrier; d) Alternative #3a/b: Non-structural measures within the 10-yr floodplain (Alt. #3a) and 50-yr floodplain (Alt. #3b).; and e) Alternative #4a/b Nonstructural measures within the 10-yr floodplain (Alt. #3a) and the 50-yr floodplain (Alt. #3b) and Levee Segment D. Further description of these alternatives are included in the Draft Feasibility Report/Environmental Assessment.

The Tentatively Selected Plan identified as having the highest net benefits is Alternative 4a, nonstructural measures within the 10-yr floodplain and Levee Segment D. A total of 136 structures will be treated with nonstructural measures such as wet floodproofing, dry floodproofing and elevation. Levee Segment D levee is approximately 3,360 feet long and an average height of 7.5 ft. The TSP will manage risk for the 100-yr coastal storm event.

Levee Segment D is located within the upper boundaries of a 23 acre wetland complex predominantly comprised of phragmites dominated high marsh and low marsh. Wetlands impacted by the construction of Levee Segment D include 1.8 acres of phragmites dominated marsh, 2.3 acres of low marsh, 0.50 acres scrub-shrub deciduous wetland and 0.40 acres of managed wetland (Figure 2). The levee will also extend over Casey's Creek, a small tidal tributary to the Rahway River. Approximately 200 linear feet of the creek and 0.14 acres of mudflat will be modified through the installation of the levee and associated drainage structure. A flap gate will be installed in the drainage structure in order to maintain flows through the creek under normal flow conditions.

Mitigation currently being evaluated to compensate for wetland and open water impacts include on-site mitigation through the on-site restoration of four acres of low marsh, the on-site restoration of deciduous scrub-shrub wetlands, the on-site restoration of 200 linear feet of tidal creek and 0.14 acres

of mudflat, and the installation of a flap gate within the levee drainage structure to maintain normal tidal flows of Casey's Creek.

1.2 Essential Fish Habitat Assessment

A description of the general distribution and life history of smooth dogfish, summer flounder and inshore longfin squid and any EFH important prey species that are known to occur within the Rahway River are included in Sections 2 and 3 below. A completed EFH Assessment Worksheet is provided in Attachment 1. Based on a review of its habitat requirements inshore longfin squid was not included in the assessment worksheet as it is not expected to occur within the project area.

Figure 1: Essential Fish Habitat within the Rahway River

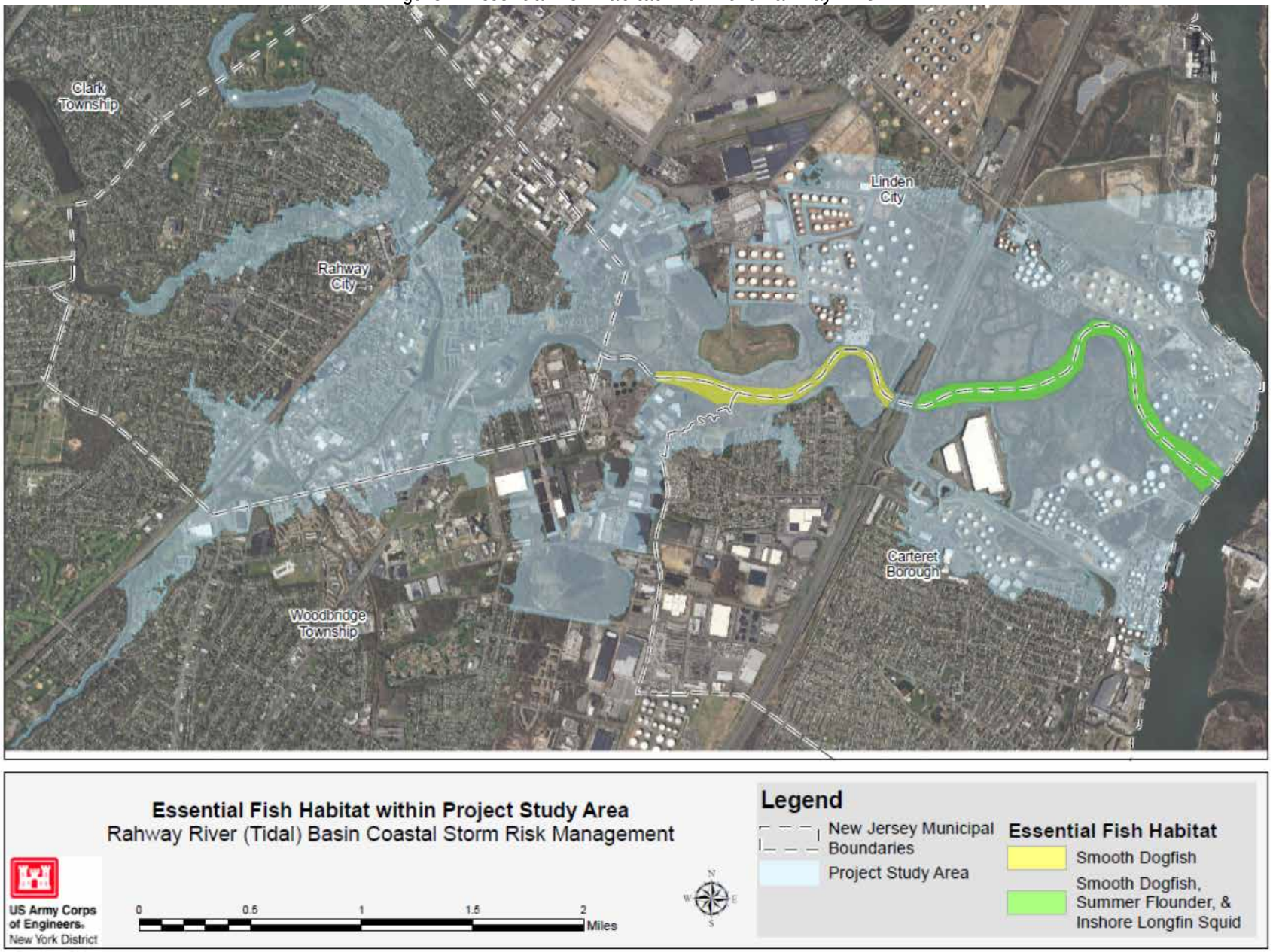
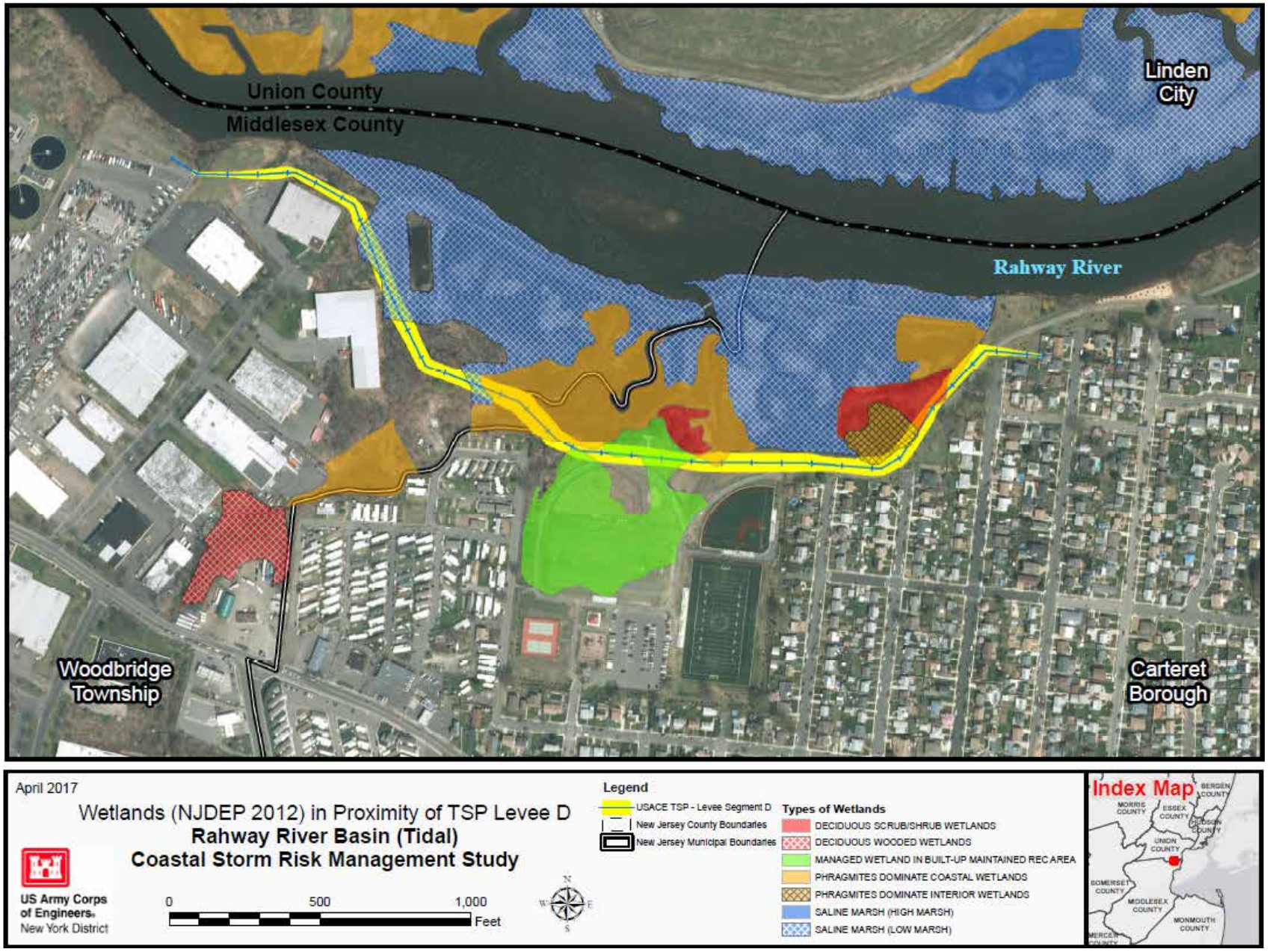


Figure 2: Segment Levee D Wetland Impacts



2.0 General Distribution and Life History of Managed Fish Species

2.1 Smooth Dogfish (*Mestulus canis*): Smooth dogfish is migratory shark species that typically overwinters offshore of the Carolinas and then move north along the coast to New England starting in early spring. They give birth to live young in late April through May with nursery areas consisting of inlets and tidal creeks extending from Virginia through southern Massachusetts (Montemarano, Havelin & Draud, 2016) (Giresi, Driggers, Grubbs, Gelsleichter and Hoffmayer, 2014). Peak abundance of this species in the New York/New Jersey area ranges from late April through October (Giresi, Driggers, Grubbs, Gelsleichter and Hoffmayer, 2014).

Surveys conducted within tidal marsh creeks and bay shoal habitats within sections of the Little Egg Harbor-Great Bay estuary in southern New Jersey showed a stronger propensity of young of the year smooth dogfish use of these areas than adults. Juveniles appeared in estuaries in May and left the study area by end of October whereas the adults were present from April through September (Rountree and Able, 1996).

Dominant prey of young of year include shrimps, crabs decapod crabs, razor clam and small fish such as Atlantic silverside (*Menidia menidia*) and mummichog (*Fundulus heteroclitus*) (Rountree and Able, 1996).The diet of adult smooth dogfish includes crustaceans, molluscs and teleosts. Favored species include rock crabs (*Cancer* sp.) and lobsters (*Homarus* sp.) Known fish species consumed by smooth dogfish include menhaden (Brevoortia), tautog (Tautoga), puffers (*Spheroides*), scup (*Stenotomus*), sticklebacks (Gasterosteus) and sculpins (*Myoxocephalus*). (Montemarano, Havelin & Draud, 2016). Both young of the year and adult smooth dogfish exhibit a strong nocturnal pattern in habitat use; making tidal migrations into shallow bay shoal and tidal marsh creek habitats primarily at night. (Rountree and Able, 1996).

2.2 Summer Flounder (*Paralichthys dentatus*): The geographical range for summer flounder encompasses the shallow estuarine waters and outer continental shelf from Nova Scotia to Florida. Spawning occurs offshore during autumn and early winter. Larvae are transported toward coastal areas by prevailing water currents. Development of post-larvae and juveniles occurs primarily within bays and estuarine areas using various habitats include salt marsh creeks, seagrass beds, mudflats, and open bay areas.

Summer flounder are concentrated in bays and estuaries from late spring through early autumn, when an offshore migration to the outer continental shelf is undertaken. On the outer shelf they are found at depths up to 147.6 feet.

The diet of young of year summer flounder consists of species such as Atlantic silversides, mummichog, grass shrimp (*Palaemonetes vulgaris*) and sand shrimp (*Crangon setpemspinosa*). Adults prey on crustaceans, small pelagic fish such as anchovy, squid, Atlantic silverside, herrings, hermit crabs, isopods and shrimp, and squid (NOAA, 1999).

2.3 Inshore Longfin Squid (*Loligo pealeii*): The geographical range for longfin inshore squid encompasses the contentinental shelf from Newfoundland to the Gulf of Venezuela. Spawning in the Mid Atlantic region typically occurs from the late spring to early summer. Egg masses occur on sandy/muddy bottoms in water depths usually less than 50 meters and are commonly attached to rocks, small boulders, pilings and on aquatic vegetation such as sea lettuce (*Ulva lactuca*) or algae.

In the Hudson-Raritan estuary, pre-recruits were found during spring, summer and fall with highest concentrations found in the eastern portion of the bay during the summer and fall.

Diet changes with size with small individuals feeding on planktonic organisms while larger individuals consume crustaceans and small fish. Adults prey on squid larvae and fish species such as silver hake, mackerel, herring, menhaden, bay anchovy, weakfish and silversides (NOAA, 2005).

3.0 General Distribution and Life History of Prey Species Known to Occur in the Rahway River

3.1 Alewife (*Alosa pseudoharengus*): Alewife inhabits waters from the Gulf of Saint Lawrence to South Carolina, occurring primarily between the Gulf of Maine and the Chesapeake Bay. Adult alewives enter the NY/NJ Harbor between late-February and mid-March moving upstream to spawn in freshwater tributaries in relatively shallow water with slow currents (Schmidt et al. 1988, Everly and Boreman 1999).

Alewife larvae and juveniles remain in their freshwater nurseries until late May or June before moving downstream as YOY into the lower estuary where they remain until November prior to movement into the ocean. It is generally accepted that juveniles join the adult population at sea within the first year of their lives and follow a north-south seasonal migration along the Atlantic coast. (USACE, NYD. November 2013. New York and New Jersey Harbor Deepening Project, 2012 Migratory finfish Report)

3.2 American eel (*Anguilla rostrate*): The geographical range for American eels is Greenland to South America. Spawning occurs during the winter and early spring in the Sargasso Sea. They are adapted to a wide range of habitats; freshwater and brackish tributaries including streams, creeks, rivers, lakes and ponds. American eels are primarily nocturnal feeders, consuming worms, small fish, clams and crustaceans. (NOAA, 2000).

3.3 Bluefish (*Pomatomus saltatrix*): It is believed that estuarine and nearshore waters are important habitats for juveniles and adults from Maine to Florida. Eggs of this species are pelagic and highly buoyant; with hatching and early larval development occurring in oceanic waters in the Mid-Atlantic Bight, a coastal region running from Massachusetts to North Carolina. The young move inshore to estuaries, which serve as chief habitat for juveniles. Adults travel northward in spring and summer and to the south in fall and winter. Southerly migration may be closer to shore than northerly movement, although movement in both directions is characterized by inshore-offshore movement. Diet of young of year bluefish include bay anchovy (*Anchoa mitchilli*), Atlantic silverside, copepods and amphipods Adult bluefish prey almost exclusively on other fish species (NOAA, 2006)

3.4 Mummichog (*Fundulus heteroclitus*): Spawning season from New Jersey northward occurs from late spring to early fall. Spawning occurs in fresh, brackish and saltwater. (Abraham, 1985).

3.5 Striped bass (*Morone saxatilis*): Adult striped bass are present in coastal ocean waters of New York and New Jersey in March before entering estuaries. Striped bass are demersal and may be present all year in the Hudson-Raritan Estuary with adults primarily occurring from early March through early September (spawning in fresh waters from late April to June followed by post-spawning movements).

Spawning occurs in early spring at or near the surface in fresh or slightly brackish waters from early May through June (Boreman and Klauda 1988). Eggs and larvae remain in the Hudson River, upstream of the NY/NJ Harbor, until the end of the larval post yolk-sac stage toward the end of the summer, when juveniles migrate from upstream areas to higher salinity waters closer to the Harbor. (USACE, 2013)

3.6 Ribbed mussel (Giekensia demissa): Although ribbed mussels inhabit all portions of salt marshes, they are typically most prevalent along the marsh edges. They are known to attach to salt marsh cordgrass (*Spartina altnerniflora*). They are primarily prey food for blue crab and birds.

3.7 Blue crab (*Callinectes sapidus*): Blue crab inhabit estuaries exclusively. Females tend to prefer higher salinity levels than males. Preferred habitat for smaller crabs consists of shallow estuarine waters with substrates composed of soft detritus, mud or mud shell. Larger crabs tend to inhabit deeper estuarine waters with harder bottom substrates (USFWS, 1989).

3.8 Grass shrimp (*Palaemonetes* spp.): Grass shrimp typically inhabit shallow coastal waters in salt marshes, seaweed and eelgrass beds. They are nocturnal feeders and are omnivorous; eating detritus, phytoplankton and small invertebrates (Coen and Wenner, 2005).

4.0 References

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U.S. Fish and Wildlife Service. October 2015. American eel (*Anguilla rostrata*) Factsheet. Available at: https://www.fws.gov/northeast/americaneel/. Accessed April 6, 2017.

Attachment 1:

Essential Fish Habitat Assessment Worksheet for Federal Agencies

EFH ASSESSMENT WORKSHEET FOR FEDERAL AGENCIES (modified 3/2016)

PROJECT NAME:

DATE:

PROJECT NO.:

LOCATION (Water body, county, physical address):

PREPARER:

Step 1: Use the Habitat Conservation Division EFH webpage's Guide to Essential Fish Habitat Designations in the Northeastern United States to generate the list of designated EFH for federally-managed species for the geographic area of interest (http://www.greateratlantic.fisheries.noaa.gov/hcd/index2a.htm). Use the species list as part of the initial screening process to determine if EFH for those species occurs in the vicinity of the proposed action. The list can be included as an attachment to the worksheet. Make a preliminary determination on the need to conduct an EFH consultation.

1. INITIAL CONSIDERATIONS

EFH Designations	Yes	No
Is the action located in or adjacent to EFH designated for eggs? List the species:	✔	
Is the action located in or adjacent to EFH designated for larvae? List the species:	✔	
Is the action located in or adjacent to EFH designated for juveniles? List the species:	✔	
Is the action located in or adjacent to EFH designated for adults or spawning adults? List the species:	✔	
If you answered no to all questions above, then EFH consultation is not required - go to Section 5. If you answered yes to any of the above questions proceed to Section 2 and complete remainder of the worksheet.	✔	

Step 2: In order to assess impacts, it is critical to know the habitat characteristics of the site before the activity is undertaken. Use existing information, to the extent possible, in answering these questions. Identify the sources of the information provided and provide as much description as available. These should not be yes or no answers. Please note that there may be circumstances in which new information must be collected to appropriately characterize the site and assess impacts. Project plans that show the location and extent of sensitive habitats, as well as water depths, the HTL, MHW and MLW should be provided.

2. SITE CHARACTERISTICS

Site Characteristics	Description
Is the site intertidal, sub-tidal, or water column?	
What are the sediment characteristics?	
Is there submerged aquatic vegetation (SAV) at or adjacent to project site? If so describe the SAV species and spatial extent.	
Are there wetlands present on or adjacent to the site? If so, describe the spatial extent and vegetation types.	
Is there shellfish present at or adjacent to the project site? If so, please describe the spatial extent and species present.	
Are there mudflats present at or adjacent to the project site? If so please describe the spatial extent.	
Is there rocky or cobble bottom habitat present at or adjacent to the project site? If so, please describe the spatial extent.	
Is Habitat Area of Particular Concern (HAPC) designated at or near the site? If so for which species, what type habitat type, size, characteristics?	
What is the typical salinity, depth and water temperature regime/range?	
What is the normal frequency of site disturbance, both natural and man-made?	

What is the area of proposed impact (work footprint & far afield)?	

<u>Step 3</u>: This section is used to describe the anticipated impacts from the proposed action on the physical/chemical/biological environment at the project site and areas adjacent to the site that may be affected.

3. DESCRIPTION OF IMPACTS

Impacts	Y	N	Description
Nature and duration of activity(s). Clearly describe the activities proposed and the duration of any disturbances.			
Will the benthic community be disturbed? If no, why not? If yes, describe in detail how the benthos will be impacted.			
Will SAV be impacted? If no, why not? If yes, describe in detail how the SAV will be impacted. Consider both direct and indirect impacts. Provide details of any SAV survey conducted at the site.			
Will salt marsh habitat be impacted? If no, why not? If yes, describe in detail how wetlands will be impacted. What is the aerial extent of the impacts? Are the effects temporary or permanent?			
Will mudflat habitat be impacted? If no, why not? If yes, describe in detail how mudflats will be impacted. What is the aerial extent of the impacts? Are the effects temporary or permanent?			
Will shellfish habitat be impacted? If so, provide in detail how the shellfish habitat will be impacted. What is the aerial extent of the impact?			

Provide details of any shellfish survey conducted at the site.	☐	☑	N/A
Will hard bottom (rocky, cobble, gravel) habitat be impacted at the site? If so, provide in detail how the hard bottom will be impacted. What is the aerial extent of the impact?	☐	☑	No hard bottom present on site.
Will sediments be altered and/or sedimentation rates change? If no, why not? If yes, describe how.	☑	☐	Excavation and fill consisting of concrete (drainage structure), clay to create an impervious core for the levee, and embankment fill will modify existing sediments within the tidal tributary and wetlands.
Will turbidity increase? If no, why not? If yes, describe the causes, the extent of the effects, and the duration.	☑	☐	Turbidity may increase during construction to Casey's Creek as a result of construction activities within wetlands and tributary. This increase is temporary and will be minimized through the implementation of erosion and sediment control BMPs such as turbidity curtains, wetland anti-track matting and the potential use of cofferdams or stream diversion to conduct work within
Will water depth change? What are the current and proposed depths?	☐	☑	
Will contaminants be released into sediments or water column? If yes, describe the nature of the contaminants and the extent of the effects.	☐	☑	
Will tidal flow, currents, or wave patterns be altered? If no, why not? If yes, describe in detail how.	☐	☑	Levee is located within the upper boundaries of the wetland complex and will not impact tidal flow to the wetlands on the wet side of the levee; a flap gate to maintain normal flows of Casey's creek through the levee will be installed in the levee.
Will water quality be altered? If no, why not? If yes, describe in detail how. If the effects are temporary, describe the duration of the impact.	☐	☑	The implementation of erosion and sediment control BMPs such as turbidity barriers and anti-tracking mats will prevent water quality degradation. Although the exact method will be determined in the Preconstruction Engineering Design Phase, levee construction within Casey's Creek will be conducted in the dry. Construction duration of the segment of levee within the
Will ambient noise levels change? If no, why not? If yes, describe in detail how. If the effects are temporary, describe the duration and degree of impact.	☑	☐	There will be an increase in ambient noise levels during construction which has anticipated duration of two years. Noise will be limited to daytime hours in accordance with local municipality noise ordinances.

Does the action have the potential to impact prey species of federally managed fish with EFH designations?			

Step 4: This section is used to evaluate the consequences of the proposed action on the functions and values of EFH as well as the vulnerability of the EFH species and their life stages. Identify which species (from the list generated in Step 1) will be adversely impacted from the action. Assessment of EFH impacts should be based upon the site characteristics identified in Step 2 and the nature of the impacts described within Step 3. The Guide to EFH Descriptions webpage (http://www.greateratlantic.fisheries.noaa.gov/hcd/list.htm) should be used during this assessment to determine the ecological parameters/preferences associated with each species listed and the potential impact to those parameters.

4. EFH ASSESSMENT			
Functions and Values	**Y**	**N**	**Describe habitat type, species and life stages to be adversely impacted**
Will functions and values of EFH be impacted for:			
Spawning **If yes, describe in detail how, and for which species. Describe how adverse effects will be avoided and minimized.**			
Nursery **If yes, describe in detail how and for which species. Describe how adverse effects will be avoided and minimized.**			
Forage **If yes, describe in detail how and for which species. Describe how adverse effects will be avoided and minimized.**			
Shelter **If yes, describe in detail how and for which species. Describe how adverse effects will be avoided and minimized.**			

Will impacts be temporary or permanent? Describe the duration of the impacts.			
Will compensatory mitigation be used? If no, why not? Describe plans for mitigation and how this will offset impacts to EFH. Include a conceptual compensatory mitigation plan, if applicable.			

Step 5: This section provides the federal agency's determination on the degree of impact to EFH from the proposed action. The EFH determination also dictates the type of EFH consultation that will be required with NOAA Fisheries.

Please note: if information provided in the worksheet is insufficient to allow NOAA Fisheries to complete the EFH consultation additional information will be requested.

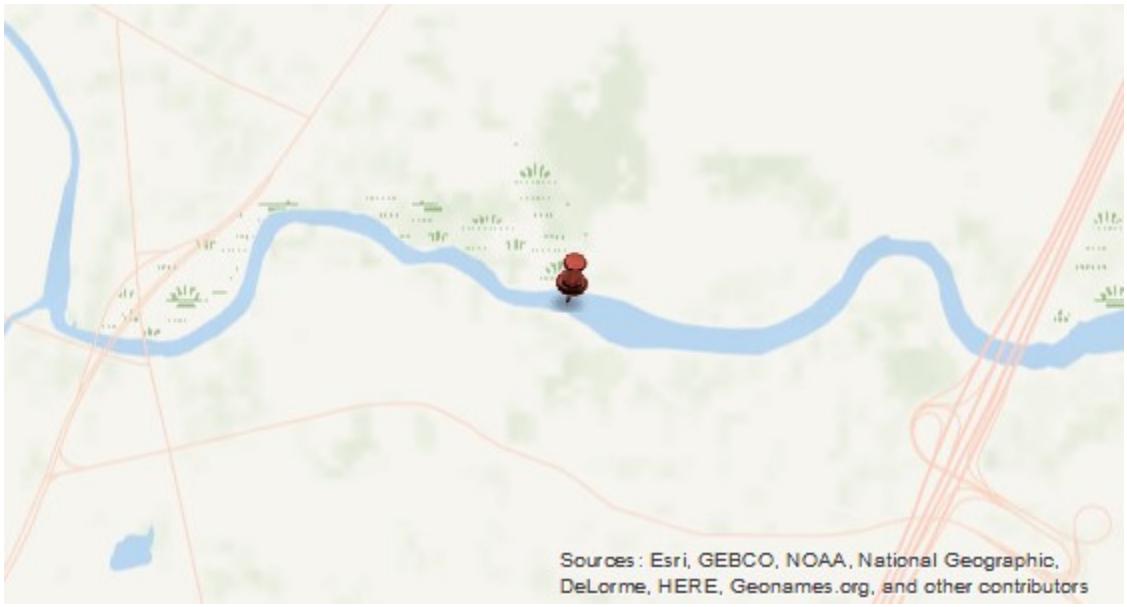
5. DETERMINATION OF IMPACT		
	/	**Federal Agency's EFH Determination**
Overall degree of adverse effects on EFH (not including compensatory mitigation) will be: **(check the appropriate statement)**		**There is no adverse effect on EFH or no EFH is designated at the project site.** **EFH Consultation is not required**
		The adverse effect on EFH is not substantial. This means that the adverse effects are either no more than minimal, temporary, or that they can be alleviated with minor project modifications or conservation recommendations. **This is a request for an abbreviated EFH consultation.**
		The adverse effect on EFH is substantial. **This is a request for an expanded EFH consultation**

Step 6: Consultation with NOAA Fisheries may also be required if the proposed action results in adverse impacts to other NOAA-trust resources, such as anadromous fish, shellfish, crustaceans, or their habitats as part of the Fish and Wildlife Coordination Act Some examples of other NOAA-trust resources are listed below. Inquiries regarding potential impacts to marine mammals or threatened/endangered species should be directed to NOAA Fisheries' Protected Resources Division.

6. OTHER NOAA-TRUST RESOURCES IMPACT ASSESSMENT

Species known to occur at site (list others that may apply)	Describe habitat impact type (i.e., physical, chemical, or biological disruption of spawning and/or egg development habitat, juvenile nursery and/or adult feeding or migration habitat). Please note, impacts to federally listed species of fish, sea turtles, and marine mammals must be coordinated with the GARFO Protected Resources Division.
alewife	Temporary and permanent impacts to juvenile nursery and adult foraging/shelter habitat during construction of levee.Temporary impacts
American eel	Temporary and permanent impacts to adult foraging/shelter habitat during construction of levee.Temporary impacts during construction of on-site
American shad	N/A
Atlantic menhaden	N/A
blue crab	Temporary and permanent impacts to juvenile nursery and adult foraging/shelter habitat during construction of levee. Temporary impacts during construction of on-site wetland and open water mitigation which will
blue mussel	N/A
blueback herring	N/A
Eastern oyster	N/A
horseshoe crab	N/A
quahog	N/A
soft-shell clams	N/A
striped bass	Temporary and permanent impacts to juvenile nursery and adult foraging/shelter habitat during construction of levee.Temporary impacts
mummichog	Temporary and permanent impacts to juvenile nursery and adult foraging/shelter habitat during construction of levee.Temporary impacts
Bluefish	Temporary and permanent impacts to juvenile nursery and adult foraging/shelter habitat during construction of levee.Temporary impacts
Ribbed Mussel	Temporary and permanent impacts to spawning, juvenile nursery and adult foraging/shelter habitat during construction of levee.Temporary impacts

EFH Data Notice: Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional Fishery Management Councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.



Query Results

Map Scale = 1:36,112
Degrees, Minutes, Seconds: Latitude = 40º36'2" N, Longitude = 75º44'57" W
Decimal Degrees: Latitude = 40.60, Longitude = -74.25

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

EFH

Show	Link	Data Caveats	Species/Management Unit	Life stage (s) Found at Location	Management Council	FMP
			Smooth Dogfish	ALL	Secretarial	HMS

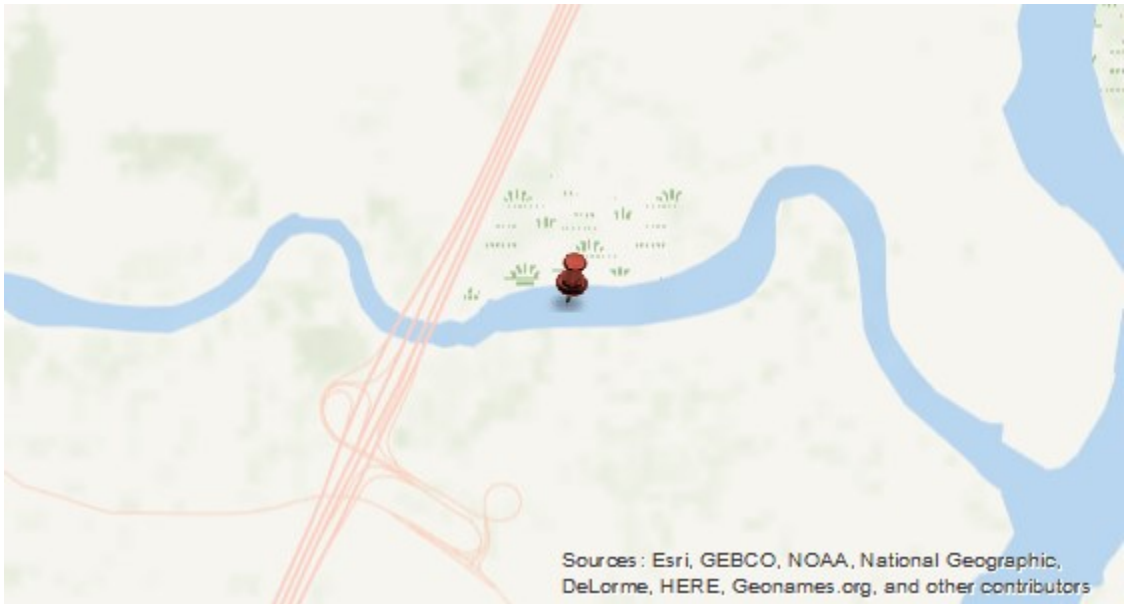
HAPCs

No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

EFH Data Notice: Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional Fishery Management Councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.



Query Results

Map Scale = 1:36,112
Degrees, Minutes, Seconds: Latitude = 40º36'0" N, Longitude = 75º46'28" W
Decimal Degrees: Latitude = 40.60, Longitude = -74.23

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

EFH

Show	Link	Data Caveats	Species/Management Unit	Life stage(s) Found at Location	Management Council	FMP
			Smooth Dogfish	ALL	Secretarial	HMS
			Longfin Inshore Squid	Eggs ALL	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
			Summer Flounder	Adult Juvenile	Mid-Atlantic	Summer Flounder,

Show	Link	Data Caveats	Species/Management Unit	Life stage(s) Found at Location	Management Council	FMP
				Larvae ALL		Scup, Black Sea Bass

HAPCs

No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Rahway River Basin, New Jersey Coastal Storm Risk Management Feasibility Study

Appendix A.6
Statement of Compliance with Coastal Zone Management Rules

New Jersey Coastal Zone Management Evaluation
Rahway River Basin Coastal Storm Risk Management Feasibility Study
Union and Middlesex Counties, New Jersey

INTRODUCTION

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. §§1451-1466) was enacted by Congress in an effort to balance the often competing demands of growth and development with the protection of coastal resources. Its stated purpose is to "…preserve, protect, develop, where possible, to restore or enhance, the resources of the nation's coastal zone…". The Act established the framework for achieving this balance by encouraging the states to develop coastal zone management programs, consistent with minimum federal standards, designed to regulate land use activities that could impact coastal resources. The Coastal Zone Act Reauthorization Act Amendments of 1990 further strengthened the act by requiring the state programs to focus more on controlling land use activities and the cumulative effects of activities within designated coastal zones.

The State of New Jersey administers its Federally-approved coastal zone program through the Department of Environmental Protection, Land Use Regulation Program (LURP). Pursuant to the Federal CZMA, New Jersey has defined its coastal zone boundaries and developed policies to be utilized to evaluate projects within the designated coastal zone, as set forth in New Jersey's Rules on Coastal Zone Management (CZM) (N.J.A.C. 7:7, 7:7E, dated October 17, 2016). The Waterfront Development Law (N.J.S.A. 12:5-3) and related requirements (N.J.A.C. 7:7-3) provide the authority for issuance of permits for, among other activities the reconstruction (with or without expansion) of single family homes.

New Jersey's rules on Coastal Zone Management are employed by the State's Land Use Regulation Program in the review of permit applications and coastal decision-making; they address issues of location, use, and resources. New Jersey's rules provide for a balance between economic development, and coastal resource protection, recognizing that coastal management involves explicit consideration of a broad range of concerns, in contrast to other resource management programs that have a more limited scope of concern.

The proposed project is a coastal storm risk management project involving the implementation of nonstructural measures, and the construction of a levee located within the designated coastal zone of New Jersey, in the City of Rahway, Township of Woodbridge, Borough of Carteret and City of Linden, Union and Middlesex Counties. In addition, as the construction of the levee will potentially impact five acres of tidal and scrub-shrub wetlands, the project will include mitigation for these resources. The following assessment identifies the coastal zone management policies relevant to the proposed coastal storm risk management project and associated environmental resource mitigation. This assessment is based on feasibility level conceptual plans and will be updated during the Preconstruction Engineering Design Phase as more detailed plans are developed and permits applications are submitted.

DISCUSSION OF NEW JERSEY COASTAL ZONE MANAGEMENT POLICIES APPLICABLE TO THE PROPOSED PROJECT

The following section identifies the New Jersey CZM policies, identifies how they are applicable to the proposed project, and discusses the project issues relevant to each.

SUBCHAPTER 9 – SPECIAL AREAS

7:7-9.1 PURPOSE AND SCOPE: Special areas are areas that are so naturally valuable, important for human use, hazardous, sensitive to impact, or particular in their planning requirements, as to merit focused attention and special management rules.

7:7-9.2 SHELLFISH HABITAT
This policy generally limits disturbance of shellfish habitat.

Based on a review of the NJ Shellfish Growing Water Classification Charts developed by the NJDEP, the proposed project is neither located in nor adjacent to designated shellfish habitat. In addition, the proposed project will not impact coastal waters such as the Arthur Kill? Therefore, this policy is not applicable.

7:7-9.3 SURF CLAM AREAS
This policy prohibits development that would destroy or contaminate surf clam areas.

The proposed project is not located in a surf clam area nor would it contaminate surface water, therefore this policy is not applicable to the proposed project.

7:7-9.4 PRIME FISHING AREAS
This policy prohibits sand or gravel submarine mining which would alter existing bathymetry in a manner that would significantly reduce high fishery productivity in prime fishing areas. Prime fishing areas include tidal water areas and water's edge areas which have a demonstrable history of supporting a significant local intensity of recreational or commercial fishing activity in addition to areas identified in "New Jersey's Recreational and Commercial Fishing Grounds of Raritan Bay, Sandy Hook Bay and Delaware Bay and the Shellfish Resources of Raritan Bay and Sandy Hook Bay" by Figley and McCloy (1988) and those areas identified on the map titled, "New Jersey's Specific Sport Ocean Fishing Grounds".

The proposed project is not located in a prime fishing area as defined above nor does the proposed project involve any sand or gravel mining. Therefore, this policy is not applicable.

7:7-9.5 FINFISH MIGRATORY PATHWAYS
This policy prohibits development such as dams, dikes, spillways, channelization, tide gates, and intake pipes that would create physical barriers to migratory fish or degrade water quality such that it interferes with fish movement.

The proposed project would not create permanent physical barriers to migratory fish nor would it degrade water quality. A tide gate will be placed in the levee drainage structure proposed within Casey's Creek to maintain fish passage. Erosion and sediment control best management practies will be implemented during construction to minimize impacts to water quality. The proposed project will have no permanent adverse impacts to water quality. Therefore, the proposed project is in compliance with this policy.

7:7-9.6 SUBMERGED VEGETATION HABITAT

This policy prohibits or restricts development at or near submerged vegetation habitats unless compensation efforts establish self-sustaining habitat for the appropriate species. As defined by the State, submerged vegetation consists of an area that supports or is documented as supporting rooted, submerged vascular plants such as widgeongrass (*Ruppia maritima*), sago pondweed (*Stuckenia pectinata*), horned pondweed (*Zannichellia palustris*), and eelgrass (*Zostera marina*). N.J.A.C. 7:7-9.6 states that in New Jersey, submerged vegetation is most prevalent in the shallow portions of the Navesink, Shrewsbury, Manasquan, and Metedeconk Rivers, and in Barnegat, Manahawkin, and Little Egg Harbor Bays.

Based on a review of "New Jersey Submerged Aquatic Vegetation Distribution" mapping, this policy is not applicable since the proposed project is not located in water areas supporting or documented as previously supporting rooted, submerged vascular plants.

7:7-9.7 NAVIGATION CHANNELS

This policy prohibits construction that would extend into a navigation channel or would result in the loss of navigability. This policy discourages the placement of structures within 50 feet of any authorized navigation channel, unless it can be demonstrated that the proposed structure will not hinder navigation. This policy requires appropriate mitigation measures for development which would cause terrestrial soil and shoreline erosion and siltation in navigation channels.

The Rahway River within the project area does not have a constructed navigation channel. However, it is navigable for small watercraft. All elements of the proposed project are located on land, and are therefore in compliance with this policy.

7:7-9.8 CANALS

This policy prohibits actions that would interfere with boat traffic in canals used for navigation, defined as navigation channels for boat traffic through land areas which are created by cutting and dredging or other human construction technique sometimes enlarging existing natural surface water channels.

This policy is not applicable because the proposed project does not involve or affect navigation canals used for boat traffic through land areas.

7:7-9.9 INLETS

This policy prohibits filling and discourages submerged infrastructure in inlets, which are natural channels through barrier islands allowing movement of fresh and salt water between the ocean and the back-bay system.

This policy is not applicable because the proposed project will not impact any inlets as defined above.

7:7-9.10 MARINA MOORINGS

This policy prohibits non-water dependent development in marina mooring areas and discourages any use that would detract from existing or proposed recreational boating use in marina mooring areas.

This policy is not applicable since the proposed project does not involve development in any marina mooring areas nor does it detract from existing or proposed recreational boating use in marina mooring areas.

7:7-9.11 PORTS

This policy prohibits actions that would preempt or interfere with port uses. Ports are water areas having, or lying immediately adjacent to, concentrations of shoreside marine terminals and transfer

facilities for the movement of waterborne cargo (including fluids), and including facilities for loading, unloading and temporary storage.

This policy is not applicable since the proposed project is not located in a port.

7:7-9.12 SUBMERGED INFRASTRUCTURE ROUTES
This policy prohibits any activity that would increase the likelihood of submerged infrastructure damage or breakage, or interfere with maintenance operations.

There is an existing natural gas pipeline in the western-most footprint of the proposed levee. This pipeline runs perpendicular to the levee, therefore only a small portion of the pipeline will be affected. As part of construction of the levee, the Corps will modify the pipeline to extend emergency shut off valves outside of the levee footprint and the 15 ft no vegetation zone in order to maintain emergency access to the pipeline. Therefore, the proposed project is in compliance with this policy.

7:7E-9.13 SHIPWRECK AND ARTIFICIAL REEF HABITATS
This policy restricts the use of areas with shipwrecks and artificial reefs that would adversely affect the usefulness of the area as a fisheries resource.

This policy is not applicable since there are no shipwrecks or artificial reef habitats in the proposed project area.

7:7-9.14 WET BORROW PITS
Wet borrow pits are scattered artificially created lakes that are the results of surface mining for coastal minerals extending below groundwater level to create a permanently flooded depression. This includes, but is not limited to, flooded sand, gravel, and clay pits, and stone quarries. Where a wet borrow pit is also a wetland and/or wetlands buffer, the wetlands rule, N.J.A.C. 7:7-9.27, and/or wetlands buffers rule, N.J.A.C. 7:7-9.28, shall apply.

This policy is not applicable since the proposed project does not contain nor will make use of any wet borrow pits.

7:7-9.15 INTERTIDAL AND SUBTIDAL SHALLOWS
This policy discourages disturbance of shallow water areas (all permanently or temporarily submerged areas from the spring high water line to a depth of four feet below mean low water).

The levee will be constructed over Casey's Creek, a small, tidal tributary to the Rahway River. The construction of the levee will require minor dredging and filling within the intertidal and subtidal shallows associated with Casey's Creek. However, the proposed project is in the interest of public safety, impacts were minimized to the extent possible, and mitigation for associated impacts is provided for (refer to Appendix A6 of the Draft Feasibility Report/Environmental Assessment). Additionally, the proposed project is compatible with existing land and water uses and is consistent with the filling rule (N.J.A.C. 7:7-12.11).

7:7E-9.16 DUNES
This policy prohibits development on dunes and removal of vegetation from dunes. A dune is a wind or wave deposited or man-made formation of sand (mound or ridge), that lies generally parallel to, and landward of, the beach and the foot of the most inland dune slope.

This policy is not applicable since the proposed project is not located on or near dunes.

7:7-9.17 OVERWASH AREAS

This policy restricts development in over-wash areas, an area subject to accumulation of sediment, usually sand, that is deposited landward of the beach or dune by the rush of water over the crest of the beach berm, a dune or a structure.

This policy is not applicable since the proposed project is not located on over-wash areas.

7:7-9.18 COASTAL HIGH HAZARD AREAS
This policy restricts development in coastal high hazard areas, flood prone areas subject to high velocity waters as delineated on FEMA maps and areas within 25 feet of oceanfront shore protection structures, which are subject to wave run-up and overtopping. The coastal high hazard area is identified as Zone V on Flood Insurance Rate Maps (FIRMs).

Based on a review of FEMA Flood Insurance Rate Maps, the proposed project area is located in Zone AE. Therefore, this policy is not applicable.

7:7-9.19 EROSION HAZARD AREAS
This policy prohibits development in erosion hazard areas under most circumstances, to protect public safety. Erosion hazard areas are shoreline areas that are eroding and/or have a history of erosion, causing them to be highly susceptible to further erosion, and damage from storms.

This policy is not applicable since the proposed project is not located on a shoreline area that is susceptible to storm related erosion and damage.

7:7-9.20 BARRIER ISLAND CORRIDOR
This policy restricts new development on barrier islands. Barrier island corridors are the interior portions of oceanfront barrier islands, spits and peninsulas.

None of the municipalities within the project area are barrier islands; therefore this policy does not apply.

7:7E-9.21 BAY ISLANDS
This policy restricts development on bay islands, islands or filled areas surrounded by tidal waters, wetlands, beaches or dunes, lying between the mainland and barrier island.

None of the municipalities within the project area are islands; therefore this policy does not apply.

7:7-9.22 BEACHES
This policy restricts development on beach areas. Beaches are gently sloping areas of sand or other unconsolidated material, found on all tidal shorelines, including ocean, bay, and river shorelines that extend landward from the mean high water line.

This policy is not applicable since the proposed project is not located on any beaches.

7:7-9.23 FILLED WATER'S EDGE
This policy seeks to promote water dependent uses at areas along the waterfront that have been previously filled. Filled water's edge areas are existing filled areas lying between wetlands or water areas, and either the upland limit of fill, or the first paved public road or railroad landward of the adjacent water area, whichever is closer to the water.

A portion of the proposed levee is located within a Middlesex County owned park. Specifically, the levee alignment is located along an existing walking trail that parallels the Rahway River and a tidal

wetlands complex. The portion of the park on the north side of the walking trail has been developed to include athletic fields, tennis courts, a playground, comfort stations and a parking lot. The portion of the park on the south side of the walking trial is relatively undeveloped with the exception of a wildlife observation deck and consists of the Rahway River river bank and the tidal wetland complex. Although the area is not known to be filled water's edge areas. However, some filling of wetlands has occurred through development of park infrastructure.

The proposed activities will not reduce or adversely affect the area currently or recently devoted to any water dependent use and complies with the Public Access rule (N.J.A.C. 7:7- 16.9) as public access to the waterfront will be maintained by including a footpath on top of the levee and replacing the wildlife observation deck after construction of the levee.

7:7-9.24 EXISTING LAGOON EDGES

This policy restricts development at lagoon edges. Existing lagoon edges are defined as existing manmade land areas resulting from the dredging and filling of wetlands, bay bottom, and other estuarine water areas for the purpose of creating waterfront lots along lagoons for residential and commercial development.

This policy is not applicable since the proposed project is not located along any lagoon edges.

7:7-9.25 FLOOD HAZARD AREAS

This policy is designed to restrict development in flood hazard areas to ensure that the waterfront is not pre-empted by uses that could function equally at inland locations. The goal of this rule is to reduce losses of life and property resulting from unwise development of flood hazard areas, and allow uses compatible with periodic flooding. Flood hazard areas are areas subject to flooding from the flood hazard area design flood, as defined by NJDEP under the Flood Hazard Area Control Act rules at N.J.A.C. 7:13. Flood hazard areas include those areas mapped as such by the NJDEP, areas defined or delineated as an A or a V zone by the FEMA, and any unmapped areas subject to flooding by the flood hazard area design flood.

Per the FEMA FIRM for Carteret, the proposed project is located in Flood Zone AE with a base flood elevation of +7 feet NAVD 88. Since the proposed project is a coastal storm risk management project involving the implementation of nonstructural measures (e.g. wet/dry floodproofing, elevation) and a levee, the project is compatible with this policy.

7:7-9.26 RIPARIAN ZONES

This policy restricts development in riparian zones around regulated waters.

Per 7:13-4.1 (c) of the Flood Hazard Area Control Act Rules, the regulated riparian zone is 50 feet. All elements of the proposed project are outside of this zone. Therefore, this policy is not applicable.

7:7-9.27 WETLANDS

This policy restricts disturbance in wetland areas and requires mitigation if wetlands are destroyed or disturbed.

The proposed levee and associated 15 vegetation free zone will permanently impact approximately 5 acres of wetlands. The specific wetland types include 2.3 acres of low marsh, 1.8 acres of phragmites dominated high marsh, 0.50 acres of deciduous scrub-shrub wetlands. Approximately 1.13 acres of of wetlands will be temporarily impacted by the construction of the levee.

The temporarily impacted wetlands and buffers will be restored after construction and the permanently impacted wetlands will be mitigated for as described in Appendix A8 of the draft Feasibility Report/Environmental Assessment. All permits will be applied for after the project is authorized for construction and during the Preconstruction Engineering Phase.

7:7-9.28 WETLAND BUFFERS
This policy restricts development in wetland buffer areas in order to protect wetlands.

The proposed levee is located within the upper boundaries of a wetland complex in which the majority of the wetland buffer area has already been modified by development. However, temporary impacted wetlands and buffers will be restored and permanently impacted areas will be mitigated for as described in Appendix A8 of the draft Feasibility Report/Environmental Assessment.

7:7-9.29 COASTAL BLUFFS
This policy restricts development on coastal bluffs.

This policy is not applicable since the proposed project is not located along any coastal bluffs.

7:7-9.30 INTERMITTENT STREAM CORRIDORS
This policy restricts actions in intermittent stream corridors.

This policy is not applicable since the proposed project is not located in intermittent stream corridors.

7:7-9.31 FARMLAND CONSERVATION AREAS
This policy seeks to maintain and protect large parcels of land used for farming for farming or farm dependent uses.

This policy is not applicable since the proposed project is not located near or on farmland conservation areas.

7:7-9.32 STEEP SLOPES
This policy seeks to preserve steep slopes by restricting development in such areas.

This policy is not applicable since the proposed project is not located on steep slopes.
The topography within the project area is relatively flat, with significant slopes limited to the proposed levee.

7:7-9.33 DRY BORROW PITS
This policy restricts the use and provides maintenance of dry borrow pits within acceptable limits.

This policy is not applicable since the proposed project is not located near dry borrow pit areas.

7:7E-9.34 HISTORIC AND ARCHAEOLOGICAL RESOURCES
This policy protects the value of historic and archaeological resources and may require cultural resource surveys and other protective measures.

A preliminary assessment was carried out for the study area to identify documented historic properties and archaeological sites within the vicinity of the project area (See Appendix A.4). A number of the structures identified for non-structural flood risk management measures are within the Upper Rahway Historic District and are adjacent to the Rahway River Parkway Historic District. The proposed levee intersects with the Inch Lines Linear Multistate Historic District, an oil pipeline that is now operating as a natural gas pipeline. Additional survey and public and agency coordination will be carried out to

identify previously undocumented historic properties eligible for the National Register of Historic Places and to investigate areas with archaeological potential. Adverse effects to resources within the project area will be considered as the plans are developed. Section 106 of the National Historic Preservation Act also requires consideration of these resources and directs federal agencies to address adverse effects through avoidance, minimization of impacts, and mitigation, if necessary. A Programmatic Agreement has been prepared that directs these actions and ensures ongoing coordination with the State Historic Preservation Office and other interested parties, therefore the project is compatible with this policy.

7:7-9.35 SPECIMAN TREES
This policy seeks to protect specimen trees.

This policy is not applicable since the proposed project does not contain any known specimen trees.

7:7-9.36 ENDANGERED OR THREATENED WILDLIFE OR PLANT SPECIES HABITATS
This policy restricts development in endangered or threatened wildlife or vegetation species habitat areas.

Endangered or threatened wildlife or plant species habitats are terrestrial and aquatic (marine, estuarine, or freshwater) areas known to be inhabited on a seasonal or permanent basis by or to be critical at any stage in the life cycle of any wildlife or plant identified as “endangered” or “threatened” species on official federal or state lists of endangered or threatened species, or under active consideration for state or federal listing. The definition of endangered or threatened wildlife or plant species habitats includes a sufficient buffer area to ensure continued survival of the population of the species as well as areas that serve an essential role as corridors for movement of endangered or threatened wildlife. Absence of such a buffer area does not preclude an area from being endangered or threatened wildlife or plant species habitat.

Development of endangered or threatened wildlife or plant species habitat is prohibited unless it can be demonstrated, through an endangered or threatened wildlife or plant species impact assessment as described at N.J.A.C. 7:7-11, that endangered or threatened wildlife or plant species habitat would not directly or through secondary impacts on the relevant site or in the surrounding area be adversely affected.

Based on an official Endangered and Threatened species list the District obtained from the U.S. Fish and Wildlife Service, there is the potential for the endangered Indiana bat (Myotis sodalis), and threatened northern long eared bat (Myotis septentrionalis) to occur within the project area. These species will be protected during construction by the implementation of a tree clearing restriction from from 1 April through 30 September.

Studies conducted by the New Jersey Department of Environmental Protection Division of Fish and Wildlife in 2016 identified two active American bald eagle nests; one in Linden and one in Kearny, approximately two miles from the project area.

The wetland complexes in the lower portion of the Rahway River have documented foraging habitat for approximately 27 state listed endangered, threatened and special concern species. The full list is located in Section 3.6.2 of the main draft Feasibility Report/Environmental Assessment.

Based on a review of NJ-Geoweb, the wetland complex in which the proposed levee is located has been documented as having suitable foraging habitat for cattle egret, snowy egret, black-crowned night heron, little blue heron and glossy ibis.

Although the proposed project will permanently impact wetlands, the project is located within the upper boundary of the wetlands that have already experienced modification. A vegetation clearing restriction from 15 April through 31 August will be implemented during construction to protect migratory bird species. In addition, the proposed on-site mitigation will serve to enhance foraging habitat for bird species.

The anticipated level of ground disturbance from implementing the nonstructural measures will be centered around the existing foundations and within the same boundaries of prior disturbance and therefore would not adversely impact habitat, either directly or through secondary impacts on the relevant site or in the surrounding area. The Corps will continue to coordinate throughout all phases of the proposed project with the USFWS, NOAA Fisheris, and/or the NJDEP to remain consistent with this policy.

7:7-9.37 CRITICAL WILDLIFE HABITATS

This policy discourages development that would adversely affect critical wildlife habitat. Critical wildlife habitats are specific areas known to serve an essential role in maintaining wildlife, particularly in wintering, breeding, and migrating. Definitions and maps of critical wildlife habitats are currently available only for colonial waterbird habitat in the 1979 Aerial Colony Nesting Waterbird Survey for New Jersey. Other sites are considered on a case-by- case basis by the Division of Fish and Wildlife.

Development that will directly or through secondary impacts on the relevant site or in the surrounding region adversely affect critical wildlife habitats is discouraged, unless: minimal feasible interference with the habitat can be demonstrated; there is no prudent or feasible alternative location for the development; and the proposal includes appropriate mitigation measures.

The proposed project is not known to serve as critical wildlife habitat as defined by the state of New Jersey. The project area is included in the Arthur Kill and Tributaries Important Bird Area as designated by the National Audubon Society. In addition, the proposed project is located within the Arthur Kill Complex which is part of the Significant Habitats and Habitat Complexes of the New York Bight Watershed as determined by the U.S. Fish and Wildlife Service.

Although the proposed levee will permanently impact wetlands, the project is located within the upper boundary of the wetlands that have already experienced modification. A vegetation clearing restriction from 1 April through 31 August will be implemented during construction to protect migratory bird species. In addition, the proposed on-site mitigation will serve to enhance foraging habitat for bird species. The nonstructural measures will not have any adverse impacts
Therefore, the proposed project is in compliance with this policy.

7:7-9.38 PUBLIC OPEN SPACE

This policy encourages new public open spaces and discourages development that might adversely affect existing public open space. Public open space refers to lands owned or maintained by federal, state, or local agencies and which are dedicated to the conservation of public recreation, natural resources, visual or physical public access, and/or the protection and management of wildlife.

Development that adversely affects existing public open space is discouraged. Development within existing public open space is conditionally acceptable, provided that the development is consistent with the character and purpose of public open space, as described by the park master plan when such a plan exists. All new development adjacent to public open space will be required to provide an adequate buffer area.

A portion of the proposed levee is located within Joseph Medwick Memorial Park which is owned and operated by Middlesex County. Recreational facilities within the park include a walking path, tennis courts, playgrounds, a comfort station, wildlife observation decks, and athletic fields. The levee footprint is located within an existing walking path and will require the removal of a wildlife observation deck that overlooks a tidal wetland. However, the top of the levee will be paved to continue the footpath and the wildlife observation deck will be replaced after construction.

The project would serves to protect public open space from storms and floods and is consistent with the goals of the Borough of Carteret Access Plan (adopted June 2015) to preserve public land and to support future regional conservation and recreation needs within the Borough. Therefore, the proposed project is consistent with this policy.

7:7-9.39 SPECIAL HAZARD AREAS

This policy discourages development in hazard areas. Special hazard areas include areas with a known actual or potential hazard to public health, safety, and welfare, or to public or private property, including areas where hazardous substances are used or disposed, including adjacent areas and areas of hazardous material contamination.

This policy is not applicable since the proposed project does not affect special hazard areas.

7:7-9.40 EXCLUDED FEDERAL LANDS

Excluded federal lands are those lands, the use of which is, by law, subject solely to the discretion of or held in trust by the federal government, its officers, or agents. New Jersey has the authority to review activities on Federal lands if impacts may occur in New Jersey's Coastal Zone.

This policy is not applicable since the proposed project is not on the list of Excluded Federal Lands.

7:7-9.41 SPECIAL URBAN AREAS

This policy seeks to encourage development that would help to restore the economic and social viability of certain municipalities that receive state aid. Special urban areas are those municipalities defined in urban aid legislation (N.J.S.A.52:27D178) qualified to receive state aid to enable them to maintain and upgrade municipal services and offset local property taxes.

This policy is not applicable since the proposed project is not located in special urban areas.

7:7-9.42 PINELANDS NATIONAL RESERVE AND PINELANDS PROTECTION AREA

This policy allows the Pinelands Commission to serve as the reviewing agency for actions within the Pinelands National Reserve.

This policy is not applicable since the proposed project is not within the Pinelands National Reserve.

7:7-9.43 HACKENSACK MEADOWLANDS DISTRICT

This policy allows the Hackensack Meadowlands Development Commission to serve as the reviewing agency for actions within the Hackensack Meadowlands District.

This policy is not applicable since the proposed project is not within the Hackensack Meadowlands District.

7:7-9.44 WILD AND SCENIC RIVER CORRIDORS

This policy recognizes the outstanding value of certain rivers in New Jersey by restricting development to compatible uses. Wild and scenic river corridors are all rivers designated into the National Wild and

Scenic Rivers System and any rivers or segments thereof being studied for possible designation into that system pursuant to the National Wild and Scenic Rivers Act (16 U.S.C. 1271-1278).

This policy is not applicable since the proposed project is not located in any Wild and Scenic River Corridor.

7:7-9.45 GEODETIC CONTROL REFERENCE MARKS

This policy discourages the disturbance of geodetic control reference marks. Geodetic control reference marks are traverse stations and benchmarks established or used by the New Jersey Geodetic Control Survey pursuant to P.L. 1934, c.116. They include monuments, disks, points, rivets, and marks.

This policy is not applicable since the proposed project area does not contain any known geodetic control reference marks.

7:7-9.46 HUDSON RIVER WATERFRONT AREA

This policy restricts development along the Hudson River Waterfront and requires development, maintenance, and management of a section of the Hudson Waterfront Walkway coincident with the shoreline of the development property.

This policy is not applicable since the proposed project is not located in the Hudson River Waterfront Area.

7:7-9.47 ATLANTIC CITY

This policy restricts development within the municipal boundary of the City of Atlantic City.

This policy is not applicable since the proposed project is not located in Atlantic City.

7:7-9.48 LANDS AND WATERS SUBJECT TO PUBLIC TRUST RIGHTS

This policy restricts development that adversely affects lands and waters subject to public trust rights. Lands and waters subject to public trust rights are tidal waterways and their shores, including both lands now or formerly below the mean high water line, and shores above the mean high water line. Tidal waterways and their shores are subject to the Public Trust Doctrine and are held in trust by the state for the benefit of all the people, allowing the public to fully enjoy these lands and waters for a variety of public uses.

This policy is not applicable since the proposed project is not located on lands and waters subject to public trust rights.

7:7:9.49 DREDGED MATERIAL MANAGEMENT AREAS

A dredged material management area is an area documented through historical data, including, but not limited to, aerial photography, historic surveys, and/or previously issued permits, as having been previously used for the placement of sediment associated with the dredging of State and/or Federal navigation channels and marinas.

This policy is not applicable since the proposed project is not located within or near any dredged material management areas.

SUBCHAPTER 10 – STANDARDS FOR BEACH AND DUNE ACTIVITIES

This subchapter sets forth the standards applicable to routine beach maintenance, emergency post-storm restoration, dune creation and maintenance, and construction of boardwalks. These standards are referenced at N.J.A.C. 7:7-9.16, Dunes; N.J.A.C. 7:7-9.17, Overwash areas; N.J.A.C.

7:7-9.19, Erosion hazard areas; N.J.A.C. 7:7-9.22, Beaches; and N.J.A.C. 7:7-15.11, Coastal engineering. In addition, N.J.A.C. 7:7-10.2, 10.3, and 10.4 are the standards for the general permit for beach and dune maintenance activities, N.J.A.C. 7:7-6.2.

This policy is not applicable because the proposed project is not located in an area that contains any beaches and/or dunes.

SUBCHAPTER 11 – STANDARDS FOR CONDUCTING AND REPORTING THE RESULTS OF AN ENDANGERED OR THREATENED WILDLIFE OR PLANT SPECIES HABITAT IMPACT ASSESSMENT AND/OR ENDANGERED OR THREATENED SPECIES HABITAT EVALUATION

This section details the performance and reporting standards for impact assessments for endangered and threatened wildlife species. If required, based on updated relevant agency correspondence, habitat/impact assessments for endangered and threatened species will conform to the performance and reporting standards listed.

This policy restricts development in endangered or threatened wildlife or vegetation species habitat areas.

Refer to Section 7:7-9:36. The Corps will continue coordination with the U.S. Fish and Wildlife Service and NOAA-Fisheries throughout all phases of the project.

SUBCHAPTER 12 – GENERAL WATER AREAS

7:7-12.1 PURPOSE AND SCOPE

General water areas are all water areas which are located below either the spring high water line or the normal water level of non-tidal waters. Sections 7:7-12.2-12.24 set forth the requirements for specific types of development within general water areas.

7:7-12.2 SHELLFISH AQUACULTURE

This policy sets standards for shellfish aquaculture. Shellfish aquaculture means the propagation, rearing, and subsequent harvesting of shellfish in controlled or selected environments, and the processing, packaging and marketing of the harvested shellfish. Shellfish aquaculture includes activities that intervene in the rearing process to increase production such as stocking, feeding, transplanting, and providing for protection from predators. For the purposes of this section, shellfish means any species of benthic mollusks including hard clams (*Mercenaria mercenaria*), soft clams (*Mya arenaria*), surf clams (*Spisula solidissma*), bay scallops (*Aequipectin irradians*), and oysters (*Crassostrea virginica*). Shellfish shall not include conch, specifically, knobbed whelks (*Busycon carica*),lightning whelks (*Busycon contrarium*), and channeled whelks (*Busycotypus canaliculatus*).

This policy is not applicable because the proposed project is not located within or near any shellfish aquaculture areas.

7:7-12.3 BOAT RAMPS

This policy sets standards for the installation of boat ramps.

This policy is not applicable because there are not boat ramps within the project a.

7:7-12.4 DOCKS AND PIERS FOR CARGO AND COMMERCIAL FISHERIES

This policy sets standards for the installation of docks and piers specific for cargo and passenger movement either supported on pilings driven into the bottom substrate or floating on the water surface, used for loading and unlocking passengers or cargo and ensure they do not interfere with navigation.

This policy is not applicable because there are no docks or piers as described above within the project footprint.

7:7-12.5 RECREATIONAL DOCKS AND PIERS
This policy sets standards for recreational and fishing docks and piers supported on pilings driven into the bottom substrate or floating on the water surface or cantilevered over water, which are used for recreation fishing or for the mooring of boats or jet skis used for fishing or recreation.

This policy is not applicable because there are no such piers in area.

7:7-12.6 MAINTENANCE DREDGING
This policy sets standards for maintenance Maintenance dredging is the periodic removal of accumulated sediment from previously legally dredged navigation and access channels, marinas, lagoons, canals, or boat moorings for the purpose of safe navigation.

This policy is not applicable because it does not involve maintenance dredging.

7:7-12.7 NEW DREDGING

New dredging is the removal of sediment that does not meet the definition of maintenance dredging at N.J.A.C. 7:7-12.6 or the definition of environmental dredging at N.J.A.C. 7:7-12.8.

Approximately 200 cubic yards of sediment will be removed from within the channel of Casey's Creek as part of the construction of the proposed levee.

7:7-12.8 ENVIRONMENTAL DREDGING
Environmental dredging means new dredging performed in a special hazard area designated as such pursuant to N.J.A.C. 7:7-9.39 specifically to remove contaminated sediments for the purpose of remediating to an environmental standard as specified in the Department's Technical Requirements for Site Remediation, N.J.A.C. 7:26E.

This policy is not applicable to the proposed project as it does not involve dredging as described above.

7:7-12.9 DREDGED MATERIAL DISPOSAL
Dredged material disposal is the discharge of sediments removed during dredging operations in water areas. Dredged material disposal does not include the beneficial use of dredged material for the purposes of habitat creation, restoration, or enhancement, artificial reef construction, or the establishment of living shorelines.

The construction contractor will dispose of the sediments in a suitable authorized upland facility in accordance with NJDEP regulations.

7:7-12.10 SOLID WASTE OR SLUDGE DUMPING
This policy prohibits the dumping of solid waste or sludge into a water areas. Solid waste or sludge is defined as the discharge of solid or semi-solid waste material from industrial or domestic sources or sewage treatment operations into a water area.

The construction contractor will be required to prepare an Environmental Protection Plan that will outlined measures taken to prevent any unregulated discharges.

7:7-12.11 FILLING
This policy sets standards related to fill activities within water areas. Filling is defined as the deposition of material including, but not limited to, sand, soil, earth, and dredged material, into water areas for the purpose of raising water bottom elevations to create land areas.

In cases where there is no alternative to filling, filling is conditionally acceptable provided: 1) The use that requires the fill is water-dependent; 2) There is a demonstrated need that cannot be satisfied by existing facilities; 3) There is no feasible or practicable alternative site on an existing water's edge; 4) The minimum practicable area is filled; 5) The adverse environmental impacts are minimized; 6) Minimal feasible interference is caused to special areas, as defined at N.J.A.C. 7:7-9; and 7) Pilings and columnar support or floating structures are unsuitable for engineering or environmental reasons.

The proposed project is a water-dependent project whose function cannot be accomplished at an alternate location. An alternatives evaluating various non-structural and structural alternatives was conducted and is discussed in the main report of the draft Feasibility Report/Environmental Assessment. The most practicable overall alternative plan that met the planning objectives, maximized socioeconomic benefits, and avoided or minimized environmental impacts has been selected. Mitigation to compensate for unavoidable habitat loss is discussed in Appendix A8 of the draft Feasibility Report/Environmental Assessment. Further evaluations to minimize impacts on environmental resources and avoid impacts on protected resources to the extent possible will occur in the Preconstruction Engineering Design Phase. As such, the proposed project is in compliance with this policy.

7:7-12:12 MOORING
This policy sets standards for mooring structures. A boat mooring is a temporary or permanently fixed or floating anchored facility in a water body for the purpose of attaching a boat.

The proposed project does not involve the installation of any mooring structures. Therefore, this policy not applicable.

7:7 12.13 SAND AND GRAVEL MINING
This policy sets standards for sand and gravel mining in water bodies. Sand and gravel mining is the removal of sand or gravel from the water bottom substrate, usually by suction dredge, for the purpose of using the sand or gravel at another location.

This policy is not applicable to the proposed project.

7:7-12.14 BRIDGES
This policy sets standards for the construction of bridges located within the CZM area.

This policy is not applicable as the proposed project does not involve the construction or modification of any bridges.

7:7 -12:15 SUBMERGED PIPELINES
This policy sets standards for Submerged pipelines (pipelines) are underwater pipelines which transmit liquids or gas, including crude oil, natural gas, water petroleum products or sewerage.

The levee will be constructed over an existing natural gas pipeline. As a result, the modifications to the pipeline in the form of extending shutoff valves to outside the levee footprint will be required. The proposed project will adhere to all standards within this policy for compliance.

7:7-12:16 OVERHEAD TRANSMISSION LINES
This policy sets standards for overhead transmission lines installed along or within waterbodies.

There are not overhead transmission lines within the project area. Therefore, this policy is not applicable.

7:7-12:17 DAMS AND IMPOUNDMENTS
Dams and impoundments are structures that obstruct natural water flow patterns for the purpose of forming a contained volume of water. Impoundments include dikes with sluice gates and other structures to control the flow of water.

Dams and impoundments are conditionally acceptable in medium rivers, creeks, and streams provided: 1) The structures are essential for water supply purposes or for creation of special wildlife habitats; 2) Adverse impacts are minimized; and 3) The structures will not adversely affect navigation routes.

The proposed levee is necessary to manage coastal storm risk within the Borough of Carteret and the Township of Woodbringe. The levee will be designed to minimize impacts on environmental resources and avoid impacts on protected resources to the extent possible, and provide mitigation to compensate for unavoidable habitat loss. Additionally, the project will not adversely affect any navigation routes. As such, the proposed project is in compliance with this policy.

7:7-12:18 OUTFALLS AND INTAKES
This policy sets standards for the installation of outfalls and intakes within waterways. Outfalls and intakes are pipe openings that are located in water areas for the purpose of intake of water or discharge of effluent including sewage, stormwater and industrial effluents.

7:7-12.19 REALIGNMENT OF WATER AREAS
Realignment of water areas means the physical alteration or relocation of the surface configuration of any water area.

Approximately 200 linear feet of Casey's Creek will be modified as a result of the construction of the levee and installation of the drainage structure. A tide/flapgate will be installed to maintain normal flows of the creek. In addition, impacts to the creek will be compensated for through on-site mitigation. Refer to Appendix A8 for further discussions on mitigation. Additionally, surface water quality will be temporarily impacted during construction because of increased suspended sediments in the water column. However, implementation of soil erosion and sediment control measures will minimize any adverse impacts.

7:7-12.20 VERTICAL WAKE OR WAVE ATTENUATION STRUCTURES
Vertical wake or wave attenuation structures are structures designed to protect boat moorings, including those at marinas, by intercepting wakes or waves and reducing the wake or wave energy which would normally impact the adjacent boat mooring areas. Typically, timber, metal, or vinyl wake or wave attenuation structures are designed and utilized to protect boat moorings. For the purposes of this section, a vertical wake or wave attenuation structure does not include a breakwater constructed of concrete or rubble mound. Breakwaters designed to protect shoreline areas shall comply with the filling rule, N.J.A.C. 7:7-12.11, and the coastal engineering rule at N.J.A.C. 7:7-15.11.

The proposed project does not involve the construction of any structures defined above. Therefore this policy is not applicable.

7:7-21 SUBMERGED CABLES
This policy sets standards for the construction of submerged cables such as underwater telecommunication cables, and all associated structures in the water such as repeaters.

The proposed project does not involve the installation of submerged cables and is therefore not applicable.

7:7-12.22 ARTIFICIAL REEFS
This policy sets standards for the construction of artificial reefs. Artificial reefs are man-made structures intended to simulate the characteristics and functions of natural reefs created by placing hard structures on the sea-floor for the purpose of enhancing fish habitat and/or fisheries. In time, an artificial reef will attain many of the biological and ecological attributes of a natural reef. Artificial reefs do not include shore protection structures, pipelines, fish aggregating devices, and other structures not constructed for the sole purpose of fish habitat.

The proposed project does not involve the creation of artificial reefs and is therefore not applicable.

7:7-12.23 LIVING SHORELINES
This policy sets to standards to the creation of living shorelines. Living shorelines are a shoreline management practice that addresses the loss of vegetated shorelines and habitat in the littoral zone by providing for the protection, restoration or enhancement of these habitats. This is accomplished through the strategic placement of vegetation, sand or other structural and organic materials.

The proposed project does not involve the creation of living shorelines and is therefore not applicable.

SUBCHAPTER 13 – REQUIREMENTS FOR IMPERVIOUS COVER AND VEGETATIVE COVER FOR GENERAL LAND USE AREAS AND CERTAIN SPECIAL AREAS
This policy sets forth requirements for impervious cover and vegetative cover on sites in the upland waterfront development area and CAFRA areas.

The proposed project is not located in an area designated as CAFRA nor is it located in an area that sets allowable limits for maximum allowable impervious cover. The implementation of nonstructural measures would remain within the existing footprint of the development and will abide by the applicable impervious cover limits and vegetative cover percentages as determined under N.J.A.C. 7:7E-5B.

Therefore, the proposed project is compatible with this policy.

SUBCHAPTER 14 – GENERAL LOCATION RULES

7:7-14.1 LOCATION OF LINEAR DEVELOPMENT
This policy sets conditions for acceptability of linear development (e.g., roads, walkways, pipelines).

This policy is not applicable since there is no linear development associated with the proposed project.

7:7-14.2 BASIC LOCATION

This policy states that the NJDEP may reject or conditionally approve a project for safety, protection of certain property, or preservation of the environment.

The proposed project would involve protecting private and public property through the implementation of nonstructural measures and a levee. The location of the coastal storm risk management measures are necessary to provide the necessary storm risk management to the surrounding community.

7:7-14.3 SECONDARY IMPACTS
This policy sets the requirements for secondary impact analysis from the effects of additional development likely to be constructed as a result of the approval of a particular proposal. Secondary impacts are the effects of additional development likely to be constructed as a result of the approval of a particular proposal. Secondary impacts can also include traffic increases, increased recreational demand and any other offsite impacts generated by onsite activities which affect the site and surrounding region.

This policy is not applicable because the proposed project would not involve additional development nor would induce additional development.

SUBCHAPTER 15- USE RULES

7:7-15.1 PURPOSE AND SCOPE: Use rules are rules and conditions applicable to particular kinds of development. In general, conditions contained in the use rules must be satisfied in addition to the location rules (N.J.A.C. 7:7-9 through 14), and the resource rules described in the following subchapter (N.J.A.C. 7:7-16).

7:7-15.2 HOUSING USE
This policy sets standards for housing construction in coastal areas.

The proposed project involves implementing nonstructural measures and a levee to protect existing residential and business structures and does not include new construction or expansion of the existing footprint. The proposed project is compatible with this policy.

7:7-15.3 RESORT/RECREATIONAL USE
This policy sets standards for resort and recreational uses in the coastal area.

This policy is not applicable because the proposed project does not involve resort or recreational uses.

7:7-7.14 MARINA DEVELOPMENT
This policy sets standards for marina development in the coastal area.

This policy is not applicable since the proposed project does not include marina development.

7:7-7.15 ENERGY FACILITY USE
This policy sets standards for energy uses in coastal areas.

This policy is not applicable because the proposed project does not involve new construction that would require long-term energy use.

7:7-15.5 TRANSPORTATION USE

This policy sets standards for roads, public transportation, footpaths and parking facilities in coastal areas.

This policy is not applicable since the proposed project does not involve construction of roads, public transportation, footpaths and/or parking facilities.

7:7-15.6 PUBLIC FACILITY USE
This policy sets standards for public facilities (e.g., solid waste facilities) in coastal areas.

This policy is not applicable since the proposed project does not involve construction of a public facility.

7:7-15.7 INDUSTRY USE
This policy sets standards for industrial uses in coastal areas.

This policy is not applicable because the proposed project does not involve construction of industrial facilities.

7:7-15.8 MINING USE
This policy sets standards for mining in coastal areas.

This policy is not applicable because the proposed project does not involve mining.

7:7-15.9 PORT USE
This policy sets standards for port uses and port-related development.

This policy is not applicable because the proposed project does not involve port use or the construction of a port.

7:7-15.10 COMMERCIAL FACILITY USE
This policy sets standards for commercial facilities such as hotels, and other retail services in the coastal zone.

This policy is not applicable since the proposed project does not involve construction of commercial facilities.

7:7-15.11 COASTAL ENGINEERING
This policy sets standards to protect the shoreline, maintain dunes, and provide beach nourishment. Coastal engineering measures include a variety of non-structural, hybrid, and structural shore protection and storm damage reduction measures to manage water areas and protect the shoreline from the effects of erosion, storms, and sediment and sand movement. Beach nourishment, sand fences, pedestrian crossing of dunes, stabilization of dunes, dune restoration projects, dredged material management, living shorelines, and the construction of retaining structures such as bulkheads, gabions, revetments, and seawalls are all examples of coastal engineering measures.

The proposed project includes the construction of a levee and nonstructural measures. Therefore, the Coastal Engineering Use Rule applies. The project will be designed to comply with the standards relevant to coastal engineering and provide maximum flood protection while minimizing impacts to natural resources and maintaining public access to the Rahway River. Therefore, the proposed project is in compliance with this rule.

7:7-15.12 DREDGED MATERIAL PLACEMENT ON LAND
This policy sets standards for disposal of dredged materials.

During construction, the contractor will be required to adhere to an Erosion and Sediment Control Plan and develop an Environmental Protection Plan to deal with any excavated material. In addition, any excavated material will be disposed of at a state approved facility. Therefore, the project is in compliance with this policy. This rule applies to the placement of dredged material landward of the spring high water line. The standards for dredged material disposal in water areas are found at N.J.A.C. 7:7-12.9. The future contractor will dispose of the sediments in a suitable authorized upland facility in accordance with NJDEP regulations.

7:7-15.13 NATIONAL DEFENSE FACILITIES USE
This policy sets standards for the location of defense facilities in the coastal zone.

This policy is not applicable since the proposed project does not involve national defense facilities.

7:7-15.14 HIGH RISE STRUCTURES
This policy sets standards for high rise structures in the coastal zone.

This policy is not applicable because the proposed project does not involve high rise structures.

SUBCHAPTER 16 – RESOURCE RULES

7:7-16.1: PURPOSE AND SCOPE: This subchapter contains the standards the Department utilizes to analyze the proposed development in terms of its effects on various resources of the built and natural environment of the coastal zone, both at the proposed site as well as in its surrounding region.

7:7-16.2 MARINE FISH AND FISHERIES
This policy sets standards of acceptability so as to cause minimal feasible interference with the reproductive and migratory fish patterns of estuarine and marine species of finfish and shellfish.

The portion of the Rahway River in which the proposed levee is located is designated as Essential Fish Habitat for smooth dogfish. Depending on the results of optimization of the Tentatively Selected Plan, the levee will be impacting between approximately 2.5 to 5.5 acres of tidal wetlands. In addition, the levee will be extending across Casey's' Creek, a tidal tributary to the Rahway River. Mitigation to compensate for the permanent impacts to tidal wetlands is currently being evaluated. A tide gate will be installed in the levee to maintain flows to minimize impacts to aquatic resources within Casey's Creek. An Essential Fish Habitat Assessment indicating minor adverse impacts to EFH species is located in Appendix A-6. Therefore, the project is in compliance with this policy.

7:7-16.3 WATER QUALITY
This policy sets standards for coastal development to limit effects on water quality.

Short-term water quality impacts resulting from construction activities may occur and are anticipated to be localized to the vicinity of the footprint proposed levee. Erosion and sediment control best management practices will be implemented during construction to minimize impacts to water quality. No long-term impacts to the offshore or near-shore water quality are anticipated as a result of the proposed project.

7:7-16.4 SURFACE WATER USE
This policy sets standards for coastal development so as to limit effects on surface water.

Short-term water quality impacts resulting from construction activities are expected and are anticipated to be localized proximal to the footprint of the proposed levee. Erosion and sediment control best management practices will be implemented during construction to minimize impacts to surface water. A tide gate will be implemented in the levee drainage structure to maintain flow of Casey's Creek.

7:7-16.5 GROUNDWATER USE
This policy sets standards for coastal development so as to limit effects on groundwater supplies.

This policy is not applicable because the proposed project does not involve or effect future use of groundwater supplies.

7:7-16.6 STORMWATER MANAGEMENT
This policy sets standards for coastal development so as to limit effects of storm-water runoff.

The proposed project would not involve or effect future storm-water management.

7:7-16.7 VEGETATION
This policy sets standards for coastal development while protecting native vegetation. Vegetation is the plant life or total plant cover that is found on a specific area, whether indigenous or introduced by humans. Coastal development shall preserve, to the maximum extent practicable, existing vegetation within a development site. Coastal development shall plant new vegetation, particularly appropriate coastal species, native to New Jersey to the maximum extent practicable.

Construction of the proposed levee, and to a lesser degree, the nonstructural measures will result in temporary and permanent disturbance of vegetation. Per Corps policy, a 15- foot vegetation free zone (maintained lawn only) is required on either side of the levee. Existing vegetation will be preserved to the maximum extent practicable. Most of the area within the project footprint has undergone prior disturbance. Invasive and nuisance species and monocultures of common reed are common within the footprint of the levee. Following construction, impacted areas would be stabilized and revegetated. Per Corps and state policy all vegetation replanted will be native to New Jersey. Refer to Appendix A8 of the draft Feasibility Report/Environmental Assessment for a full description of mitigation.

7:7-16.8 AIR QUALITY
This policy sets standards for coastal development with requirements that projects must meet applicable air quality standards.

Emissions to construct the proposed project do not exceed threshold levels for any emission variable. As a result, a Clean Air Act "Record of Non-Applicability" has been prepared. The proposed project is consistent with this policy since it is not anticipated to increase air emissions above existing levels.

7:7-16.9 PUBLIC ACCESS
This policy requires that coastal development adjacent to the waterfront provide perpendicular and linear access to the waterfront to the extent practicable, including both visual and physical access.

A portion of the levee is located within Joseph Medwick Memorial Park, a Middlesex County owned and operated park. The park does not offer direct waterfront access (e.g. canoe launch), however, a walking trail parallels the Rahway River and associated tidal wetland complex, and a wildlife observation deck is located off of the walking trail. The proposed levee footprint is located on the footpath. A footpath will be installed on the top of the levee to maintain a walking trail. The existing wildlife observation deck will need to be removed during construction, but will be replaced after

construction. Ramps along the levee to provide access to the wildlife observation deck will be evaluated during the Preconstruction Engineering Design Phase. Therefore, the proposed project is consistent with this policy. This policy does not apply to the portion of the levee that is located on private property.

7:7-16.10 SCENIC RESOURCES AND DESIGN
This policy sets standards that new coastal development be visually compatible with its surroundings.

There will be a changed in the scenery for approximately seven homes where the levee will obstruct the view of Rahway River. However, the project is necessary to protect these homes from coastal storms. A footpath will be installed on top of the levee to allow park patrons to view the Rahway River and associated wetlands. Therefore the proposed project is consistent with this policy.

7:7-16.11 BUFFERS AND COMPATIBILITY OF USES
This policy sets standards for adequate buffers between compatible land uses. Buffers are natural or man-made areas, structures, or objects that serve to separate distinct uses are areas. Compatibility of uses is the ability for uses to exist together without aesthetic or functional conflicts.

The proposed project is intended to protect surrounding land uses which includes parkland and park facilities, and residential and business structures from coastal storm damage. The proposed levee will be stabilized with grass to maintain aesthetics and a footpath will be included on the top of the levee to maintain the walking trail for park patrons using Joseph Medwick Memorial Park. Therefore, the proposed project is consistent with this policy.

7:7-16.12 TRAFFIC
This policy sets standards that restrict coastal development that would disturb traffic systems.

The proposed project would make every effort possible to mitigate temporary impacts on traffic during construction. The proposed project would have no permanent effects on traffic and therefore is consistent with this policy.

7:7-16.13 SUBSURFACE SEWAGE DISPOSAL SYSTEMS
This policy sets standards for subsurface sewage disposal systems in the coastal zone.

This policy is not applicable because the proposed project does not involve sewage disposal or the development of a subsurface sewage disposal system.

7:7-16.14 SOLID AND HAZARDOUS WASTE
This policy sets standards for handling and disposal of solid and hazardous waste.

This policy is not applicable because the proposed project does not involve solid and hazardous waste. The construction contractor will be required to develop an Environmental Protection Plan that details the prevention of accidental discharge of any solid waste during construction.

Rahway River Basin, New Jersey Coastal Storm Risk Management Feasibility Study

Appendix A.7
General Conformity Analysis

Environmental Analysis Branch
(CENAN-PL-E)

April 11, 2017

RECORD OF NON-APPLICABILITY (RONA)

Project Name: Rahway Tidal
Reference: Equipment list provided by Kim Rightler (21 Feb 17) to Jeffrey Fry via email

Project/Action Point of Contact: Kim Rightler,

Begin Date: October 2019

End Date: October 2021

1. The project described above has been evaluated for Section 176 of the Clean Air Act. Project related emissions associated with the federal action were estimated to evaluate the applicability of General Conformity regulations (40CFR§93 Subpart B).

2. The requirements of this rule do not apply because the total direct and indirect emissions from this project are significantly less than the 100 tons trigger levels for NO_x, CO, and $PM_{2.5}$ and less than 50 tons for VOCs for each project year (40CFR§93.153(b)(1) & (2)). The estimated maximum annual NO_x emissions for the project are 68.0 tons. VOC, $PM_{2.5,}$ and CO are all less than 9 tons per year for the project (see attached estimates).

3. The project is presumed to conform with the General Conformity requirements and is exempted from Subpart B under 40CFR§93.153(c)(1).

Encl

Emissions have been estimated using project planning information developed by the New York District, consisting of anticipated equipment types and estimates of the horsepower and operating hours of the diesel engines powering the equipment. In addition to this planning information, conservative factors have been used to represent the average level of engine load of operating engines (load factors) and the average emissions of typical engines used to power the equipment (emission factors). The basic emission estimating equation is the following:

$$\mathbf{E = hrs \times LF \times EF}$$

Where:

E = Emissions per period of time such as a year or the entire project.
hrs = Number of operating hours in the period of time (e.g., hours per year, hours per project).
LF = Load factor, an estimate of the average percentage of full load an engine is run at in its usual operating mode.
EF = Emission factor, an estimate of the amount of a pollutant (such as NO_x) that an engine emits while performing a defined amount of work.

In these estimates, the emission factors are in units of grams of pollutant per horsepower hour (g/hphr). For each piece of equipment, the number of horsepower hours (hphr) is calculated by multiplying the engine's horsepower by the load factor assigned to the type of equipment and the number of hours that piece of equipment is anticipated to work during the year or during the project. For example, a crane with a 250-horsepower engine would have a load factor of 0.43 (meaning on average the crane's engine operates at 43% of its maximum rated power output). If the crane were anticipated to operate 1,000 hours during the course of the project, the horsepower hours would be calculated by:

$$\mathbf{250 \text{ horsepower} \times 0.43 \times 1{,}000 \text{ hours} = 107{,}500 \text{ hphr}}$$

The emissions from diesel engines vary with the age of an engine and, most importantly, with when it was built. Newer engines of a given size and function typically emit lower levels of most pollutants than older engines. The emission factors used in these calculations assume that the equipment pre-dates most emission control requirements (known as Tier 0 engines in most cases), to provide a reasonable "upper bound" to the emission estimates. If newer engines are actually used in the work, then emissions will be lower than estimated for the same amount of work. In the example of the crane engine, a NO_x emission factor of 9.5 g/hphr would be used to estimate emissions from this crane on the project by the following equation:

$$\frac{\mathbf{107{,}500 \text{ hphr} \times 9.5 \text{ g } NO_x\text{/hphr}}}{\mathbf{453.59 \text{ g/lb} \times 2{,}000 \text{ lbs/ton}}} = \mathbf{1.1 \text{ tons of } NO_x}$$

As noted above, information on the equipment types, horsepower, and hours of operation associated with the project have been obtained from the project's plans and represent current best estimates of the equipment and work that will be required. Load factors have been obtained from various sources depending on the type of equipment. Land-side nonroad equipment load factors are from the documentation for EPA's NONROAD emission estimating model, "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, EPA420-P-04-005, April 2004."

Emission factors have also been sourced from a variety of documents and other sources depending on engine type and pollutant. Nonroad equipment NOx and other emission factors have been derived from EPA emission standards and documentation. On-road vehicle emission factors have also been developed from the EPA model MOVES2014a run for 15-year-old single-unit short-haul trucks operating in CY 2017.

As noted above, the emission factors have been chosen to be moderately conservative so as not to underestimate project emissions. Actual project emissions will be estimated and tracked during the course of the project and will be based on the characteristics and operating hours of the specific equipment chosen by the contractor to do the work.

The following pages summarize the estimated emissions in sum for the project including the anticipated equipment and engine information developed by the New York District, the load factors and emission factors as discussed above, and the estimated emissions for the project.

U.S. Army Corps of Engineers
Project : Rahway River (Tidal) SRM Feasability Study - Alternative 4a - REV 2
General Conformity Related Emission Estimates
DRAFT
5/16/2017

Summary of Emissions

	tons				
Pollutants:	**NO_x**	**VOC**	**SO_x**	**$PM_{2.5}$**	**CO**
Calendar Year					
2019	17.0	0.3	0.0	0.3	2.2
2020	68.0	1.4	0.0	1.2	8.7
2021	56.7	1.2	0.0	1.0	7.3
Totals	**141.7**	**2.9**	**0.1**	**2.4**	**18.2**

Off-Road Emission Sources

		Load			g/hphr					tons				
Category	**Horsepower (approx.)**	**Factor**	**Hours**	**hphrs**	**NO_x**	**VOC**	**SO_x**	**$PM_{2.5}$**	**CO**	**NO_x**	**VOC**	**SO_x**	**$PM_{2.5}$**	**CO**
Rubber tired loader	300	0.59	1,949	344,973	9.5	0.19	0.0050	0.16	1.21	3.613	0.072	0.002	0.061	0.460
Other diesel engines	100	0.59	159	9,381	9.5	0.19	0.0050	0.16	1.21	0.098	0.002	0.000	0.002	0.013
Compactor	250	0.43	41,623	4,474,473	9.5	0.19	0.0050	0.16	1.21	46.857	0.937	0.025	0.789	5.968
Crane	300	0.43	0	0	9.5	0.19	0.0050	0.16	1.21	0.000	0.000	0.000	0.000	0.000
Excavator	300	0.59	79	13,983	9.5	0.19	0.0050	0.16	1.21	0.146	0.003	0.000	0.002	0.019
Excavator	500	0.59	21,318	6,288,810	9.5	0.19	0.0050	0.16	1.21	65.856	1.317	0.035	1.109	8.388
Skid Steer Loader	175	0.21	159	5,843	9.5	0.19	0.0050	0.16	1.21	0.061	0.001	0.000	0.001	0.008
Rubber tired loader	175	0.59	588	60,711	9.5	0.19	0.0050	0.16	1.21	0.636	0.013	0.000	0.011	0.081
Dozer	250	0.59	285	42,038	9.5	0.19	0.0050	0.16	1.21	0.440	0.009	0.000	0.007	0.056
Other diesel engines	50	0.59	173	5,104	9.5	0.19	0.0050	0.16	1.21	0.053	0.001	0.000	0.001	0.007
Other diesel engines	100	0.59	0	0	9.5	0.19	0.0050	0.16	1.21	0.000	0.000	0.000	0.000	0.000
Pump	50	0.43	8,311	178,687	9.5	0.19	0.0050	0.16	1.21	1.871	0.037	0.001	0.032	0.238
Dozer	300	0.59	285	50,445	9.5	0.19	0.0050	0.16	1.21	0.528	0.011	0.000	0.009	0.067
Rubber tired loader	110	0.59	23	1,493	9.5	0.19	0.0050	0.16	1.21	0.016	0.000	0.000	0.000	0.002
Off-road truck	100	0.59	105	6,195	9.5	0.19	0.0050	0.16	1.21	0.065	0.001	0.000	0.001	0.008
Generator	100	0.43	3,326	143,018	9.5	0.19	0.0050	0.16	1.21	1.498	0.030	0.001	0.025	0.191
Grader	135	0.59	80	6,372	9.5	0.19	0.0050	0.16	1.21	0.067	0.001	0.000	0.001	0.008
Rubber tired loader	300	0.59	0	0	9.5	0.19	0.0050	0.16	1.21	0.000	0.000	0.000	0.000	0.000
Off-road truck	250	0.59	21	3,098	9.5	0.19	0.0050	0.16	1.21	0.032	0.001	0.000	0.001	0.004
Compressor	75	0.43	1,595	51,439	9.5	0.19	0.0050	0.16	1.21	0.539	0.011	0.000	0.009	0.069
Compressor	100	0.43	24	1,032	9.5	0.19	0.0050	0.16	1.21	0.011	0.000	0.000	0.000	0.001
Compressor	125	0.43	387	20,801	9.5	0.19	0.0050	0.16	1.21	0.218	0.004	0.000	0.004	0.028
Compressor	75	0.43	47	1,516	9.5	0.19	0.0050	0.16	1.21	0.016	0.000	0.000	0.000	0.002
Other diesel engines	100	0.59	40	2,360	9.5	0.19	0.0050	0.16	1.21	0.025	0.000	0.000	0.000	0.003
Compactor	250	0.43	387	41,603	9.5	0.19	0.0050	0.16	1.21	0.436	0.009	0.000	0.007	0.055
Compactor	250	0.43	33	3,548	9.5	0.19	0.0050	0.16	1.21	0.037	0.001	0.000	0.001	0.005
Other diesel engines	225	0.59	1,595	211,736	9.5	0.19	0.0050	0.16	1.21	2.217	0.044	0.001	0.037	0.282
Crane	225	0.43	1,179	114,068	9.5	0.19	0.0050	0.16	1.21	1.195	0.024	0.001	0.020	0.152
Crane	300	0.43	9	1,161	9.5	0.19	0.0050	0.16	1.21	0.012	0.000	0.000	0.000	0.002
Crane	300	0.43	2,328	300,312	9.5	0.19	0.0050	0.16	1.21	3.145	0.063	0.002	0.053	0.401
Other diesel engines	225	0.59	1,179	156,512	9.5	0.19	0.0050	0.16	1.21	1.639	0.033	0.001	0.028	0.209
Other diesel engines	100	0.59	714	42,126	9.5	0.19	0.0050	0.16	1.21	0.441	0.009	0.000	0.007	0.056
Generator	100	0.43	1,663	71,509	9.5	0.19	0.0050	0.16	1.21	0.749	0.015	0.000	0.013	0.095
Excavator	300	0.59	115	20,355	9.5	0.19	0.0050	0.16	1.21	0.213	0.004	0.000	0.004	0.027
Skid Steer Loader	175	0.21	24	882	9.5	0.19	0.0050	0.16	1.21	0.009	0.000	0.000	0.000	0.001
Skid Steer Loader	175	0.21	40	1,470	9.5	0.19	0.0050	0.16	1.21	0.015	0.000	0.000	0.000	0.002
Rubber tired loader	175	0.59	274	28,291	9.5	0.19	0.0050	0.16	1.21	0.296	0.006	0.000	0.005	0.038
Rubber tired loader	250	0.59	21	3,098	9.5	0.19	0.0050	0.16	1.21	0.032	0.001	0.000	0.001	0.004
Rubber tired loader	110	0.59	5	325	9.5	0.19	0.0050	0.16	1.21	0.003	0.000	0.000	0.000	0.000
Other diesel engines	100	0.59	1,255	74,045	9.5	0.19	0.0050	0.16	1.21	0.775	0.016	0.000	0.013	0.099
Other diesel engines	100	0.59	1,073	63,307	9.5	0.19	0.0050	0.16	1.21	0.663	0.013	0.000	0.011	0.084
Pump	50	0.43	237	5,096	9.5	0.19	0.0050	0.16	1.21	0.053	0.001	0.000	0.001	0.007
Pump	50	0.43	1,179	25,349	9.5	0.19	0.0050	0.16	1.21	0.265	0.005	0.000	0.004	0.034
Pump	50	0.43	1,179	25,349	9.5	0.19	0.0050	0.16	1.21	0.265	0.005	0.000	0.004	0.034
Pump	50	0.43	1,179	25,349	9.5	0.19	0.0050	0.16	1.21	0.265	0.005	0.000	0.004	0.034
Other diesel engines	150	0.59	124	10,974	9.5	0.19	0.0050	0.16	1.21	0.115	0.002	0.000	0.002	0.015
Other diesel engines	250	0.59	0	0	9.5	0.19	0.0050	0.16	1.21	0.000	0.000	0.000	0.000	0.000
Other diesel engines	200	0.59	38	4,484	9.5	0.19	0.0050	0.16	1.21	0.047	0.001	0.000	0.001	0.006
Dozer	75	0.59	123	5,443	9.5	0.19	0.0050	0.16	1.21	0.057	0.001	0.000	0.001	0.007
Dozer	250	0.59	38	5,605	9.5	0.19	0.0050	0.16	1.21	0.059	0.001	0.000	0.001	0.007
Generator	7.5	0.43	652	2,103	9.5	0.19	0.0050	0.16	1.21	0.022	0.000	0.000	0.000	0.003
Other diesel engines	225	0.59	105	13,939	9.5	0.19	0.0050	0.16	1.21	0.146	0.003	0.000	0.002	0.019
Off-road truck	100	0.59	0	0	9.5	0.19	0.0050	0.16	1.21	0.000	0.000	0.000	0.000	0.000

U.S. Army Corps of Engineers
Project : Rahway River (Tidal) SRM Feasability Study - Alternative 4a - REV 2
General Conformity Related Emission Estimates
DRAFT
5/16/2017

Category	Horsepower (approx.)	Load Factor	Hours	hphrs	g/hphr NO_x	VOC	SO_x	$PM_{2.5}$	CO	tons NO_x	VOC	SO_x	$PM_{2.5}$	CO
Compressor	100	0.43	329	14,147	9.5	0.19	0.0050	0.16	1.21	0.148	0.003	0.000	0.002	0.019
Compressor	75	0.43	657	21,188	9.5	0.19	0.0050	0.16	1.21	0.222	0.004	0.000	0.004	0.028
Other diesel engines	225	0.59	25	3,319	9.5	0.19	0.0050	0.16	1.21	0.035	0.001	0.000	0.001	0.004
Other diesel engines	225	0.59	38	5,045	9.5	0.19	0.0050	0.16	1.21	0.053	0.001	0.000	0.001	0.007
Crane	225	0.43	35	3,386	9.5	0.19	0.0050	0.16	1.21	0.035	0.001	0.000	0.001	0.005
Crane	225	0.43	209	20,221	9.5	0.19	0.0050	0.16	1.21	0.212	0.004	0.000	0.004	0.027
Crane	225	0.43	23	2,225	9.5	0.19	0.0050	0.16	1.21	0.023	0.000	0.000	0.000	0.003
Grader	138	0.59	20	1,628	9.5	0.19	0.0050	0.16	1.21	0.017	0.000	0.000	0.000	0.002
Excavator	300	0.59	139	24,603	9.5	0.19	0.0050	0.16	1.21	0.258	0.005	0.000	0.004	0.033
Excavator	400	0.59	348	82,128	9.5	0.19	0.0050	0.16	1.21	0.860	0.017	0.000	0.014	0.110
Excavator	300	0.59	348	61,596	9.5	0.19	0.0050	0.16	1.21	0.645	0.013	0.000	0.011	0.082
Skid Steer Loader	175	0.21	17	625	9.5	0.19	0.0050	0.16	1.21	0.007	0.000	0.000	0.000	0.001
Skid Steer Loader	175	0.21	497	18,265	9.5	0.19	0.0050	0.16	1.21	0.191	0.004	0.000	0.003	0.024
Rubber tired loader	175	0.59	514	53,071	9.5	0.19	0.0050	0.16	1.21	0.556	0.011	0.000	0.009	0.071
Rubber tired loader	175	0.59	348	35,931	9.5	0.19	0.0050	0.16	1.21	0.376	0.008	0.000	0.006	0.048
Rubber tired loader	250	0.59	77	11,358	9.5	0.19	0.0050	0.16	1.21	0.119	0.002	0.000	0.002	0.015
Rubber tired loader	110	0.59	81	5,257	9.5	0.19	0.0050	0.16	1.21	0.055	0.001	0.000	0.001	0.007
Rubber tired loader	110	0.59	1,133	73,532	9.5	0.19	0.0050	0.16	1.21	0.770	0.015	0.000	0.013	0.098
Other diesel engines	250	0.59	173	25,518	9.5	0.19	0.0050	0.16	1.21	0.267	0.005	0.000	0.005	0.034
Other diesel engines	150	0.59	25	2,213	9.5	0.19	0.0050	0.16	1.21	0.023	0.000	0.000	0.000	0.003
Other diesel engines	200	0.59	5	590	9.5	0.19	0.0050	0.16	1.21	0.006	0.000	0.000	0.000	0.001
Other diesel engines	150	0.59	25	2,213	9.5	0.19	0.0050	0.16	1.21	0.023	0.000	0.000	0.000	0.003
Other diesel engines	150	0.59	194	17,169	9.5	0.19	0.0050	0.16	1.21	0.180	0.004	0.000	0.003	0.023
Other diesel engines	200	0.59	20	2,360	9.5	0.19	0.0050	0.16	1.21	0.025	0.000	0.000	0.000	0.003
Dozer	250	0.59	329	48,528	9.5	0.19	0.0050	0.16	1.21	0.508	0.010	0.000	0.009	0.065
Dozer	340	0.59	20	4,012	9.5	0.19	0.0050	0.16	1.21	0.042	0.001	0.000	0.001	0.005
Totals										**141.5**	**2.8**	**0.07**	**2.4**	**18.0**

On-Road Emission Sources

Category	Miles	grams per mile* NO_x	VOC	SO_x	$PM_{2.5}$	CO	tons NO_x	VOC	SO_x	$PM_{2.5}$	CO
Short-haul diesel truck	3,976	9.315	2.183	0.011	0.667	5.339	0.041	0.010	0.000	0.003	0.023
Short-haul diesel truck	3,976	9.315	2.183	0.011	0.667	5.339	0.041	0.010	0.000	0.003	0.023
Short-haul diesel truck	3,334	9.315	2.183	0.011	0.667	5.339	0.034	0.008	0.000	0.002	0.020
Short-haul diesel truck	80	9.315	2.183	0.011	0.667	5.339	0.001	0.000	0.000	0.000	0.000
Short-haul diesel truck	2,034	9.315	2.183	0.011	0.667	5.339	0.021	0.005	0.000	0.001	0.012
Short-haul diesel truck	52	9.315	2.183	0.011	0.667	5.339	0.001	0.000	0.000	0.000	0.000
Short-haul diesel truck	3,334	9.315	2.183	0.011	0.667	5.339	0.034	0.008	0.000	0.002	0.020
Short-haul diesel truck	2,114	9.315	2.183	0.011	0.667	5.339	0.022	0.005	0.000	0.002	0.012
Short-haul diesel truck	524	9.315	2.183	0.011	0.667	5.339	0.005	0.001	0.000	0.000	0.003
Short-haul diesel truck	337	9.315	2.183	0.011	0.667	5.339	0.003	0.001	0.000	0.000	0.002
Short-haul diesel truck	2,248	9.315	2.183	0.011	0.667	5.339	0.023	0.005	0.000	0.002	0.013
Short-haul diesel truck	2,248	9.315	2.183	0.011	0.667	5.339	0.023	0.005	0.000	0.002	0.013
Short-haul diesel truck	20	9.315	2.183	0.011	0.667	5.339	0.000	0.000	0.000	0.000	0.000
Short-haul diesel truck	662	9.315	2.183	0.011	0.667	5.339	0.007	0.002	0.000	0.000	0.004
Short-haul diesel truck	34	9.315	2.183	0.011	0.667	5.339	0.000	0.000	0.000	0.000	0.000
Short-haul diesel truck	20	9.315	2.183	0.011	0.667	5.339	0.000	0.000	0.000	0.000	0.000
Short-haul diesel truck	524	9.315	2.183	0.011	0.667	5.339	0.005	0.001	0.000	0.000	0.003
Totals		**0.3**	**0.06**	**0.000**	**0.02**	**0.15**					

* Emission factors from MOVES2014 for 2017, Union Co. NJ. MY 2002 (15-year-old) single-unit short-haul truck

U.S. Army Corps of Engineers
Project : Rahway River (Tidal) SRM Feasability Study - Alternative 4a - REV 2
Greenhouse Gas Emission Estimates
5/16/2017

GHG emissions, metric tons CO_2:

Calendar Year	
2019	929
2020	3,718
2021	3,098
	7,745

Category	Horsepower (approx.)	Load Factor	Hours	hphrs	CO_2 g/hphr	CO_2 tonnes
Rubber tired loader	300	0.59	1,949	344,973	571	197
Other diesel engines	100	0.59	159	9,381	571	5
Compactor	250	0.43	41,623	4,474,473	571	2,555
Crane	300	0.43	0	0	571	0
Excavator	300	0.59	79	13,983	571	8
Excavator	500	0.59	21,318	6,288,810	571	3,591
Skid Steer Loader	175	0.21	159	5,843	571	3
Rubber tired loader	175	0.59	588	60,711	571	35
Dozer	250	0.59	285	42,038	571	24
Other diesel engines	50	0.59	173	5,104	571	3
Other diesel engines	100	0.59	0	0	571	0
Pump	50	0.43	8,311	178,687	571	102
Dozer	300	0.59	285	50,445	571	29
Rubber tired loader	110	0.59	23	1,493	571	1
Off-road truck	100	0.59	105	6,195	571	4
Generator	100	0.43	3,326	143,018	571	82
Grader	135	0.59	80	6,372	571	4
Rubber tired loader	300	0.59	0	0	571	0
Off-road truck	250	0.59	21	3,098	571	2
Compressor	75	0.43	1,595	51,439	571	29
Compressor	100	0.43	24	1,032	571	1
Compressor	125	0.43	387	20,801	571	12
Compressor	75	0.43	47	1,516	571	1
Other diesel engines	100	0.59	40	2,360	571	1
Compactor	250	0.43	387	41,603	571	24
Compactor	250	0.43	33	3,548	571	2
Other diesel engines	225	0.59	1,595	211,736	571	121
Crane	225	0.43	1,179	114,068	571	65
Crane	300	0.43	9	1,161	571	1
Crane	300	0.43	2,328	300,312	571	171
Other diesel engines	225	0.59	1,179	156,512	571	89
Other diesel engines	100	0.59	714	42,126	571	24
Generator	100	0.43	1,663	71,509	571	41
Excavator	300	0.59	115	20,355	571	12
Skid Steer Loader	175	0.21	24	882	571	1
Skid Steer Loader	175	0.21	40	1,470	571	1
Rubber tired loader	175	0.59	274	28,291	571	16
Rubber tired loader	250	0.59	21	3,098	571	2
Rubber tired loader	110	0.59	5	325	571	0
Other diesel engines	100	0.59	1,255	74,045	571	42
Other diesel engines	100	0.59	1,073	63,307	571	36
Pump	50	0.43	237	5,096	571	3
Pump	50	0.43	1,179	25,349	571	14
Pump	50	0.43	1,179	25,349	571	14
Pump	50	0.43	1,179	25,349	571	14
Other diesel engines	150	0.59	124	10,974	571	6
Other diesel engines	250	0.59	0	0	571	0
Other diesel engines	200	0.59	38	4,484	571	3
Dozer	75	0.59	123	5,443	571	3
Dozer	250	0.59	38	5,605	571	3
Generator	7.5	0.43	652	2,103	571	1

U.S. Army Corps of Engineers
Project : Rahway River (Tidal) SRM Feasability Study - Alternative 4a - REV 2
Greenhouse Gas Emission Estimates
5/16/2017

Category	Horsepower (approx.)	Load Factor	Hours	hphrs	CO_2 g/hphr	CO_2 tonnes
Other diesel engines	225	0.59	105	13,939	571	8
Off-road truck	100	0.59	0	0	571	0
Compressor	100	0.43	329	14,147	571	8
Compressor	75	0.43	657	21,188	571	12
Other diesel engines	225	0.59	25	3,319	571	2
Other diesel engines	225	0.59	38	5,045	571	3
Crane	225	0.43	35	3,386	571	2
Crane	225	0.43	209	20,221	571	12
Crane	225	0.43	23	2,225	571	1
Grader	138	0.59	20	1,628	571	1
Excavator	300	0.59	139	24,603	571	14
Excavator	400	0.59	348	82,128	571	47
Excavator	300	0.59	348	61,596	571	35
Skid Steer Loader	175	0.21	17	625	571	0
Skid Steer Loader	175	0.21	497	18,265	571	10
Rubber tired loader	175	0.59	514	53,071	571	30
Rubber tired loader	175	0.59	348	35,931	571	21
Rubber tired loader	250	0.59	77	11,358	571	6
Rubber tired loader	110	0.59	81	5,257	571	3
Rubber tired loader	110	0.59	1,133	73,532	571	42
Other diesel engines	250	0.59	173	25,518	571	15
Other diesel engines	150	0.59	25	2,213	571	1
Other diesel engines	200	0.59	5	590	571	0
Other diesel engines	150	0.59	25	2,213	571	1
Other diesel engines	150	0.59	194	17,169	571	10
Other diesel engines	200	0.59	20	2,360	571	1
Dozer	250	0.59	329	48,528	571	28
Dozer	340	0.59	20	4,012	571	2
Totals						**7,714**

On-Road Emission Sources

Category	Miles	CO_2 g/hphr	CO_2 tonnes
Short-haul diesel truck	3,976	1,215	4.8
Short-haul diesel truck	3,976	1,215	4.8
Short-haul diesel truck	3,334	1,215	4.1
Short-haul diesel truck	80	1,215	0.1
Short-haul diesel truck	2,034	1,215	2.5
Short-haul diesel truck	52	1,215	0.1
Short-haul diesel truck	3,334	1,215	4.1
Short-haul diesel truck	2,114	1,215	2.6
Short-haul diesel truck	524	1,215	0.6
Short-haul diesel truck	337	1,215	0.4
Short-haul diesel truck	2,248	1,215	2.7
Short-haul diesel truck	2,248	1,215	2.7
Short-haul diesel truck	20	1,215	0.0
Short-haul diesel truck	662	1,215	0.8
Short-haul diesel truck	34	1,215	0.0
Short-haul diesel truck	20	1,215	0.0
Short-haul diesel truck	524	1,215	0.6
Totals			**31.0**

* Emission factors from MOVES2014 for 2017, Union Co. NJ. MY 2002 (15-year-old) single-unit short-haul truck

Rahway River Basin, New Jersey Coastal Storm Risk Management Feasibility Study

Appendix A.8 General Correspondence

From:	Rightler, Kimberly CIV USARMY CENAN (US)
To:	"Ritchey, John"; "McGee, Fawn"; "Appelget, Kevin"; "Jandoli, Steve"; "Moyle, John"; "Clark, Crystal"
Cc:	Salim, Rifat CIV CENAN CENAD (US); Brighton, Nancy J CIV USARMY CENAN (US)
Subject:	Memorandum for Record: 15 March 2017 USACE and NJDEP Green Acres Meeting Regarding Rahway Tidal Coastal Storm Risk Management Study
Date:	Wednesday, March 22, 2017 10:56:00 AM
Attachments:	15 March 2017 USACE_NJDEP Green Acres Mtg Memorandum for Record.pdf

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Good Morning,

Attached, please find the subject MFR which includes a copy of the presentation that was given. If you feel anything that was discussed was omitted or not captured accurately, please let me know by Friday 31 March and I will make the necessary revisions.

Thank you,
Kim

Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Appendix A.9: Mitigation, Monitoring and Adaptive Management Plan

1.0 Introduction

This document outlines the feasibility level Mitigation, Monitoring and Adaptive Management Plan for the Rahway Tidal Coastal Storm Risk Management study. The U.S. Army Corps of Engineers (Corps), New York District (District) in partnership with the New Jersey Department of Environmental Protection (NJDEP) has developed feasibility level plans to provide coastal storm risk for the Cities of Rahway and Linden, the Borough of Carteret, and the Township of Woodbridge, Middlesex and Union Counties, New Jersey.

The Tentatively Selected Plan (TSP) consists of nonstructural measures for 136 structures in the 10-year floodplain and levee that will manage coastal storm risk for the 1% event. The levee will permanently impact approximately five acres of wetlands and 200 linear feet of a small tidal tributary of the Rahway River. The specific wetland habitat types that will be permanently impacted include 1.8 acres of phragmites dominated high marsh, 2.3 acres of low marsh, 0.50 acres of scrub shrub wetland and 0.40 acres of managed wetland, and 0.14 acres of mudflat. This plan identifies and describes the mitigation, monitoring and adaptive management activities proposed and the estimated cost of the effort.

The general purpose of this plan is to provide a systematic approach for improving resource management outcomes and a structured process for recommending decisions, with an emphasis on uncertainty to improve management.
More specifically, the plan will:

- Establish the method for determining mitigation requirements.
- Establish the framework for effective monitoring, assessment of monitoring data and decision making for implementation of adaptive management activities in the project area.
- Provide the process for identifying adaptive management actions in the project.
- Establish decision criteria for vegetation and wildlife evaluation and modification of adaptive management activities.

Per the Corps Civil Works Planning process, a feasibility level habitat functional assessment and incremental cost analysis will be performed to identify the appropriate level of mitigation required for the optimized NED Plan and will be presented in the report. The plan will be then reviewed and revised as needed during the Preconstruction Engineering Design Phase (PED) as specific design details are made available.

1.1 Mitigation Guidelines

1.1.1 Federal Mitigation Guidelines

The following documents provide distinct Corps policy and guidance pertinent to developing this monitoring and adaptive management plan:

- CECW-P 6 Nov 2008 Memo: Implementation Guidance for the Water Resources Development Act of 2007- Section 2036(c) Wetlands Mitigation – directs the Secretary, where appropriate, to first consider the use of a mitigation bank to compensate for wetland impacts that occur within the service area of an existing, approved mitigation bank.
- CECW-PC 31 August 2009 Memo: Implementation Guidance for Section 2036(a) of the Water Resources Development Act of 2007 (WRDA 07) – Mitigation for Fish and Wildlife and Wetlands Losses" – requires: 1) monitoring until successful, 2) criteria for determining ecological success, 3) a description of available lands for mitigation and the basis for the determination of availability, 4) the development of contingency plans/adaptive management plans, 5) identification of the

entity responsible for monitoring; and 6) establish a consultation process with appropriate Federal and State agencies in determining the success of mitigation.

- ER 1105-2-100 dated 22 April 2000, Planning Guidance Notebook
- Compensatory Mitigation for Losses of Aquatic Resources; Final Rule; Federal Register, Volume 73, No. 70, April 10, 2008.

Corps regulations stipulate that the recommended plan must contain sufficient mitigation measures to ensure that the plan selected will have no more than negligible net adverse impacts on fish and wildlife resources, including impacts of the mitigation measures themselves. Regarding wetlands, however, the guidance contains very specific requirements that the District "ensure that adverse impacts to wetland resources are fully mitigated...as required to clearly demonstrate efforts made to meet the Administration's goal of no net loss of wetlands" as determined by a habitat functional assessment method.

1.1.1.1 *Federal Mitigation Hierarchy*

The Mitigation Rules' preference hierarchy for types of wetland mitigation is as follows:

- The purchase of wetland credits from an approved wetland mitigation bank
- In-Lieu fee program credits (monetary contribution)
- On-site and in-kind restoration, enhancement, establishment or preservation.
- Off-site and/or out of kind restoration, enhancement, establishment or preservation.

Under the Corps Civil Works guidance and Mitigation Rule, restoration should be the first method considered for an on-site and in-kind mitigation. The Corps does not apply a mitigation hierarchy to non-wetland habitats (e.g. upland forest).

1.2 State Mitigation Guidelines

The following documents provide New Jersey policy and guidance that are pertinent to developing this monitoring and adaptive management plan:

- New Jersey Freshwater Wetlands Protection Act, N.J.S.A. 13:9B; Freshwater Protection Act Rules N.J.A.C. 7:7A: Outlines requirements for compliance with Sections 401 and 404 of Clean Water Act.
- N.J.A.C. Coastal Zone Management Rules: Establishes compliance and mitigation requirements related to Sections 401 and 404 of the Clean Water Act for tidal wetland and open water resources.

1.2.1.1 *State Mitigation Hierarchy*

Mitigation hierarchy for intertidal and subtidal shallows and tidal water as outlined in Subchapter 17 of the Coastal Zone Management Rules is as follows:

1. Creation of intertidal, subtidal or tidal waters on site where filling occurred;
2. Off-site creation within same estuary as site or through purchase of in-kind credits from a mitigation bank;
3. Restoration, creation, or enhancement of a wetland within same estuary as site of filling or through purchase of out-of kind credits from a mitigation bank in service area;
4. Upland preservation;
5. In-lieu fee payment via monetary contribution to the New Jersey Mitigation Council/Wetland Mitigation Fund; and
6. Land donation in accordance with Freshwater Wetland Act Rules.

Subchapter 17 of the CZM Rules requires a 1:1 ratio for the on site creation of intertidal, subtidal or tidal waters. It also requires a 1:1 mitigation ratio for the off-site creation of intertidal, subtidal or tidal waters.

Mitigation hierarchy for freshwater wetland impacts less than 1.5 acres as outlined in the Freshwater Wetlands Act Rules is as follows:

1. Purchase from a NJDEP approved wetland mitigation bank in the same Hydrologic Unit Code 11 (HUC-11) as the disturbance;
2. Purchase credits from a bank in an adjacent HUC-11 as disturbance and within same watershed management area as disturbance;
3. Purchase of credits in same watershed management area as the disturbance ;
4. On-site or off-site creation, restoration or enhancement;
5. In-lieu fee payment via monetary contribution to the Mitigation Council/Wetland Mitigation Fund;
6. Upland preservation; and
7. Land donation.

The NJDEP Freshwater Wetlands Protection Act Rules require a mitigation ratio of 2:1 for wetland restoration or creation, and a minimum mitigation ratio of a 3:1 for wetland enhancement. The purchase of wetland mitigation credits is based on a 1:1 mitigation ratio.

1.3 Roles and Responsibilities

The New York District will be responsible for the proposed mitigation construction and monitoring until the initial success criteria as defined in Sections 3.1 – 3.3 are met. Initial construction and monitoring will be funded in accordance with all applicable cost-share agreements with the non-federal sponsor.

It should be noted that the state might require mitigation beyond what has been determined to be appropriate by the functional assessment analysis due to their use of a ratio based mitigation approach. In event this occurs, the non-federal sponsor will be required to pay the for the mitigation costs that exceed what is necessary to meet the federal requirements.

The New York District will monitor (on a cost-shared basis) the completed mitigation to determine whether additional construction, invasive plant species control, and/or plantings are necessary to achieve initial success criteria. If, during the monitoring period the mitigation is failing to meet the success criteria, the District will consult with the NJDEP to determine the appropriate management or remedial actions required to achieve ecological success. The non-federal sponsor will perform any additional monitoring of the site as part of their O&M obligations once the District has determined that the mitigation goals are met.

The New York District will retain the final decision on whether or not the project's required mitigation benefits are being achieved and whether or not remedial actions are required. If additional site modifications are deemed necessary to achieve ecological success, the District will implement the appropriate measures in accordance with the adaptive management plan. The adaptive management measures will be subject to cost-sharing requirements, availability of funding, and current budgetary and other guidance.

2.0 **Habitat Mitigation Alternatives**

2.1 Wetland Mitigation Banks and In-lieu Fee Programs

Based on a review of the State of New Jersey Approved Wetlands Mitigation Banks List (dated 24 March 2017), there are currently no state approved wetland mitigation banks currently operating in either the HUC-11 area where the TSP is located or within the same Watershed Management Area. The District may reevaluate the availability of mitigation credits during the Preconstruction Engineering Design Phase when permits are acquired.

In addition, there are no privately operated In-lieu Fee Programs within the state. The state operates its own In-lieu Fee Program through its Wetland Mitigation Fund. However, as noted in Section 1.2.1.1, this option is lower in the mitigation hierarchy structure than on-site restoration, of which opportunities exist within the proposed levee project area. Therefore, as an authority responsible for administering Section 404 of the Clean Water Act, it is unlikely that the state would approve a monetary contribution.

2.2 On-Site Wetland Mitigation

A portion of the proposed levee is located within the upper boundaries of a 23 acre wetland complex within the northern portion Joseph Medwick Memorial Park. Habitat types found within the complex include approximately 15 acres of low marsh, 6 acres of phragmites dominated high marsh, 0.68 acres of interior wetlands dominated by phragmites, and 1.34 acres of deciduous scrub shrub wetland. The wetland complex also includes Casey's Creek, a tidally influenced tributary to the Rahway River and several other smaller, manmade and natural channels.

The six acres of phragmites dominated high marsh will be evaluated for the potential restoration of four acres of low marsh system. In addition, there is a 0.68 acre stand of phragmites that will be evaluated for the potential restoration of deciduous scrub shrub wetland. Compensation for the 0.40 acres of permanent loss of managed wetland will either involve restoration of low marsh wetland or deciduous scrub shrub wetland.

The District completed a 14 acre low marsh restoration project in 2007 in the southern end of Medwick Park. The District completed a 14 acre tidal marsh wetland mitigation within the Joseph Medwick Memorial Park in 2007 to compensate for wetland impacts associated with the Arthur Kill Channel deepening related to the overall New York/New Jersey Harbor deepening project. This area will be used as a reference site during optimization of the TSP to further develop conceptual mitigation plans.

2.2.1 Evaluation of Planned Wetlands Assessment

The District will be using the Evaluation of Planned Wetlands (EPW) model to assess the functional value of the wetlands impacted and determine mitigation needs.

The EPW model was approved for regional use by the Corps Ecosystem Restoration Planning Center of Expertise in July 2016. In accordance with the Corps Civil Works Planning Policy, the EPW analysis and the incremental cost analysis to determine the appropriate level of mitigation required will occur during optimization of the TSP. The results of these analyses will be presented in the final report.

2.3 On-Site Upland Forest Mitigation

The District is proposing on-site mitigation to approximately 0.70 acres of upland forest. The specific species to be used and the on-site location of the replanting efforts will be determined during optimization of the TSP and will be documented in the final report. The District will coordinate with Middlesex County and NJDEP Green Acres Program staff to determine if there are locations within Joseph Medwick Memorial Park that would benefit from forest creation and/or enhancement.

2.3.1 Habitat Suitability Index Model

The District will be using one or more Habitat Suitability Index (HSI) models for bird species known to inhabit the project area to assess the functional value of the upland forest being impacted and determine mitigation needs. The specific HSI model(s) to be used will be determined during optimization. However, HSI models that will be considered include those for great blue heron, hairy woodpecker, downy woodpecker, and black-capped chickadee given that they are known occur within the overall project area. In addition, those models have been approved for use by the Corps Ecosystem Restoration Planning Center of Expertise. Similar with the wetland mitigation, the HSI model(s) analysis and incremental cost analysis to determine the appropriate level of upland forest mitigation will occur during optimization of the TSP. The results of these analyses will be presented in the final report.

2.4 Preliminary Cost Estimate

A preliminary cost estimate was prepared and assumes soil excavation of approximately 1.5 ft to restore low marsh habitat and remove invasive plant species, herbicide applications, replanting native vegetation, installation of anti-herbivory measures such as fencing and tree guards, and post construction monitoring. The Total Project Cost for the mitigation is $2,035,000 and is presented in Account 06 "Fish and Wildlife Facilities" in Appendix D Cost Engineering.

The cost estimate will be revised during optimization of the TSP pending the results of the functional assessment and incremental cost analyses and will be included in the final report.

3.0 **Monitoring and Reporting**

An effective monitoring program will be required to determine if the mitigation performed is consistent with original project goals and objectives. Information collected under this monitoring plan will provide insights into the effectiveness of mitigation and adaptive management strategies and indicate where goals have been met, if actions should continue and/or whether more aggressive management is warranted. The information generated by the monitoring plan will be used by the District in consultation with the non-federal sponsor to guide decisions on operation changes that may be needed to ensure that the mitigation project meets the success criteria.

Federal wetland mitigation rules require monitoring until success criteria is met and do not establish a minimum required monitoring period. The New Jersey Freshwater Wetlands Protection Act Rules require a minimum monitoring period of five years for any wetland enhancement, restoration or creation, and establish specific criteria for determining success. Therefore, for cost estimating purposes, the District is assuming a minimum monitoring period of five years for each mitigation type.

3.1 Low Marsh Wetlands Monitoring Protocol

The District will utilize quadrat sampling to monitor the development of herbaceous vegetative cover and dominance patterns within the restored low marsh habitat. Within each 1-meter square quadrat, an estimate of the total percent cover provided by native and invasive herbaceous plants will be generated. Percent cover of individual species will also be noted. The location of each quadrat will be shown on the plans contained in the monitoring report.

The location of the sampling points will be evenly spaced across each marsh wetland area to be sampled. The same start location will be used each year of the monitoring program. The distance of the first sampling point from the starting point along the perimeter of the emergent area will be decided by using a new random number each year. Each successive sample will be at equidistant intervals along the perimeter. The distance will be determined by calculating the perimeter of each emergent wetland to be

sampled from the as-built plans and divided it into a minimum of ten equal lengths. At each sampling point along the perimeter of the tidal and emergent wetland, a marker will be blindly tossed into the site to select the quadrat location. One edge of the quadrat will be aligned with a North-South axis. Each successive sample will be located using the same method at equidistant intervals along the perimeter.

A minimum of six soil pits will be dug and described to a depth of 20 inches within the mitigation area. The soil profiles will document the depth of topsoil placement as well as indicators of hydric soil. The depth to saturated soil and free water will also be recorded for each soil profile. The location of each soil pit will be documented using GPS and plotted onto a map for inclusion in the Monitoring Report.

The success criteria at the end of the five year monitoring period for which mitigation success is determined includes: 1) 85 percent survival and 85 percent area coverage of the mitigation plantings or target hydrophytes which are species native to the area and similar to ones identified in the mitigation planting plan; 2) Any trees planted are at least five feet in height; 3) The site contains hydric soils or there is evidence of oxidatative reduction (redox) occurring in the soil; 4) Evidence that the site is meeting the hydrologic regime as specified in the mitigation proposal; 5) The site is less than 10 percent occupied by invasive or noxious species; and 6) The site delineates as a wetland using the 1989 Federal Manual for Identifying and Delineated Jurisdictional Wetlands.

3.2 Deciduous Scrub Shrub Wetland Monitoring Protocol

Densities of woody plants will be generated using stem counts within permanent 1-meter square sample plots randomly located within the scrub shrub mitigation area. Within each plot the number of shrubs will be counted, by species, and recorded onto a data form. The h shrub will also be recorded. The location of each sample plot will be shown on the plans contained in the monitoring report.

The location of each sample plot will be determined prior to conducting field work by randomly by establishing a 10- meter square grid over the area to be monitored as shown on the As-Built plans, assigning each grid block a number, and generating a series of random numbers. The random numbers corresponding to the first ten grid blocks will be used to establish the sample locations. The location of each quadrat will be shown on the plans contained in the monitoring report.

A minimum of six soil pits will be dug and described to a depth of 20 inches within the mitigation area. The soil profiles will document the depth of topsoil placement as well as indicators of hydric soil. The depth to saturated soil and free water will also be recorded for each soil profile. The location of each soil pit will be documented using GPS and plotted onto a map for inclusion in the Monitoring Report.

The success criteria at the end of the five year monitoring period for which mitigation success is the same as described in Section 3.1.

3.3 Upland Forest Monitoring Protocol

Stem densities of woody plants will be generated using stem counts within permanent 10-meter square sample plots randomly located within upland forest mitigation area. The location of each sample plot will be determined prior to conducting field work by randomly by establishing a 10- meter square grid over the area to be monitored as shown on the As-Built plans, assigning each grid block a number, and generating a series of random numbers. The random numbers corresponding to the first ten grid blocks will be used to establish the sample locations. Within each plot the number of trees and shrubs will be counted, by species, and recorded onto a data form. The height of each tree and shrub will also be recorded. In addition, the presence and extent of any invasive plant species will be documented.

The location of each sample plot will be shown on the plans contained in the monitoring report.

The success criteria at the end of the five year monitoring period for which mitigation success is determined includes: 1) 85 percent survival and 85 percent area coverage of the mitigation plantings or target hydrophytes which are species native to the area and similar to ones identified in the mitigation planting plan; and 2) The site is less than 10 percent occupied by invasive or noxious species.

3.4 Monitoring Costs

Preliminary cost estimates for the monitoring of each mitigation type are presented in Table 1. Costs include the level of effort needed to complete the required field investigations and report preparation and coordination.

Table 1: Preliminary Mitigation Monitoring Costs

Mitigation Feature	Annual Monitoring Cost	Total Monitoring Period (5 yrs) Cost
Low Marsh/Tidal Creek/Mudflat	$12,000.00	$52,000.00
Scrub shrub wetland	$ 1,000.00	$ 5,000.00
Upland	$ 600.00	$ 3,000.00
Total	**$13,600.00**	**$60,000.00**

3.5 Reporting

The District will prepare an annual Monitoring Report summarizing the results of monitoring efforts conducted for each mitigation type and describing any necessary adaptive management measures.

The format of the report will contain, but not be limited to: 1) Executive Summary; 2) Requirements and goals of approved mitigation proposal have been achieved 3) Documentation includes tidal, topo for spring high tide, photos and field notes ; 4) suggested adaptive management measures and their estimated costs.

Figures contained within the report will include but not be limited to: 1) Mitigation site location delineated on USGS quad map; 2) mitigation site delineated on an aerial; 3) mitigation site delineated on tax map; and 4) preconstruction and post construction habitat type map.

Appendices will include but not be limited to: 1) permits; 2) as-built plans; 3) vegetation species table and survey data sheets; 4) photograph log and location map; and 5) soil investigation report.

As required by NJDEP, the District submit the Monitoring and Adaptive Management Report to the agency by 31 December each year the monitoring is conducted. The District will also post the report on the District webpage and will submit the report to the Corps Headquarters (Corps HQ) for inclusion to the annual mitigation report that is submitted to Congress and posted on the Corps HQ website.

4.0 **Adaptive Management**

A comprehensive adaptive management plan will be prepared, if needed, during post construction monitoring. However, the following sections describe common adaptive management measures associated with each habitat type.

4.1 Tidal Wetlands

- Replanting vegetation in areas where plantings do not meet predetermined criteria
- Enhancing survival of planted vegetation (by applying a fertilizer)
- Improving tidal flushing through modification of channel morphology and/or hydrology through additional topographical modifications.
- Suppressing encroachment by Phragmites through mechanical landscaping techniques, physical removal and/or replanting of desirable species
- Installation/maintenance of anti-herbivory measures (e.g. fencing, tree guards)

4.2 Scrub Shrub Wetlands

- Enhancing survival of planted vegetation (by applying a fertilizer)
- Suppressing encroachment by Phragmites and/or other invasive plant species through herbicide application, physical removal, landscaping techniques (e.g. weed mats) and/or replanting of desirable species
- Installation/maintenance of anti-herbivory measures (e.g. fencing, tree guards)
- Elevation modifications through additional grading/excavation to achieve desired hydrology.

4.3 Upland Forest

- Enhancing survival of planted vegetation (by applying a fertilizer)
- Suppressing encroachment by Phragmites and/or other invasive plant species through herbicide application, physical removal, landscaping techniques (e.g. weed mats) and/or replanting of desirable species
- Installation/maintenance of anti-herbivory measures (e.g. fencing, tree guards)

Rahway River Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Appendix A.10
Draft Feasibility Report/Environmental Assessment Distribution List

Draft Feasibility Report/Environmental Assessment Distribution List

Federal Agencies

NOAA/National Marine Fisheries Office Greater Atlantic Regional Fisheries Office Habitat Conservation Division Attn: Karen Greene James J. Howard Marine Sciences Laboratory 74 Magruder Rd Highlands, NJ 07732	U.S. Fish and Wildlife Service New Jersey Field Office Attn: Eric Schrader 4 East Jimmie Leeds Road, Unit 4 Galloway, New Jersey 08205
NOAA/National Marine Fisheries Office Protected Resources Attn: Kimberly Damon-Randall 55 Great Republic Drive Gloucester, MA 01930	U.S. Environmental Protection Agency Region 2 Attn: Grace Musumeci 290 Broadway New York, NY 10007-1866

Federally Recognized Tribes

Delaware Nation Kim Penrod P.O. Box 825 Anadarko, OK 73005 kpenrod@delawarenation.com	Ms. Kim Jumper Tribal Historic Preservation Officer Shawnee Tribe of Oklahoma 29S HWY69A Miami, OK 74355 kim.jumper@shawnee-tribe.com
Delaware Tribe of Indians Ms. Susan Bachor Delaware Tribe Historic Preservation Representative P.O. Box 64 Pocono Lake, PA 18347 temple@delawaretribe.org	

State Agencies

New Jersey Department of Environmental Protection, Division of Dam Safety and Flood Control Attn: John Moyle	New Jersey Historic Preservation Office Ms. Katherine Marcopul Deputy State Historic Preservation Officer P.O. Box 420 Trenton, NJ 08625-0420 Kate.Marcopul@dep.state.nj.us
New Jersey Department of Environmental Protection, Office of Permit Coordination and Environmental Review Attn: Ruth Foster 401 East State Street P.O. Box 420 Trenton, NJ 08625	

County Agencies

Middlesex County Freeholders 75 Bayard Street New Brunswick, NJ 08901	Union County Freeholders 10 Elizabethtown Plaza Elizabeth, NJ 07207
Middlesex County Department of Parks and Recreation Jackie Neill P.O. Box 661 New Brunswick, NJ 08903 732-745-3936	Mr. Daniel Bernier, Director Office of Park Planning and Environmental Services Union County Department of Parks and Recreation 908-789-3682 dbernier@ucnj.org
Middlesex County Division of Historic Sites and History Services Office of Culture and Heritage Isha Vyas, Division Director culturalandheritage@co.middlesex.nj.us 1050 River Road Piscataway, NJ 732-745-3030	Union County Department of Cultural and Heritage Affairs Mr. John Prescott, History Coordinator 633 Pearl Street Elizabeth 07202 908-558-2550 Culturalinfo@ucnj.org
	Mr. Ronald Zuber, Director Union County Department of Parks and Recreation 908-527-4900 rzuber@ucnj.org

Municipalities

City of Rahway Mayor Samson D. Steinman 1 City Hall Plaza Rahway, NJ 07065	Carteret Borough Mayor Daniel J. Reiman Memorial Municipal Building 61 Cooke Avenue Carteret, New Jersey 07008
Mr. Alex Shipley Director of Museum Operations Merchants and Drovers Tavern Museum Association P.O. Box 1842 1632 St. George Avenue Rahway, NJ 07065	Carteret Historical Committee Susan Wentzel 61 Cooke Avenue Carteret, NJ 07008 carterethistoricalcommittee@carteret.net 732-541-3800
Town of Woodbridge Mayor John E. McCormac 1 Main Street Woodbridge, NJ 07095	City of Linden Mayor Derek Armstead 301 North Wood Avenue Linden, NJ 07036

Woodbridge Township Historic Preservation Commission Dolores Capraro Gioffre, Chair 582 Rahway Avenue Woodbridge, NJ 07095 732-634-4500 ext.2126 WTHPC1669@hotmail.com	Linden Society for Historic Preservation 301 N Wood Ave Linden, NJ 07036 908-474-8493 councilmankoziol@gmail.com

Non-Government Organizations

Rahway River Watershed Association P.O. Box 1101 Rahway, New Jersey 07065	Friends of Rahway River Parkway P.O. Box 55, Cranford, NJ 07016
Sierra Club New Jersey Chapter Attn: Eric Hausker 139 West Hanover Street Trenton, NJ 08618	New York/New Jersey Baykeeper 52 W. Front Street Keyport, NJ 07735

Rahway River Basin, New Jersey Coastal Storm Risk Management Feasibility Study

Appendix A.11
Draft Finding of No Significant Impact

Draft Finding of No Significant Impact (FONSI)

I. DESCRIPTION OF ACTION

The proposed action involves the treatment of 136 structures located within the 10-yr floodplain with nonstructural measures in the Cities of Rahway, Linden and the Borough of Carteret and the construction of a levee (Levee Segment D) in the Township of Woodbridge and the Borough of Carteret. Both the nonstructural measures and the Segment D levee will manage coastal storm risk for up to the 100-yr storm event. The proposed action is authorized by the Disaster Relief Appropriation Act of 2013 (P.L. 113-2).

II. ALTERNATIVES

In addition to the proposed action described in section I of the FONSI, the following alternatives were evaluated in the *Rahway River (Tidal) Basin Coastal Storm Risk Management Feasibility Report and Environnmental Assessment*:a). No Action; b) Alternative #1: Levees and floodwalls; c) Alternative #2: Surge Barrier; d) Alternative #3a/b: Non-structural measures within the 10-yr floodplain (Alt. #3a) and 50-yr floodplain (Alt. #3b).; and e) Alternative #4a/b Nonstructural measures within the 10-yr floodplain (Alt. #3a) and the 50-yr floodplain (Alt. #3b) and Levee Segment D.

III. ANTICIPATED ENVIRONMENTAL CONSEQUENCES

A full assessment of impacts associated with the No Action Alternative and Proposed Action were evaluated in the attached *Rahway River Basin Coastal Storm Risk Management Feasibility Report and Environmental Assessment.* A summary of anticipated environmental consequences is as follows:

- The project will not negatively impact public health or safety. Rather, the project serves to improve public health and safety through the acquisition and removal of flood prone homes.
- The project will not negatively impact the quality of the human environment.
- The project will manage coastal storm risk to protected structures for up to the 100-yr storm event.
- The project will not have significant long-term impact on endangered, threatened or special concern State and Federal species. To comply with Section 7 of the Endangered Species Act, a tree clearing restriction window of 15 April through 30 September will be established during construction as a precautionary measure to protect Indiana bat (*Myotis sodalist*), a federally endangered species and northern long-eared bat (*Myotis septentrionalis*), a federally threatened species.
- A restriction on the clearing of shrubs and trees from 1 April through 31 August will be implemented during construction activities to comply with the Migratory Bird Treaty Act.
- Standard erosion control techniques, including cofferdams or a temporary stream diversion, will minimize excess sedimentation to Casey's Creek and associated tributaries during construction.
- Approximately five acres of wetlands will be permanently impacted and 0.77 acres will experience temporary impacts as a result of the construction of Levee Segment D. Specific wetland habitats being impacted include 1.8 acre of phragmites dominated marsh and interior wetland, 2.3 acres of low marsh, 0.50 acres of deciduous scrub-shrub wetland and

The District is proposing on-site compensation of the permanent and temporary impacts through the restoration of 4 acres of low marsh and 1 acre of deciduous scrub shrub wetland habitats.

- Approximately 200 linear feet of Casey's Creek, a tidal tributary to the Rahway River, will be permanently impacted by the construction of Segment Levee D. The District is proposing for on-site restoration of 200 linear feet of tidal flow within the wetland complex being impacted.
- Approximately 0.14 acres of mudflat will be permanently impacted by the construction of Levee Segment D. The District is proposing on-site restoration of 0.14 acres of mudflat using the excavated material dredged from Casey's Creek.
- There is a potential for adverse impacts to portions of the Upper Rahway Historic District and the Rahway River Parkway Historic District as well as to the Inch Lines Linear Multistate Historic District. A Programmatic Agreement has been prepared in coordination with the New Jersey State Historic Preservation Office, the Advisory Council on Historic Preservation and other interested parties to ensure that adverse effects are managed in accordance with Section 106 of the National Historic Preservation Act as the project moves forward. Avoidance, minimization, and mitigation measures will be employed as appropriate to reduce or eliminate adverse impacts to historic properties.
- A portion of Levee Segment D is located within the Joseph Medwick Memorial Park which is encumbered by New Jersey Green Acres restrictions. The levee will permanently impact a walking trail and will temporarily impact a wildlife observation deck. Mitigation measures proposed to compensate for these impacts include installing a footpath on top of the levee and replacing the wildlife observation deck once construction of levee is completed.
- The anticipated emission levels for NOx emissions from construction equipment are below the *de minimis* levels established for General Conformity and have been documented with a Record of Non-Applicability.
- No adverse cumulative impacts are associated with project implementation. When assessed in conjunction with other past, present or future flood risk management initiatives within the Rahway River Basin, positive cumulative impacts include a regional long term risk reduction to loss of life and property/infrastructure damages resulting from flood events.

IV. COORDINATION

The New York District has coordinated this project with Federal and State resource agencies and the interested public and issued a Notice of Availability of the draft Environmental Assessment (EA) in order to:

a. Inform agencies and stakeholders of the proposed work and the environmental evaluation contained in the draft EA, and
b. Provide an opportunity for comments on that evaluation and findings.

V. CONCLUSION

Based on my review and evaluation of the environmental effects as presented in the Environmental Assessment, I have determined that the proposed action to provide coastal storm risk management for the Cities of Rahway and Linden, the Borough of Carteret and Township of Woodbridge, Middlesex and Union Counties, New Jersey is not a major federal action significantly affecting the quality of the human environment. Therefore, I have determined that this project is exempt from the requirement to prepare an Environmental Impact Statement.

Date:_____ _____

David A. Caldwell
Colonel, U.S. Army
Commander