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

Appendix A.3
USFWS Coordination

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

Appendix A.3
December 16, 2019 Official Endangered and Threatened Species List for Project Area

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
4 E. Jimmie Leeds Road, Suite 4
Galloway, NJ 08205
Phone: (609) 646-9310 Fax: (609) 646-0352
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

In Reply Refer To: December 16, 2019
Consultation Code: 05E2NJ00-2017-SLI-0612
Event Code: 05E2NJ00-2020-E-00631
Project Name: Rahway Tidal Flood Risk Management Study Tentatively Selected Plan

Subject: Updated 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(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New Jersey Ecological Services Field Office
4 E. Jimmie Leeds Road, Suite 4
Galloway, NJ 08205
(609) 646-9310

Project Summary

Consultation Code: 05E2NJ00-2017-SLI-0612

Event Code: 05E2NJ00-2020-E-00631

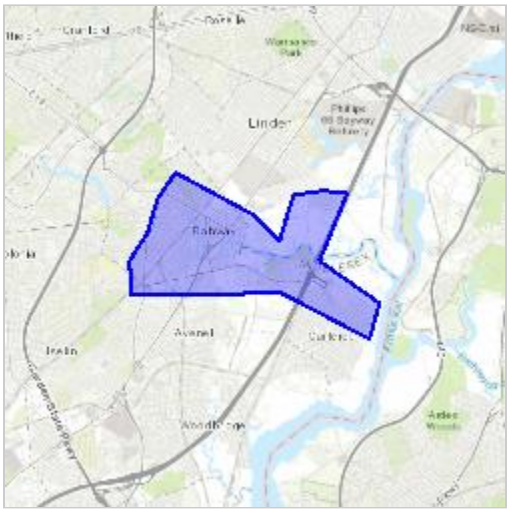
Project Name: Rahway Tidal Flood Risk Management Study Tentatively Selected Plan

Project Type: LAND - FLOODING

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.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/40.59951560421132N74.26247650669613W



Counties: Middlesex, NJ | Union, NJ

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this 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.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Blue-winged Warbler *Vermivora pinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 1 to Jun 30

NAME	BREEDING SEASON
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee

was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

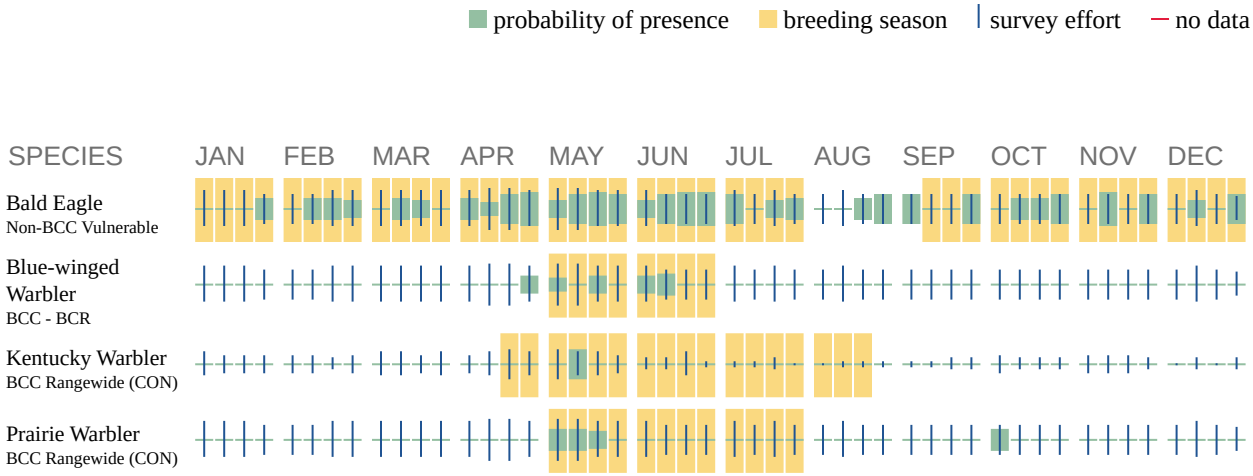
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

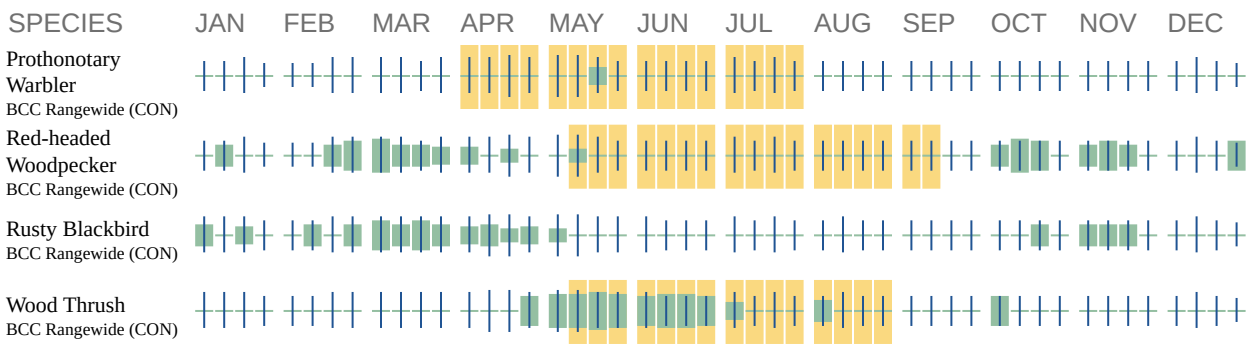
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.
Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act

requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can

implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

ESTUARINE AND MARINE DEEPWATER

- E1UBL
- E1UBLh
- E1UBLx

ESTUARINE AND MARINE WETLAND

- E2EM1P
- E2EM1Pd
- E2EM1Ph
- E2EM5P
- E2EM5Pd
- E2EM5Ph
- E2EM5Px
- E2USNx

FRESHWATER EMERGENT WETLAND

- PEM1C
- PEM1E
- PEM1Ex
- PEM5E
- PEM5Fx
- PEM1A
- PEM1Dh

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1E
- PFO1/SS1A
- PFO1A
- PFO1D

- PFO1Ed
- PFO1R
- PSS1/EM1D
- PSS1/FO1A
- PSS1E
- PFO1Dd

FRESHWATER POND

- PUBFh
- PUBFx
- PUBHh
- PUBHx

RIVERINE

- R4SBC
- R5UBFx
- R5UBH
- R1UBV
- R4SBCx
- R2UBH
- R2UBHx

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

Appendix A.3
December 2018 Final FWCAR

FISH AND WILDLIFE COORDINATION ACT
FINAL SECTION 2(b) REPORT

RAHWAY RIVER BASIN COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY MIDDLESEX AND UNION COUNTIES, NEW JERSEY

Prepared by:

U.S. Fish and Wildlife Service
Ecological Services, Region 5
New Jersey Field Office
Galloway, New Jersey 08205
December 2018

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Field Office
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Galloway, New Jersey 08205
Tel: 609/646 9310
http://www.fws.gov/northeast/njfieldoffice

In Reply Refer To:
17-CPA-0241a

Peter Weppler, Chief
Environmental Analysis Branch, New York District
U.S. Army Corps of Engineers
Jacob K. Javits Federal Building
New York, New York 10278-0090
Attention: Kimberly Rightler

DEC 10 2018

Dear Mr. Weppler:

The U.S. Fish and Wildlife Service (Service) has received your letter dated November 7, 2018 inclusive of the New York District U.S. Army Corps of Engineers (Corps) responses to our July 24, 2018 draft Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 *et seq.*) (FWCA) Section 2(b) report on the *Rahway River Basin Coastal Storm Risk Management Draft Feasibility Study, Middlesex and Union Counties, New Jersey*. The Service's final report is provided in accordance with our Fiscal Year-2016 scope of work and is based on the information provided by the Corps.

The purpose of this Corps feasibility study is to investigate storm damage reduction within the areas of the Rahway River Basin affected by coastal storm surge. The Corps' planning objectives are to reduce the risk of damages to property and dangers to life resulting from coastal storm surge flooding within the project area, lying within portions of the municipalities of Carteret, Linden, Rahway and Woodbridge; and increase public awareness to the risk of flooding from the Rahway River (U.S. Army Corps of Engineers 2017).

The information presented in this final report is also provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) (ESA), ensuring protection of federally listed threatened and endangered species; the Migratory Bird Treaty Act of 1918 (40 Stat. 755, as amended; 16 U.S.C. 703-712) (MBTA); and the Bald and Golden Eagle Protection Act (16 U.S.C. 668a-d) (BGEPA). The following comments do not preclude separate review by the Service pursuant to the December 22, 1993 Memorandum of Agreement among the U.S. Environmental Protection Agency, New Jersey Department of Environmental Protection (NJDEP), and the Service, which was updated and annotated on May 10, 2018, if project implementation requires a permit from the NJDEP pursuant to the New Jersey Freshwater Wetlands Protection Act (N.J.S.A. 13:9B *et seq.*); nor do they preclude separate review and

comments by the Service on any forthcoming environmental documents pursuant to the National Environmental Policy Act of 1969 (83 Stat. 852; 42 U.S.C. 4321 *et seq.*).

Federally Listed Threatened and Endangered Species

The forested portion of the study area is located within the summer foraging range of the federally listed (endangered) Indiana bat (*Myotis sodalis*). Indiana bats hibernate in caves and abandoned mine shafts from October through April. Between April and August, Indiana bats inhabit floodplain, riparian, and upland forests, roosting under loose tree bark during the day, and foraging for flying insects in and around the tree canopy at night. A variety of upland and wetland habitats are used as foraging areas, including floodplain, riparian, and upland forests; pastures; clearings with early successional vegetation; cropland borders; and wooded fencerows. Preferred foraging areas are streams, associated floodplain forests, ponds, and reservoirs (U.S. Fish and Wildlife Service 2007). During these summer months, numerous females roost together in maternity colonies. Maternity colonies use multiple roosts in both living and dead trees. From late August to mid-November, Indiana bats congregate in the vicinity of their hibernacula, building up fat reserves for hibernation (Harvey 1992). Protection of Indiana bats during all phases of their annual life cycle is essential to preserving this species. Threats to the Indiana bat include disturbance or killing of hibernating and maternity colonies; vandalism and improper gating of hibernacula; fragmentation, degradation, and destruction of forested summer habitats; and exposure to pesticides and other environmental contaminants.

The Service notes that the forested portion of the project area also occurs within the potential summer habitat range of the federally listed (threatened) northern long-eared bat (*Myotis septentrionalis*). The northern long-eared bat is a medium-sized bat found across much of the eastern and north-central United States that predominantly overwinters in hibernacula that include caves and abandoned mines. During the summer, this species typically roosts singly or in colonies underneath bark or in cavities or crevices of both live trees and snags. Northern long-eared bats are also known to roost in human-made structures. Threats to the northern long-eared bat include disease due to the emergence of white-nose syndrome, improper closure at hibernacula, degradation and destruction of summer habitat, and exposure to pesticides. All recommended conservation measures for the Indiana bat would also protect the northern long-eared bat. The lower tidal reaches of the Rahway River are not considered suitable foraging ranges for these bat species.

Tree clearing within the summer foraging range could adversely affect these species by killing, injuring or disturbing breeding or roosting bats. Therefore, to avoid adverse effects to the Indiana and northern long-eared bats, tree removal activities should be prohibited between April 1 and September 30. According to the Corps (2017), the tree clearing restriction will be applied. If tree clearing becomes necessary during the restricted season, further consultation pursuant to Section 7 of the ESA will be required.

Bald Eagle

Nests of the bald eagle (*Haliaeetus leucocephalus*) are found occurring in the City of Linden. These nests were likely built by a single pair of eagles that hatched two eggs in 2017. Foraging habitat is delineated throughout the study area. The bald eagle was removed from the Federal List of Endangered and Threatened Wildlife effective August 8, 2007. The bald eagle continues to be protected under the Federal BGEPA and MBTA and also remains a State-listed species under the New Jersey Endangered and Nongame Species Conservation Act (N.J.S.A. 23:2A *et seq.*), which carries protections under the State land use regulation program. These Federal and State laws prohibit take of bald eagles. For the continued protection of bald eagles, and to ensure compliance with Federal and State laws, the Service recommends managing bald eagles in accordance with the National Bald Eagle Management Guidelines and all applicable State regulations. Links to State agencies and the Guidelines are available on this office's web site at http://www.fws.gov/northeast/njfieldoffice/Endangered.

Other Federally Listed Species or Species Proposed for Listing

No other federally listed threatened or endangered flora or fauna under Service jurisdiction are known to occur within the study areas. If additional information on federally listed species becomes available, or if project plans change, this determination may be reconsidered.

Nesting Migratory Birds

A seasonal restriction on vegetation removal would avoid adverse impacts to nesting migratory birds, which are protected by Federal law pursuant to the MBTA, which prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. In New Jersey, the recommended seasonal restriction for tree or shrub removal that may result in take of active nests with eggs or unfledged chicks of migratory birds is April 1 to August 31 according to the (to be revised) New Jersey Division of Fish and Wildlife Manual for the Protection of Fish and Wildlife Resources dated July 2008.

Other Service Comments

On October 9, 2018, the Service published in the Federal Register a proposed rule to list the eastern black rail (*Laterallus jamaicensis jamaicensis*) as a threatened species with a 4(d) rule. The proposed rule has a 60-day public comment period that ends on December 10, 2018. The proposed rule can be found at: https://www.gpo.gov/fdsys/pkg/FR-2018-10-09/pdf/2018-21799.pdf. Additional information about the species, including the species status assessment (SSA) report and other supporting material, is available at: https://www.fws.gov/southeast/wildlife/birds/eastern-black-rail/.

The Service is evaluating the little brown bat (*Myotis lucifugus*) and tri-colored bat (*Perimyotis subflavus*) to determine if listing under the ESA is warranted. The little brown bat is under Discretionary Status Review and the tri-colored bat is under a 90-Day Finding (U.S. Fish and

Wildlife Service 2018). These species do not currently receive any substantive or procedural protection under the ESA, and the Service has not yet determined if listing of any of these species is warranted. However, the Corps and other Federal action agencies should be aware that these species are being evaluated for possible listing and may wish to include them in field surveys and/or impact assessments, particularly for projects with long planning horizons and/or long operational lives.

On March 16, 2016, the Service published in the Federal Register a 90-day finding that a petition to list the yellow banded bumblebee (*Bombus terricola*) presented substantial information indicating that listing the species may be warranted. The Service has initiated a species status review and will prepare a SSA report, which will support a 12-month finding. As part of the forthcoming revised National Listing Workplan we expect to complete the SSA and resulting 12-month finding in Fiscal Year 2019. The Federal Register notice for the 90-day finding can be found at https://www.gpo.gov/fdsys/pkg/FR-2016-03-16/pdf/2016-05699.pdf.

The Service has received petitions to list other species under the ESA. Those that are known or likely to occur in New Jersey are listed on the Service's (2018) web page.

In this report, the Service also provides recommendations for the protection of State-listed species and species of special concern. Moreover, we support the Corps' proposals on habitat enhancements for bats, pollinators, and the monarch butterfly (*Danaus plexippus*). Finally, the report includes coordination requirements with the New Jersey Division of Fish and Wildlife.

Any questions regarding this final FWCA report should be directed to Carlo Popolizio at (609) 382-5271. The Service looks forward to continued cooperation with the Corps to ensure the successful implementation of the proposed project.

Sincerely,

Eric Schrading
Field Supervisor

Enclosure

References

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NJFO:ES:cpopolizio:RP:ES:cap: 11/29/2018

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FISH AND WILDLIFE COORDINATION ACT
FINAL SECTION 2(b) REPORT

RAHWAY RIVER BASIN COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY MIDDLESEX AND UNION COUNTIES, NEW JERSEY

Prepared for:

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

Prepared by:

U.S. Fish and Wildlife Service
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December 2018

EXECUTIVE SUMMARY

The United States Army Corps of Engineers, New York District (Corps) has evaluated coastal storm risk management within the tidal portion of the Rahway River basin (U.S. Army Corps of Engineers 2017) and has assessed the structural and nonstructural measures that can be used to manage risks from riverine storm surges within the lower portion of the Rahway River Basin. The Corps' Tentatively Selected Plan (TSP) consists of a combination plan of nonstructural treatments and a levee segment. Alternative 4a [10% Annual Chance Exceedance (ACE) non-structural plan - wet and dry floodproofing, elevations], in conjunction with Alternative 1 (Segment D Levee, no ringwall) is identified as the TSP. The TSP would provide coastal storm risk management for portions of the municipalities of Carteret, Linden, Rahway, and Woodbridge, Middlesex and Union Counties, New Jersey through implementation of the Segment D levee and nonstructural measures within the 10% ACE floodplain. The period of analysis (2021-2071) is assumed for the economics evaluation in this study.

The Service provides recommendations for the protection of federally listed species and species proposed for listing pursuant to the Endangered Species Act. The Service further provides lists of mammals, fish, migratory birds, reptiles, amphibians, and plants, highlighting Federal and State-listed threatened or endangered species, and other species of special concern. Finally, the Service recommends habitat enhancements for declining populations of pollinators, including the monarch butterfly (*Danaus plexippus*).

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I. INTRODUCTION

The United States Army Corps of Engineers, New York District (Corps) has evaluated coastal storm risk management within the tidal portion of the Rahway River basin (U.S. Army Corps of Engineers 2017) and has assessed the structural and nonstructural measures that can be used to manage risks from riverine storm surges within the lower portion of the Rahway River Basin. The study was authorized in a resolution of the Committee on Transportation and Infrastructure of the U.S. House of Representatives dated March 28, 1998. Additional funding is provided by the Disaster Relief Appropriations Act of 2013 (Public Law 113-2). The New Jersey Department of Environmental Protection (NJDEP) is the non-Federal sponsor.

In this final Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 *et seq.*) (FWCA), Section 2(b) Report, the Service provides updated information regarding fish and wildlife resources, including federally listed and species proposed for listing pursuant to the Endangered Species Act (87 Stat. 884; 16 U.S.C. 1531 *et seq.*) (ESA); State-listed threatened and endangered species; identifies ecologically sensitive sites in the Study Area; identifies fish and wildlife species within or in the vicinity of the Study Area and discusses potential impacts on these species that may result from implementation of flood control measures; identifies opportunities for fish and wildlife habitat improvements; and updates the current state of knowledge concerning the proposed activities and their potential adverse impacts on fish and wildlife resources.

The information in this report is based primarily on the Service's evaluation of the Corps' *Draft Integrated Feasibility Report and Environmental Impact Statement, Rahway River Basin, New Jersey Coastal Storm Risk Management Feasibility Study* (U.S. Army Corps of Engineers 2017); the Corps' letter dated November 7, 2018 in response to the Service's July 24, 2017 draft FWCA Section 2(b) report; and *The Remedial Action Report, Volume I of II* (Najaran Associates 2013).

II. DESCRIPTION OF THE PROPOSED ACTION

The Corps (2017) is carrying forward an alternative plan which includes both structural and non-structural measures. Structural measures include floodwalls, levees, surge barriers, road-raising, channel modification, and ringwalls that are described as follows:

- Floodwalls are composed of steel, concrete, rock, or aluminum that are used to contain water flow within a channel, requiring drainage facilities on the landward side to collect and disperse water that may pond behind the floodwall.

- Levees are low, wide earthen embankments built to retain floodwater inside a channel and also require interior drainage facilities, on the landward side to collect and disperse water trapped behind the levee.

- Surge barriers are placed across waterways and are closed to prevent floodwaters from entering canals and creeks.

- Road-raising involves elevating the road bed above storm surge waters.

- Channel modification reduces or prevents flooding by widening or deepening.

- Barriers such as ringwalls or ringlevees are placed around buildings such as large commercial structures where nonstructural measures are not feasible.

Nonstructural measures include dry or wet flood proofing, elevation of structures, and property buy-outs that are described as follows:

- Dry flood proofing prevents the water from getting inside the structure by attaching watertight membranes and installing closure structures in doorway and window openings, referred to as sealants and closures.

- Wet flood proofing allow flood water to get inside lower, non-living space areas of the structure via vents and openings to reduce flood-related damages to the structure's foundation. When a basement is present, it is filled with compacted earth to provide stability to the foundation.

- Elevation involves raising the lowest finished floor of a building to a height that is above the flood level. Elevation is feasible for structures having footprint of less than 3,000 square feet.

- Property buy-outs consist of acquiring the property and its structures and/or the purchase of development rights. The structure is then demolished or relocated. A buy-out plan would be successful in re-establishing and maintaining the natural state of the floodplain so properties are not jeopardized by the flood hazard.

A. ALTERNATIVES UNDER CONSIDERATION

The Corps (2017) has carried forward the following alternative plans for further analysis:

- No Action.

- Alternative #1: levees and floodwalls. This structural alternative consists of a combination of four (4) levee/floodwall segments, two (2) closure gates, interior drainage structures, and channel modification. The improvements are located in Clark, Carteret, and Linden Townships, and the City of Rahway. The segments are described as follows:

    - Segment A: levees and floodwalls, channel modification, bridge replacement, and road closure gate. "T-wall" floodwalls on both banks of the Rahway River from near Bridge Street to the Monroe Street Bridge in the City of Rahway are proposed as Segment A1. The left bank floodwall is approximately 325 feet long while the right bank floodwall is approximately 210 feet long, each at elevation of 13.8 feet North American Vertical Datum of 1988 (NAVD 88). The bridge itself would be raised by 2.8 feet, and the left abutment would be moved inland by 15 feet. As result of bridge modification, approximately 300 feet of Monroe Street would be raised by a maximum of 2.8 feet. The raised section of road would tie in into the existing roadway surface at the intersection of Monroe Street and Essex Street. The left bank floodwall would continue downstream

towards Essex Street with a top elevation of 12.6 feet. NAVD 88. The floodwall tie-in to Essex Street would require the road to be raised by approximately 1.5 feet. The raised section is approximately 150 feet long and starts 50 feet south the intersection of Essex Street and Washington Street, City of Rahway.

- Segment A2: starts approximately 150 feet north of the East Milton Avenue Bridge on the left bank of the Rahway River. This section would consist of a sheet pile wall with a maximum height of approximately 2 feet. The sheet pile would tie at the recently modified bridge. A levee section is proposed downstream of the East Milton Avenue Bridge and would tie into high ground on the abutments of the Edgar Road exit (Route 1). The levee would be approximately 1,510 feet long, with an average height of 4 feet. The final section of Segment A2 would consist of a floodwall approximately 580 feet long with an average height of 5.5 feet, to be located between the Route 1 exit and Route 1 itself. This section would also include a flood hydrostatic gate (road closure structure) approximately 65 feet wide by 6 feet high. The gate would be located on Lawrence Street, approximately 300 feet south of the Hancock Street and Lawrence Street intersection, City of Rahway.

Channel modifications in the City of Rahway from 500 feet upstream of the West Grand Avenue Bridge upstream of the confluence with Robinson's Branch and approximately 100 feet downstream of the Lawrence Street Bridge downstream of the confluence with the South Branch, respectively, would be necessary to mitigate for the induced flooding of bank encroachments caused by existing levees on the Rahway River and the additional features of Segment A. Channel modifications would mostly remove 60,000 cubic yards of sediment to reduce flood risk during frequent fluvial events.

- Segment B: levees, floodwalls and road closure gate. This segment would be a combination of levee and floodwall. The levee would have a 12-foot top width and 1:3 horizontal side slopes. It would be approximately 640 feet long, with an average height of approximately 8 feet above grade. This levee would be placed on the right side of Edgar Road just north of Randolph Avenue in the City of Rahway. The floodwall would be a sheet pile approximately 5,700 feet long, with an average height of approximately 3.8 feet. The floodwall would be located on the right bank of the South Branch, between the riverine area and Leesville Avenue. The upstream end of the floodwall would be approximately 1,300 feet downstream of East Inman Avenue and the downstream end would be approximately 600 feet upstream of East Hazelwood Avenue. Segment B would also include a flood hydrostatic gate (road closure structure). The dimension of the road closure structure would be 40 feet wide by 5 feet high, to be located on the north end of Capobianco Plaza Road, City of Rahway.

- Segment C: levee. This levee segment would be 890 feet long, with a 12-foot top width and 1:3 side slopes. The average height would be approximately 7.5 feet from grade. The levee would be located on the left bank of the Rahway River, approximately one mile downstream of the confluence with the South Branch. The upstream end would be at Beacon Street to approximately 150 feet downstream of Wall Street, City of Rahway.

- Segment D: levee. This levee segment would be 3,360 feet long with a 12-foot top width and 1:3 side slopes. The average height would be approximately 7.5 feet above grade. The

levee would be constructed next to the right bank of the Rahway River, approximately 1.2 mile 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, City of Rahway.

- Alternative #2: surge barrier. This structural alternative's main feature is a surge barrier consisting of tide gates and a pumping station at the New Jersey Turnpike Bridge north of the Borough of Carteret. A surge barrier is a specific type of floodgate designed to prevent a storm surge from flooding the area behind the barrier up to a specified design height. The barrier would be upstream of the bridge to the west of the Turnpike, spanning across the width of the river from Carteret to Linden. Additional channel modification, levees and floodwalls in both Carteret and Linden, and closure structures would complete the plan. The surge barrier would include:

  - Six tainter gates allowing navigable passage. Each gate would be 60 feet wide and 30 feet tall from invert to top of gate. Gates would be open during normal tide conditions and fluvial events. During coastal storm surge events, the gates will close during a rising tide as long as the headwater has a lower water surface elevation than the tailwater.

  - A pumping station with four pumps at a total capacity of 1,500 cubic feet per second or 2.7 million gallons per minute (gpm) would be placed on the left bank of the Rahway River.

  - A levee with tie-ins to the New Jersey Turnpike on the left and right banks.

  - The channel would be modified at the surge barrier for a length of approximately 2,000 feet, with removal of approximately 322,000 cubic yards of dredged material.

  - A 3,090-foot floodwall would be constructed along the New Jersey Turnpike Northbound.

  - Approximately 300 linear feet of Memorial Field Park in the City of Linden would be graded to an elevation of 13 feet NAVD 88.

  - Three manual flapgates eight feet in diameter would be added to the floodwall on the northbound side of the New Jersey Turnpike at Marshes Creek.

  - A six-foot high swing gate railroad closure structure would be placed on the southbound side of the New Jersey Turnpike by the Citgo oil tank farm.

  - The transmission tower would be relocated approximately 130 feet away from the river.

- Alternative #3a: 10% annual chance exceedance floodplain. Nonstructural measures were considered for approximately 577 structures (211 residential, 366 non-residential) contained in the 10% annual chance exceedance (ACE) (10-year) floodplain. Results of the study show that 257 structures will be treated, with no treatment recommended for the remaining 320 structures. This alternative would require approximately 33 ringwalls, each surrounding from one to 3 structures, varying in length from 300 to 3,500 linear feet, and varying in height

above grade from 5 to 15 feet. Channel modification would involve deepening approximately 3,300 linear feet along the Rahway River and widening the river near Monroe Street Bridge, City of Rahway for a total dredged capacity of approximately 17,000 cubic yards. The Monroe Street Bridge is also proposed to be replaced.

- Alternative #3b: 2% annual chance exceedance floodplain. Nonstructural measures were considered for approximately 983 structures (561 residential, 422 non-residential) contained in the 2% ACE (50-year) floodplain. Results of the study show that 597 structures will be treated, while no treatment is recommended for the remaining 386 structures. This alternative would requires approximately 40 ringwalls, each surrounding from one to 62 structures, varying in length from 300 to 10,000 linear feet, and varying in height above grade from 5 to 15 feet. Additional flood risk management measures would require channel modification comprised of deepening approximately 4,500 linear feet along the Rahway River, widening the river near Monroe Street Bridge, City of Rahway, and deepening approximately 2,000 linear feet along the South Branch from the existing levee upstream towards the railroad bridge. Bridge replacements and road raising would be required as well.

- Alternative #4: 10% annual chance exceedance non-structural plan plus levee. This alternative consists of a subset of nonstructural components within Alternative #3a and levee segment D from Alternative #1. Nonstructural treatments were considered for approximately 149 structures (131 residential, 18 non-residential) of the 577 structures (211 residential, 366 non-residential) contained in the 10% ACE (10-yr) floodplain. This alternative would require seven ringwalls, each surrounding from one to five structures, varying in length from 600 to 1,500 linear feet, and varying in height above grade from 5 to 10 feet. This is a reduction of 26 ringwalls from Alternative #3a, which in turn also reduced the need for channel modification and bridge replacement. No treatment was recommended for the remaining 428 structures within the floodplain.

- Alternative #4a: 10% annual chance exceedance non-structural plan plus levee, no ringwalls. Alternative #4a consists of a combination of Alternative #4 and Alternative #1 Segment D Levee, with the exclusion of all ringwalls from the nonstructural plan. Alternative #4a would consist of nonstructural treatment for approximately 136 structures (125 residential, 11 non-residential) of the 577 structures (211 residential, 366 non-residential) contained in the 10% ACE (10-yr) floodplain. No treatment is recommended at this time for the remaining 441 structures within the floodplain. The proposed levee segment would be 3,360 feet long with a 12-foot top width, 1:3 side slopes, and average height of approximately 7.5 feet. The levee would be located next to 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, City of Rahway. Nonstructural recommendations on the protected side of this levee were omitted.

B. TENTATIVELY SELECTED PLAN

The Corps (2017), in their initial economic analysis and cost estimate, determined that a combination plan of nonstructural treatments and a levee segment would provide the greatest

benefit to cost ratio. Alternative 4a (10% ACE non-structural plan - wet and dry floodproofing, elevations), in conjunction with Alternative 1 (Segment D Levee, no ringwall) is identified as the Tentatively Selected Plan (TSP). The TSP would provide coastal storm risk management for portions of the municipalities of Carteret, Linden, Rahway, and Woodbridge through implementation of the Segment D levee and nonstructural measures within the 10% ACE floodplain. During the study phase, the Segment D levee will be examined at different levels of flood risk management. The nonstructural measures will be optimized by considering implementation in different floodplains than the 10% ACE floodplain. Initial construction of the Segment D levee is estimated to occur from October 2019 until September 2021. Initial construction of the nonstructural measures is estimated to take place concurrently. The period of analysis (2021-2071) is assumed for the economics evaluation in this study.

III. STUDY AREA

The study area is the tidal portion and associated floodplains of the Rahway River from the Rahway River Park within the City of Rahway to the confluence of the Rahway River into the Arthur Kill. Portions of the Robinson Branch and South Branch of the Rahway River are also part of the study area from the Milton Lake Dam and Merrill County Park (respectively) to the confluences into the Rahway River. The study area includes portions of Clark Township, the City of Rahway, the City of Linden, and the Borough of Carteret, Union County; and Woodbridge Township, Middlesex County, New Jersey. Secondary tributaries to the Rahway River include Marshes Creek, Rolphs Creek, and Deep Creek (Appendix I).

The Robinson's Branch of the Rahway River enters the study area below the Milton Lake Dam, passing through the City of Rahway on the City's western border. From Milton Lake, the Robinson's Branch flows in an easterly direction until it converges with the North Branch of the Rahway River at the corner of Elizabeth Avenue and West Grand Street. Below Milton Lake Dam, there is a small island in the river along a broad, forested wetland floodplain. The river is shallow with a rocky bottom. The Robinson's Branch then runs through a residential area and a small, City-owned park. Downstream of the park, the river is characterized by either steep banks along a narrow strip of wetland vegetation or a retaining wall. Below the culvert under Jefferson Avenue, there is a river riffle zone followed by a long run along a thin border of forested wetland along both banks. This reach of Robinson's Branch is deeper and flows slowly. The river banks are then concrete-walled and the river is slow-flowing and the bottom is muddy. Below the New Church Street culvert, the river banks are steep with a narrow band of forested wetland and upland habitat along the bank. Portions of the bank show evidence of erosion. Farther downstream, banks are supported by a retaining wall (Grossmueller Enterprises Consolidated 1996).

The South Branch of the Rahway River enters the City of Rahway from Woodbridge Township, Middlesex County, through city's southern boundary on the western side of St. Georges Avenue. The steep banks of the South Branch are lined with rip-rap lined dikes or concrete slabs. River bottom is gravelly upstream and muddy downstream. The River passes under St. Georges Avenue and flows in an easterly direction until its convergence with the North Branch of the Rahway River at the junction of State Highway Route #1 and Hazelwood Avenue (Grossmueller Enterprises Consolidated 1996).

After the convergence of the North and South Branch, the main branch of the Rahway River flows east to the Arthur Kill along the borders of the City of Linden, Union County and the City of Carteret, Middlesex County. This area of the river is highly industrialized and occupied with many petroleum storage tanks. Prior to discharging into the Arthur Kill, the Rahway is joined by Marshes Creek in Linden and a number of unnamed tidal tributaries (Grossmueller Enterprises Consolidated 1996). One of the area's largest tracts of contiguous tidal marsh is found at the mouth of the Rahway River. Bounded by the New Jersey Turnpike to the west and surrounded on many sides by petroleum storage tanks, over 300 acres of saltmarsh and mudflats provide essential habitat for wildlife. The wetlands span both sides of the river in both Union and Middlesex counties, and are owned by a variety of entities including the Borough of Carteret and private companies (Virrazzi and Fidursky 2005).

IV. METHODS AND PROCEDURES

This final FWCA, Section 2(b) report incorporates information provided by the Corps or compiled from searches of the Service's New Jersey Field Office library and office files, personal communications, the New Jersey Landscape Project, New Jersey Division of Fish and Wildlife (NJDFW) (2012), and the New Jersey Natural Heritage Program (NJNHP) database (New Jersey Department of Environmental Protection 2007). The NJNHP database was reviewed for information regarding federally listed species, State-listed species and other fish and wildlife that may occur throughout the study area.

V. EXISTING CONDITIONS

A. FEDERALLY LISTED SPECIES

1. Indiana Bat

The Indiana bat (*Myotis sodalis*) is a temperate, insectivorous, migratory bat that hibernates in mines and caves in the winter and summers in wooded areas where females gather in maternity colonies to give birth and raise their pups. The species is currently listed as endangered pursuant to the ESA. Potential summer habitat for the Indiana bat is present along the upper tidal reaches of the Rahway River. Indiana bats hibernate in caves and abandoned mine shafts from October through April. Between April and August, Indiana bats inhabit floodplain, riparian, and upland forests, roosting under loose tree bark during the day, and foraging for flying insects in and around the tree canopy at night. A variety of upland and wetland habitats are used as foraging areas, including floodplain, riparian, and upland forests; pastures; clearings with early successional vegetation; cropland borders; and wooded fencerows. Preferred foraging areas are streams, associated flood plain forests, ponds, and reservoirs (U.S. Fish and Wildlife Service 2007). During these summer months, numerous females roost together in maternity colonies. Maternity colonies use multiple roosts in both living and dead trees. From late August to mid-November, Indiana bats congregate in the vicinity of their hibernacula, building up fat reserves for hibernation (Harvey 1992). Protection of Indiana bats during all phases of their annual life cycle is essential to preserving this species. Threats to the Indiana bat include disturbance or killing of hibernating and maternity colonies; vandalism and improper gating of hibernacula;

fragmentation, degradation, and destruction of forested summer habitats; and exposure to pesticides and other environmental contaminants.

Indiana bats are to be assumed present within forested areas of the Rahway River and its tributaries between April 1 and September 30 each year. Tree clearing could adversely affect this species by killing, injuring or disturbing breeding or roosting bats. Therefore, to avoid adverse effects to the Indiana bat, tree removal activities should be prohibited between April 1 and September 30. If project implementation will involve tree clearing, please forward a construction schedule and a tree survey (species names; number of trees proposed for removal; diameter-at-breast-height; presence of cracks, crevices, or sloughing bark, snags; photographs) to this office for review. If tree clearing is proposed during the restricted season, further consultation pursuant to Section 7 of the Endangered Species Act will be required. In the event that no tree clearing will be necessary for project implementation, please provide this office with documentation to that effect.

2. Northern Long-eared Bat

The northern long-eared bat (*Myotis septentrionalis*) is one of the species of bats most impacted by the disease white-nose syndrome. Due to declines caused by white-nose syndrome and continued spread of the disease, the northern long-eared bat was listed by the Service as threatened under the ESA on April 2, 2015. The Service also developed a final 4(d), which published in the Federal Register on January 14, 2016. The 4(d) rule specifically defines the "take" prohibitions. All measures taken to protect the Indiana bat will also be protective of the northern long-eared bat.

The northern long-eared bat is a medium-sized bat found across much of the eastern and north-central United States. The northern long-eared bat predominantly overwinters in hibernacula that include caves and abandoned mines. During the summer, this species typically roosts singly or in colonies underneath bark or in cavities or crevices of both live trees and snags. Northern long-eared bats are also known to roost in human-made structures. Threats to the northern long-eared bat include disease due to the emergence of white-nose syndrome, improper closure at hibernacula, degradation and destruction of summer habitat, and exposure to pesticides.

3. Bog Turtle

The Ash Brook Swamp Reservation, located along Robinsons Branch in Scotch Plains Township, Union County, approximately four miles upstream from its confluence with the Rahway River could support populations of the federally listed (threatened) bog turtle (*Clemmys muhlenbergii*). Bog turtles inhabit open, wet meadows and bogs with standing or slow-moving, shallow water over a mucky substrate. Bog turtles also occur in emergent and shrub/scrub wetlands and spring-fed fens. All effects resulting from Corps activities along the Rahway River or its tributaries are insignificant or discountable (unsuitable habitat); therefore, implementing the proposed project is not likely to adversely affect the bog turtle.

4. Red Knot

The federally listed (threatened) red knot (*Calidris canutus rufa*) utilizes the Atlantic shorelines and marshes as stopover habitats during the fall (mid-July through mid-November) migration period. Red knots winter at the southern tip of South America and breed within the Canadian Arctic. These small shorebirds fly more than 9,300 miles from south to north every spring and reverse the trip every autumn, making the red knot one of the longest-distance migrating animals. Migrating birds break their spring migration into non-stop segments of 1,500 miles or more, ending at stopover sites.

The Service has drafted a recovery outline for the red knot that will guide the Service's recovery implementation efforts until a recovery plan for the species is completed. The recovery outline is undergoing internal review and, upon approval, will be posted on the national Endangered Species website: https//www.fws.gov/endangered. For more information, contact Wendy Walsh in our New Jersey Office at Wendy_Walsh@fws.gov.

The New Jersey Audubon Society (2014) reported occasional sightings of red knots within the Arthur Kill complex and tributaries. All effects of the proposed activities are discountable and no further consultation for this species pursuant to the ESA is required.

5. Rusty Patched Bumble Bee

The listing of the rusty patched bumble bee (*Bombus affinis*) as endangered under the ESA became effective on March 21, 2017. The species is considered extirpated in New Jersey, but further field studies are necessary to confirm this preliminary assessment. According to the habitat description presented below, it is very unlikely that the rusty patched bumble bee occurs in the study area. Rusty patched bumble bees live in colonies that include a single queen and female workers. Rusty patched bumble bees once occupied grasslands and tallgrass prairies of the Upper Midwest and Northeast, but most grasslands and prairies have been lost, degraded, or fragmented by conversion to other uses. Bumble bees need areas that provide nectar and pollen from flowers, nesting sites (underground and abandoned rodent cavities or clumps of grasses), and overwintering sites for hibernating queens (undisturbed soil). Rusty patched bumble bee colonies have an annual cycle. In spring, solitary queens emerge and find nest sites, collect nectar and pollen from flowers and begin laying eggs, which are fertilized by sperm stored since mating the previous fall. Workers hatch from these first eggs and colonies grow as workers collect food, defend the colony, and care for young. Queens remain within the nests and continue laying eggs. In late summer, new queens and males also hatch from eggs. Males disperse to mate with new queens from other colonies. In fall, founding queens, workers and males die. Only new queens go into diapause (a form of hibernation) over winter and the cycle begins again in spring.

According to the Service (2017a), pesticides and herbicides widely used in agricultural, urban and even natural areas have the most potential to harm bumble bees: insecticides because they are specifically designed to kill insects, and herbicides because their use can reduce or eliminate available flowers that bumble bees need for pollen and nectar. Neonicotinoids are a class of insecticides used to target pests of agricultural crops, forests, turf, gardens and pets.

Neonicotinoids are of particular concern because they are systemic chemicals, meaning that the plant takes up the chemical and incorporates it throughout, including in leaf tissue, nectar and pollen. The use of neonicotinoids rapidly increased when suppliers began selling pre-treated seeds. The chemical remains in pre-treated seeds and is taken up by the developing plants and becomes present throughout the plant. Pollinators foraging on treated plants are exposed to the chemicals directly.

As the rusty patched bumble bee is presumed extirpated in New Jersey, the Service has determined that project activities will have no effect on the species. If through surveys, occurrences of the rusty patched bumble bee are discovered in New Jersey, this determination may be reconsidered.

6. Species under Review for Federal Listing

On October 9, 2018, the Service published in the Federal Register a proposed rule to list the eastern black rail (*Laterallus jamaicensis jamaicensis*) as a threatened species with a 4(d) rule. Partially migratory, the eastern black rail is known to appear in as many as 36 states plus multiple territories and countries in the Caribbean and Central and South America. One of four subspecies of black rail, the eastern black rail, though rare, is broadly distributed but highly localized, and lives in salt, brackish, and freshwater marshes. The Service is not designating critical habitat for the eastern black rail at this time due to concerns that identifying such areas may attract birders seeking out these shy and elusive birds, placing additional stress on the bird. The proposed rule has a 60-day public comment period that ends on December 10, 2018. The proposed rule can be found at: https://www.gpo.gov/fdsys/pkg/FR-2018-10-09/pdf/2018-21799.pdf. Additional information about the species, including the species status assessment (SSA) report and other supporting material, is available at: https://www.fws.gov/southeast/wildlife/birds/eastern-black-rail/.

The Service is evaluating the little brown bat (*Myotis lucifugus*) and tri-colored bat (*Perimyotis subflavus*) to determine if listing under the ESA is warranted. The little brown bat is under Discretionary Status Review and the tri-colored bat is under a 90-Day Finding (U.S. Fish and Wildlife Service 2018). These species do not currently receive any substantive or procedural protection under the ESA, and the Service has not yet determined if listing of any of these species is warranted. However, the Corps and other Federal action agencies should be aware that these species are being evaluated for possible listing and may wish to include them in field surveys and/or impact assessments, particularly for projects with long planning horizons and/or long operational lives.

In the Service's Planning Aid letter (2015a), information was provided indicating that the Service had not yet determined if listing of the American eel (*Anguilla rostrata*) was warranted under the ESA. Later in the year, the Service (2015b) determined that listing of the American eel was not warranted at that time.

On March 16, 2016, the Service published in the Federal Register a 90-day finding that a petition to list the yellow banded bumblebee (*Bombus terricola*) presented substantial information indicating that listing the species may be warranted. Potential threats to the species include habitat loss, degradation, and modification (agricultural intensification and urban development), disease (*Locustacarus buchneri* and *Nosema bombi*), the inadequacy of existing regulatory

mechanisms, and other natural or manmade factors (via climate change, the use of pesticides, and population dynamics and structure). The Service has initiated a species status review and will prepare a SSA report, which will support a 12-month finding. As part of the forthcoming revised National Listing Workplan we expect to complete the SSA and resulting 12-month finding in Fiscal Year 2019. The Federal Register notice for the 90-day finding can be found at https://www.gpo.gov/fdsys/pkg/FR-2016-03-16/pdf/2016-05699.pdf

The yellow-banded bumble bee lives in colonies and forages on pollen and nectar from a wide variety of flowering plants. Historically, the yellow-banded bumble bee was broadly distributed across the northeastern United States and southward into the Appalachians, the upper Midwest extending west to the Rocky Mountains, and from eastern to western Canada.

The Service has received petitions to list other species under the ESA. Those that are known or likely to occur in New Jersey are listed on the Service's (2018) web page.

7. Other Federally Listed Species

Except for Indiana bat, northern long-eared bat, bog turtle, and red knot, no other federally listed or proposed threatened or endangered flora or fauna are known to occur in the vicinity of the project areas. If additional information on federally listed endangered or threatened species becomes available, this determination may be reconsidered.

B. OTHER FISH AND WILDLIFE RESOURCES

1. Mammals

A list of mammals known to occur within or in the vicinity of the study area is presented in Appendix II. The list was adapted from Grossmueller Enterprises Consolidated (1996). No federally listed, State-listed, or mammals of special concern other than the Indiana bat and northern long-eared bat have been documented in or nearby the study area.

2. Fish

The Corps (2017) has provided a list of fish species that occur within the study area. The Corps is also consulting with the National Marine Fisheries Service on project activities that may adversely affect Essential Fish Habitat (EFH). An adverse effect is defined as any impact that reduces quality and/or quantity of EFH. This includes direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to species and their habitat, and other ecosystem components, or reduction of the quality and/or quantity of EFH (National Oceanic and Atmospheric Administration 2017).

3. Migratory Birds

Migratory birds are a Federal trust resource responsibility of the Service. Migratory birds are protected pursuant to the Migratory Bird Treaty Act of 1918 (MBTA) (40 Stat. 755, as amended; 16 U.S.C. 703-712). The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized

by the Department of the Interior. Please refer to the U.S. Fish and Wildlife Service (2013) for a complete list of migratory birds in the United States.

Migratory birds at or near the vicinity of the study area are listed in Appendix III, which includes State-listed and State species of special concern. The list was obtained from Grossmueller Enterprises Consolidated (1996), Niles *et al.* (2001), Munafo and Allen (2013), and Mylecraine and Allen (2015). These references are not always specific on whether these species have breeding populations within the study area or they represent occurrences during migration. Given the high number of State-listed birds or birds of special concern, the Service recommends that the Corps conduct surveys in coordination with the NJDEP's Endangered and Nongame Species Program (ENSP) to document these species' occurrences within the study area.

According to the New Jersey Division of Fish and Wildlife (2008), the general timing restriction to protect nesting migratory birds from tree or shrub/scrub removal is March 15 to July 31. Please be advised that the NJDFW and the Service informally agreed to modify the general timing restriction to April 1-August 31. Failure to implement the seasonal restriction may result in the illegal destruction of nests with eggs or unfledged chicks. This recommended seasonal restriction should be expanded to March 1 for nesting raptors, except for the bald eagle (*Haliaeetus leucocephalus*) that nests between December 15 and July 31.

For the bald eagle, the Service notes that three active nests (*i.e.*, occupied in the last five years) are located within 1.5-2.0 miles of the study area. The three nests might have been built by the same eagle pair following failed reproduction. Smith (pers. comm. 2017) reported that the "Linden" bald eagle pair successfully nested in 2017 with two eggs hatching on April 4. The entire study area is also within foraging habitat designated by the ENSP. The Service removed the bald eagle from the Federal List of Endangered and Threatened Wildlife effective August 8, 2007. The bald eagle continues to be protected under the Bald and Golden Eagle Protection Act (54 Stat. 250; 16 U.S.C. 668-668d) and the MBTA. The Service recommends conducting project activities in accordance with the National Bald Eagle Management Guidelines (guidelines). Links to the guidelines are available on the Service's NJFO web site at http://www.fws.gov/northeast/njfieldoffice/Endangered. The Service further recommends contacting the ENSP and incorporating conservation measures by the ENSP in project planning.

4. Reptiles and Amphibians

Reptiles and amphibians that may be found within or in the vicinity of the Rahway River Study Area are listed in Appendix IV (Grossmueller Enterprises Consolidated 1996). According to the NJDFW, reptiles do not include the State-listed (threatened) wood turtle (*Clemmys insculpta*) because of unsuitable habitat.

5. Benthic Macroinvertebrates

Prior to adopting the Ambient Biological Monitoring Network (AMNET) protocol, the NJDEP (1994) rated the Rahway River rated as "moderately impaired." This was due to the presence of substantial numbers pollution-intolerant Hydropsychidae (Trichoptera). The sharp decrease of

pollution-intolerant macroinvertebrates over time may be an indication that water quality in the Rahway River has diminished in recent years.

The NJDEP utilizes the Environmental Protection Agency's Rapid Bio-assessment Protocols (RBPs) to help monitor the health of streams and watersheds. The AMNET examines dynamics of benthic macroinvertebrate populations to determine the presence of taxa. Ratings of the stream condition are based on the biodiversity of the system and the level of pollution tolerance of the families collected, the ratio of pollution-tolerant to pollution-intolerant families such as members the insect orders Ephemoptera (mayflies), Plectoptera (stoneflies), and Trichoptera (caddisflies). Invertebrate sampling at three Rahway River sites during the most recent assessment in 2009 failed to detect pollution-intolerant species and scoring for each location rated as "poor" (New Jersey Department of Environmental Protection 2012).

6. Vegetation

Upland areas near the proposed project sites are dominated by red oak (*Quercus rubra*), black oak (*Q. velutina*), and white oak (*Q. alba*), along with chestnut oak (*Q. prinus*), scarlet oak (*Q. coccinea*), white ash (*Fraxinus americana*), hickories (*Carya* spp.), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), black locust (*Robinia pseudoacacia*), red cedar (*Juniperus virginiana*), black cherry (*Prunus serotina*), mulberries (*Morus alba* and *M. rubra*), tulip tree (*Liriodendron tulipifera*), and winged sumac (*Rhus copallinum*) (Grossmueller Enterprises Consolidated 1996, Township of Cranford 2003). Understory species include dogwoods (*Cornus* spp.), sassafras (*Sassafras albidum*), spicebush (*Lindera benzoin*), and viburnums (*Viburnum* spp.), multiflora rose (*Rosa multiflora*), and greenbriers (*Smilax* spp.).

Floodplains are occupied by pin oak (*Quercus palustris*), swamp white oak (*Q. bicolor*), red maple (*Acer rubrum*), silver maple (*A. saccharinum*), box elder (*A. negundo*), American elm (*Ulmus americana*), river birch (*Betula nigra*), sweet gum (*Liquidambar styraciflua*), black gum (*Nyssa sylvatica*), sycamore (*Platanus occidentalis*), willows (*Salix* spp.), witch hazel (*Hamamelis virginiana*), and arrowwood (*Viburnum dentatum*) (Grossmueller Enterprises Consolidated 1996, Township of Cranford 2003).

Tidal emergent wetlands are composed of common reed (*Phragmites australis*), salt-marsh grass (*Spartina alterniflora*), salt-meadow grass (*S. patens*), broadleaf cattail (*Typha latifolia*), groundsel-tree (*Baccharis halimifolia*), and marsh elder (*Iva frutescens*) (Grossmueller Enterprises Consolidated 1996).

C. WETLANDS

Wetlands and waterways of the Rahway River Basin have been significantly altered over the years. GeoWeb mapping indicates that in its 24-mile course, only about three miles of original channel exists today (New Jersey Department of Environmental Protection 2015) in the South Mountain Reservation above the municipality of Milburn upstream of the study area. According to the National Wetlands Inventory (U.S. Fish and Wildlife Service 2017b), wetlands within the study area fall under three major categories: palustrine, riverine, and estuarine.

Palustrine wetlands are delineated as follows:

- PFO1A - palustrine forested, broad-leaved deciduous, temporarily flooded.
- PFO1R - palustrine forested, broad-leaved deciduous, fresh tidal.
- PFO1Bd - palustrine forested, broad-leaved deciduous, seasonally saturated, partly drained/ditched.
- PEM5E - palustrine emergent, *Phragmites australis*, seasonally flooded/saturated.
- PEM5Eh - same as PEM5E, but diked/impounded.
- PUBFh - palustrine unconsolidated bottom, semi-permanently flooded, diked/impounded.
- PUBHh - same as PUBFh, but permanently flooded.

Riverine wetlands are delineated as follows:

- R1UBV - riverine tidal, unconsolidated bottom, permanently flooded-fresh/tidal.
- R2UBH - riverine lower perennial, unconsolidated bottom, permanently flooded.

Estuarine wetlands are delineated as follows:

- E1UBL - estuarine subtidal, unconsolidated bottom, subtidal.
- E1UBLx - estuarine subtidal, unconsolidated bottom, subtidal, excavated.
- E2EM1P - estuarine intertidal, emergent, persistent, irregularly flooded.
- E2EM1Pd - same as above, but diked/impounded.
- E2EM5P - Estuarine intertidal emergent, *Phragmites australis,* irregularly flooded.
- E2EM5/1Pd - same as above but hyper hyline/hypersaline, partly drained/ditched.
- E2USN - estuarine intertidal, unconsolidated shore, regularly flooded.

VI. POTENTIAL PROJECT IMPACTS AND MITIGATIVE MEASURES

The Corps (2017) identified the TSP as Alternative 4a (10% ACE Non-Structural Plan + Levee, No Ringwall). Approximately 2,000 feet of the levee is proposed to be constructed within the Joseph Medwick Memorial Park in the Borough of Carteret. Once constructed, the levee will not affect or change the use of the park and its facilities once it is completed. The remainder of the levee is proposed to be constructed on private property. Integrity of the levee will require maintaining a 15-foot buffer of herbaceous vegetation, as well as limiting property owners from building permanent structures (*e.g.*, sheds, above ground/underground pools). The Corps proposes compensating landowners with fair market values for the easements obtained. Implementation of non-structural measures will not result in permanent changes to land uses.

The footprint of the levee will have minimal grade and an average elevation of 6 feet above sea level. The height of the levee will have an average height of 12.6 feet with a side slope grade of 3:1. The non-structural measures may require modifications of foundation and lots (U.S. Army Corps of Engineers 2017). The interior of the levee will require an impermeable clay core to prevent seepage. Local soils often do not meet the geotechnical specifications for the impermeable clay core and/or the fill material for the exterior levee construction, requiring the appropriate material to be imported from an approved, permitted, off-site source. Best management practices will include silt fences, turbidity curtains, and temporary seeding within the project footprint. All temporary work locations are proposed to be restored to pre-construction conditions.

The proposed levee extends over Casey's Creek, a tidally influenced tributary of the Rahway River (U.S. Army Corps of Engineers 2017). The upper portion resembles a drainage ditch with ephemeral flow created by stormwater discharge and high tides, while the lower portion resembles a natural tidal creek with mudflats and marsh wetland complexes. The channel is overgrown with invasive vegetation such as common reed, Japanese knotweed (*Polygonum cuspidatum*), and tree of heaven (*Ailanthus altissima*). The levee is proposed to be placed where Casey's Creek transitions from a drainage ditch to a tidal creek. Approximately 200 linear feet of the creek will be permanently modified through the installation of the levee and associated drainage structure. The drainage structure will consist of a concrete culvert containing a flap gate that will remain open during normal flows and will only be closed prior to storm events. The Corps will also evaluate the on-site restoration of 200 linear feet of tidal creek within Casey Creek's wetland complex to improve tidal flow.

The proposed levee is located along the upper boundary of a 23-acre wetland complex consisting of several wetland habitat types. In absence of formal wetland delineations, the Corps (2017) assumes that five acres of wetlands will be impacted by construction of the levee. Specific wetland types that will be impacted by the construction of the levee and implementation of the required 15-foot vegetation free zone include approximately 1.8 acres of high marsh dominated by common reed, 2.3 acres of low marsh, 0.5 acre of scrub-shrub deciduous wetland, and 0.4 acre of managed wetland (*i.e.*, an area landward of the proposed levee that is part of the Joseph Medwick Memorial Park). The Corps will conduct formal wetland delineation surveys during the Pre-construction Engineering and Design Phase of the project to determine actual impacts. The wetland complex has approximately six acres of high marsh dominated by monotypic stands of common reed. The Corps is considering the potential restoration of four acres of low marsh system. Another 0.7-acre stand of common reed will be evaluated for the potential conversion to a deciduous scrub-shrub wetland. Compensation for the 0.4 acres of permanent loss of managed wetland will either involve conversion to low marsh or deciduous scrub-shrub wetland. Areas of temporary impacts (0.8 acre) will be restored to native vegetation. The levee and associated drainage structure will also permanently impact approximately 0.1 acre of the 1.3-acre mudflat habitat. The Corps (2017) proposes mitigation at a 1:1 ratio. The Service recommends mitigating impacts at a 2:1 ratio, as creation or enhancement at a 1:1 ratio does not replace the functions and values lost to impacts to the original wetland or upland forest.

The Corps (2017) does not consider the managed wetlands within the Joseph Medwick Memorial Park as having functions and values since they have been modified to accommodate recreational activities. Therefore, the Corps is not proposing to mitigate impacts to managed wetlands within the park. The Corps proposes to remove approximately 0.7 acre of upland vegetation (shrubs and trees) to construct the levee and provide for the 15-foot vegetation free zone on either side of the levee. During optimization of the TSP, the Corps will use a Habitat Suitability Index (HSI) model to assess the functions and values of this area of upland vegetation and will conduct a cost analysis to determine the appropriate level of mitigation required. The specific HSI model(s) to be used will be determined during optimization. HSI models under consideration include those for great blue heron (*Ardea herodias*), hairy woodpecker (*Picoides villosus*), downy woodpecker (*P. pubescens*), and black-capped chickadee (*Poecile atricapillus*), given that these species are known occur within the study area. Currently, the Corps is proposing the creation of 0.7 acre of native upland forest habitat. The specific location to create native upland forest habitat will be

selected by the Corps after coordinating with Middlesex County and NJDEP Green Acres Program to determine if there are locations within Joseph Medwick Memorial Park that would benefit from mitigation. The Corps will use tree stock ranging in 8-14 feet in height to enhance forest maturity, giving preference to trees suitable to bat roosting (see Appendix V).

No significant adverse impacts to the aquatic habitat are expected. The Corps (2017) will implement erosion and sediment best management practices such as turbidity curtains. The portion of levee extending over Casey's Creek will be constructed in dry conditions utilizing cofferdams or a temporary diversion culvert. The flap gate will remain open during normal flows and the culvert will be placed at a grade to maintain flow of the creek. The implementation of nonstructural measures as proposed will not have any impacts on water quality or aquatic habitat. The Corps (2017) proposes to set back the levee from the Rahway River so not to interfere with the river's normal daily tidal fluctuations. However, the levee will limit inundation of developed areas by coastal storm surge for up to a 100-year coastal storm event. The flap gate in the levee's drainage structure will remain open during normal flows and will only be closed prior to storm events.

In a June 20, 2014 memorandum, President Obama called on Federal agencies, including the Service, the Corps, and the United States Department of Agriculture (USDA) to "develop... plans to enhance pollinator habitat, and subsequently implement, as appropriate, such plans on their managed lands and facilities, consistent with their missions and public safety," and for the Army Corps of Engineers to "incorporate conservation practices for pollinator habitat improvement on ... development projects across the country" (Obama 2014). The Service believes that Corps flood control projects may provide significant contributions to these directives. While regional (*e.g.,* Mid-Atlantic) pollinator seed mixes are commercially available and contain several native herbaceous species, the Service recommends initiating coordination among the Corps, the Service, and the USDA, Natural Resources Conservation Service's (NRCS) Cape May Plant Material Center to develop a source of pollinator plants most genetically suitable for New Jersey.

On December 29, 2014, the Service announced it will be conducting a status review of the monarch butterfly (*Danaus plexippus*) under the ESA. Monarchs cannot survive without milkweed plants (*Asclepias* spp.); their caterpillars only eat milkweeds, and monarch butterflies need milkweeds to lay their eggs. The Service encourages the Corps to include milkweed and other suitable native plant species in any proposed vegetation planting [see Wild Ones (2015) for a comprehensive plant list].

For both woody and herbaceous vegetation, the Service recommends obtaining, native, local genotypes. When undertaking ecological restoration, plant materials must be sourced with care to avoid the negative genetic consequences of introducing genotypes into local plant populations that are not adapted to the region. Some well-documented consequences of translocating maladapted non-local genetic plant materials into restoration sites include founder effects, genetic swamping and outbreeding depression (Hufford and Mazer 2003). Contracting for native plant material under the current paradigm delays the initiation of procurement and production of plants, and results in compromised material selection, variety, and source. The Service offers to assist the Corps in developing a strategy that will meet the needs for providing sufficient

quantities of genetically diverse native plant material for all Corps' related resilience and coastal protection projects in New Jersey.

VII. CONCLUSIONS AND SUMMARY OF RECOMMENDATIONS

The Service recommends that the Corps incorporate the following recommendations into the selected plan to optimize benefits for and minimize potential adverse effects on federally listed species and adverse impacts on existing fish and wildlife resources within the study area. The Corps responses provided in the November 7, 2018 letter are included below.

A. RECOMMENDATIONS FOR FEDERALLY LISTED SPECIES

1. *Avoid tree removal activities between April 1 and September 30 within all study areas to avoid adverse effects on the Indiana bat. This timing restriction would also protect the northern long-eared bat. Further consultation pursuant to Section 7 of the ESA will be required if vegetation removal cannot be accomplished outside the aforementioned timing restriction. Forward a construction schedule and a tree survey (species names; number of trees proposed for removal; diameter-at-breast-height; presence of cracks, crevices, or sloughing bark, snags; photographs) to this office for review.*

   The Corps agrees to request further consultation pursuant to Section 7 of the ESA if vegetation removal cannot be accomplished outside the aforementioned timing restriction, and conduct mist net surveys for listed bats, if necessary.

2. *The little brown bat, tri-colored bat, yellow-banded bumble bee, eastern black rail, and other species identified by the Service (2018) are being evaluated for possible listing. The Corps may wish to include them in field surveys and/or impact assessments, particularly for projects with long planning horizons and/or long operational lives.*

   The Corps will update the final Feasibility Report / Environmental Assessment to include species under review and will take into consideration the effects the TSP may have on these species.

B. RECOMMENDATIONS TO AVOID IMPACTS TO FISH AND WILDLIFE RESOURCES

1. *Conduct surveys in coordination with the ENSP to document occurrences of State-listed birds and other birds of special concern within the study area.*

   The Corps is not currently planning to conduct any bird surveys for the study. In addition, comments submitted by the New Jersey Department of Environmental Protection on the DIFR/EA did not include any requests by the ENSP for such surveys. However, there are birding organizations that operate within the Study Area that the Corps could collaborate with in future phases of the project [*i.e.*, pre-construction, engineering, and design (PED) Phase, post-construction monitoring] to obtain the information suggested in the recommendation.

2. *Implement a timing restriction in the project area to protect nesting migratory birds from tree or shrub removal from April 1 to August 31. Expand the timing restriction from April 1 to March 1 if raptors are found to be nesting in areas proposed for tree removal.*

The Corps concurs. The draft Integrated Feasibility Report and Environmental Assessment (DIFR/EA) cited the April 1 to August 31 tree clearing restriction. Should the project be authorized and appropriated for construction, this restriction will be included in the construction specifications and will be extended to March 1 to August 31 if raptors are found to be nesting in areas proposed for tree removal.

3. *Conduct project activities in accordance with the National Bald Eagle guidelines. Contact the ENSP and incorporate conservation measures recommended by the ENSP in project planning.*

The Corps concurs. The Corps will maintain coordination with this office and with the ENSP during PED Phase to determine if any measures related to the protection of bald eagle during construction need to be included within the construction specifications.

4. *Contact the NJDFW to discuss protective measures for the wood turtle, which may include required surveys.*

The NJDFW had the opportunity to review the DIFR/EA and noted that no known populations of endangered and threatened species within the TSP project area. Should the project be authorized for construction, additional coordination with the office will occur during the PED Phase. [The Service concurs with the Corps by noting that the NJDFW, in the August 31, 2017 letter to the Service (Appendix VI), does not recommend protective measures for this species].

5. *Provide in-kind mitigation (i.e., forested wetland for forested wetland, upland for upland and riparian zone for riparian zone) at a ratio of 2:1.*

The Corps concurs with the provision of in kind mitigation which may be conducted through the purchase of credits from a state approved mitigation bank, if available, or through off-site habitat creation, restoration and/or enhancement within the Rahway River watershed. However, the Corps Civil Works Planning Policy requires that the appropriate level of compensatory mitigation be determined through a functional value assessment and an incremental cost analysis, not through the use of ratios. Further discussion of how compensatory mitigation is determined and the proposed models to be used is located in Appendix A.9 of the DIFR/EA.

C. RECOMMENDATIONS TO ENHANCE HABITATS

1. *Plant native trees that provide suitable roosts for Indiana bats and northern long-eared bats (Appendix V) to mitigate for tree removal.*

The Corps concurs. The mitigation plan developed for any compensatory mitigation

related to tree removal will place an emphasis on establishing native tree species that provide suitable habitat for Indiana and northern long-eared bat.

2. *Plant only native species for mitigation purposes. Following construction, monitor for invasive plant species and provide control.*

The Corps concurs. In accordance with State and Corps policy, only native plant species will be used for habitat mitigation. The draft Compensatory Mitigation, Monitoring and Adaptive Management included in the DIFR/EA contains preliminary monitoring and adaptive management efforts that will be conducted. This plan will be refined as the plan is optimized and the conceptual mitigation plan is developed.

3. *Abide by President Obama's June 20, 2014 memorandum by planting vegetation beneficial to native pollinators.*

The Corps concurs and will reference guides such as the Service's guide on recommended native New Jersey Plants for Pollinators and the Natural Resource Conservation Service New Jersey Biology Technical Note on Habitat for Pollinators when developing the mitigation planting plan.

4. *Include milkweed and other native plant species beneficial to monarch butterflies in any proposed vegetation planting.*

The Corps concurs. Milkweed and other native plant species that support monarch butterflies will be included as appropriate within mitigation planting plans.

5. *Plant locally-sourced, native genotypes to prevent introducing maladapted plants into local ecosystems.*

As part of the construction specifications, the Corps includes language requiring the contractor to obtain planting material from nurseries within a 50-mile radius from the project area to ensure regionally native planting stock.

6. *Develop a strategy to provide sufficient quantities of genetically diverse native plant material for all Corps' related resilience and coastal protection projects in New Jersey.*

The Corps typically issues a pre-solicitation to plant nurseries within a 50-mile radius when either multiple projects with overlapping construction schedules occur within the same vicinity, or if there is a project that will require a large quantity of native plant material. The pre-solicitation typically contains an approximate date the material will be needed to ensure availability of native plant material when construction occurs. The Corps will assess the need for doing this in the PED Phase and will issue a pre-solicitation for this project, if warranted.

D. RECOMMENDATIONS ON SITE CONTAMINANT CHARACTERIZATION

The comments and recommendations provided below are based on the review of the Remedial Action Report by Najaran Associates (2013) and comments provided in the Corps's e-mail dated November 14, 2018 (Rightler pers. comm. 2018).

1. Corps: For clarification, sediment testing was not conducted in this phase of the project. During the public review of the draft Feasibility Report/EA, Middlesex County, as the owner of Medwick Park, informed us that the entire park underwent a remediation action and provided us with portions of the Remediation Action Report (RAR) (Najaran 2013).

   Service: The Service appreciates the Corps providing the opportunity to review the RAR. It should be noted that environmental quality standards, promulgated by the State of New Jersey, used in the RAR are derived for the protection of human health and may not be applicable or protective of all wildlife. Deferring to public health-related goals instead of identifying parallel goals for ecological health will not be productive because wildlife species often have life history, exposure, and sensitivity differences that can make them more susceptible to contaminants than humans. As such, application of the appropriate State of New Jersey screening values for Baseline Ecological Evaluations (BEEs) will likely result in a far greater number of exceedances for a variety of contaminants of concern.

   A cursory review of the RAR data provided indicates ubiquitous contamination of the site with lead well above levels of ecological concern. Mercury contamination appears to also be ubiquitous and elevated in surface soils (0-0.5ft; n=91; range 0.008-15.8 ug/g; geometric mean 0.20 ug/g; median 0.18 ug/g; [ug/g = ppm]). For the purposes of ecological risk assessment, mercury sediment values exceeding 0.71 µg/g correlate with increased probability of adverse effects to benthic macroinvertebrates. As mercury readily bio-accumulates and bio-magnifies in the food web, additional food chain analyses would be needed to elucidate if site mercury concentrations represent potential risk to higher trophic organisms such as fish, mammals or birds.

2. Corps: Attached is the July 2013 RAR - Vol I. Please note that we were not provided Vol. II of the RAR.

   Service: Should the Corps acquire Volume II of the RAR, the Service is interested in obtaining a copy as well. Of particular interest are Appendix D (TSCA- Regulated PCB Remediation) and Appendix K (IAL Analytical Data Packages and Electronic Data Deliverables) for future reference as the project moves forward.

3. Corps: Please find attached a figure of the levee alignment overlain on one of the figures we pulled from the RAR. The proposed compensatory wetland mitigation site is located on the water side of the levee. On the figure, it is noted as Area of Contamination 22.

Service: The figure was helpful in our review; we understand the proposed compensatory wetland mitigation site is also identified as Area of Concern (AOC) 22 in the RAR Vol. I.

4. Corps: The Corps has a copy of the Filed Deed Notice. It is available upon request.

   Service: The Filed Deed Notice is not needed for environmental contaminants purposes.

5. Corps: As mentioned in the letter, the NJDEP, as the non-federal sponsor, has agreed to remediate the site further in order to for us to construct the project and will be responsible for obtaining all necessary permits and conducting any required environmental assessments related to their remediation action.

   Service: Understood.

6. Corps: It is anticipated that the Corps will conduct sediment sampling in the locations of other project features (*e.g.*, nonstructural) or portions of the levee not situated in Medwick Park. This sampling will occur in the PED phase. Therefore, once the NJDEP completes their remediation efforts and we complete our sediment testing, we will provide all information to the Service for review.

   Service: We appreciate and welcome the opportunity to review additional documents regarding this matter. At this early stage in the evolution of the mitigation bank design, the Service recommends that the Corps incorporate the following into their site characterization:

   - To assure that sediment sampling effort provides a representative and ecologically relevant presentation of existing site conditions, the Service recommends the Corps use a random stratified sampling approach (*i.e.*, Incremental Sampling Methodology); the Service is available to assist in the development of the sampling design.

   - Polychlorinated biphenyls, dioxins, and furans were not sufficiently characterized in the 2013 RAR for AOC 22. The Service recommends that the Corps characterize these analytes using EPA Methods 1668 and 1613. The Service is available to assist the Corps in developing appropriate and ecologically relevant limits of quantitation for these analytes.

   - Mitigation bank site characterization should include contaminant characterization of biotic samples including but not limited to; forage fish, crustaceans, bivalves, and birds/eggs occupying the site. Again, the Service is available to assist the Corps in developing appropriate multiyear and robust biotic sampling design for the mitigation site. Biotic sampling is recommended by the Service to elucidate the ecological viability and sustainability of the bank over time, and evaluate the effects of the proposed Federal action on trust resources under our jurisdiction.

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B. PERSONAL COMMUNICATIONS

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Smith, L. 2017. Biologist/Volunteer Manager. Conserve Wildlife Foundation of New Jersey. Woodbine, New Jersey.

APPENDIX I

Study Area

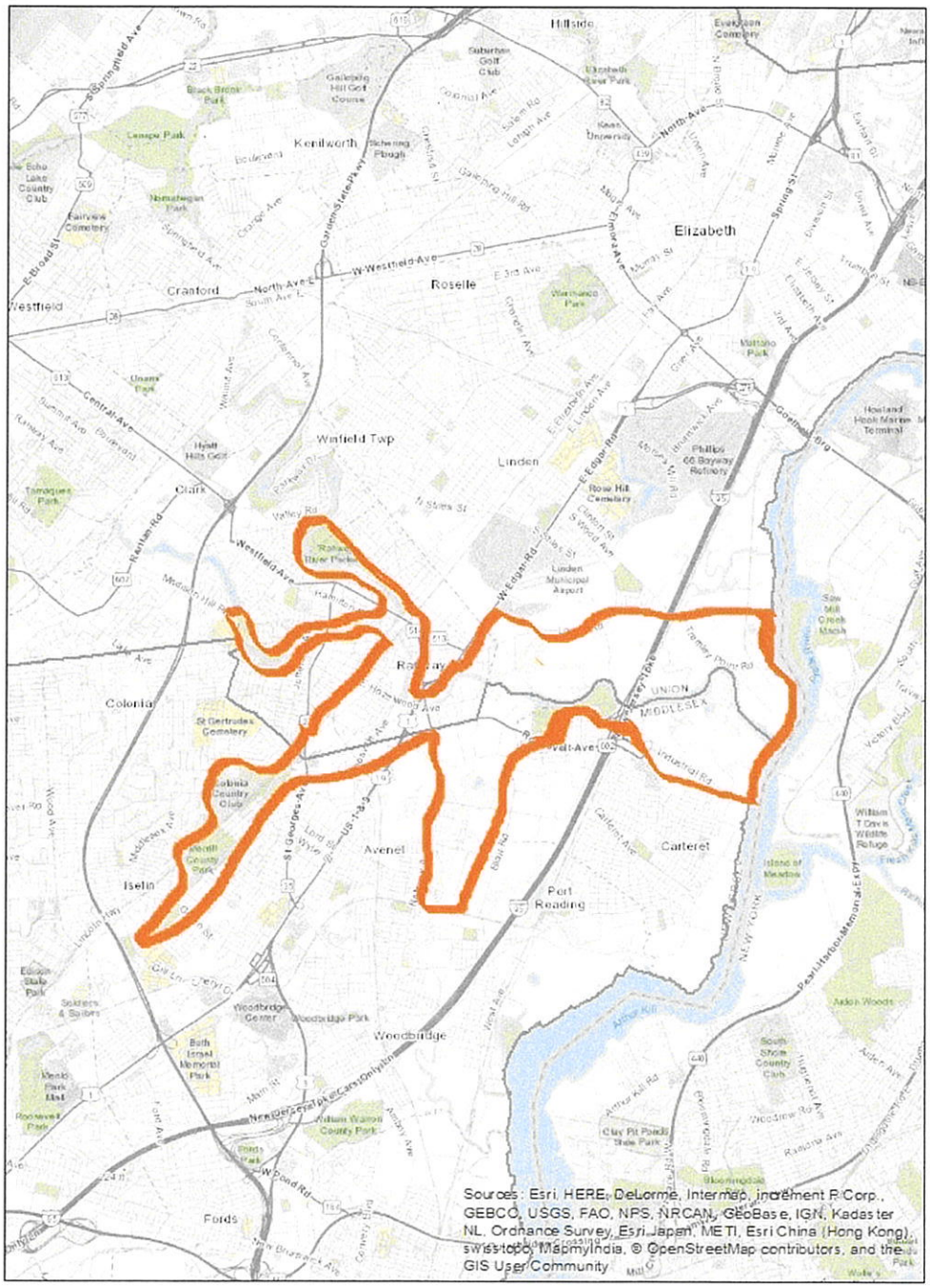


Figure 1. Approximate study area.

N↑

APPENDIX II

Mammals of the Study Area

Scientific Name	Common Name	Status
Marsupialia (Marsupials)		
Didelphis virginiana	Virginia opossum	
Insectivora (Shrews & Moles)		
Blarina brevicauda	Northern short-tailed shrew	
Condylura cristata	Star-nosed mole	
Cryptotis parva	Least shrew	
Scalopus aquaticus	Eastern mole	
Sorex cinereus	Masked shrew	
Chiroptera (Bats)		
Eptesicus fuscus	Big brown bat	
Lasionycteris noctivagans	Silver-haired bat	
Lasiurus borealis	Eastern red bat	
Lasiurus cinereus	Hoary bat	
Myotis leibii	Eastern small-footed bat	
Myotis lucifugus	Little brown bat	
Myotis septentrionalis	Northern long-eared bat	**T**
Myotis sodalis	Indiana bat	**E**
Pipistrellus subflavus	Eastern pipistrelle	
Lagomorpha (Rabbits)		
Sylvilagus floridanus	Eastern cottontail	
Rodentia (Rodents)		
Clethrionomys gapperi	Red-backed vole	
Glaucomys volans	Southern flying squirrel	
Marmota monax	Woodchuck	
Microtus pennsylvanicus	Meadow vole (field mouse)	
Microtus pinetorum	Woodland vole	
Mus musculus	House mouse (non-native)	
Neotoma floridana	Eastern wood rat	
Ondatra zibethicus	Common muskrat	
Peromyscus leucopus	White-footed mouse	
Peromyscus maniculatus	Deer mouse	
Rattus norvegicus	Norway rat (non-native)	
Rattus rattus	Black rat (non-native)	
Sciurus carolinensis	Eastern gray squirrel	
Tamias striatus	Eastern chipmunk	
Tamiasciurus hudsonicus	Red squirrel	
Zapus hudsonius	Jumping mouse	
Carnivora (Carnivores)		
Mephitis mephitis	Striped skunk	
Mustela erminea	Short-tailed weasel	
Mustela frenata	Long-tailed weasel	
Procyon lotor	Common raccoon	
Vulpes vulpes fulva	Red fox	

Artiodactyla (Even-toed Hoofed Mammals)		
Odocoileus virginianus	White-tailed deer	

T: federally listed as threatened
E: federally listed as endangered

APPENDIX III

Migratory Birds of the Study Area

SCIENTIFIC NAME	COMMON NAME	STATUS
Accipiter cooperii	Cooper's hawk	State special concern
Accipiter striatus	Accipiter striatus	State special concern
Actitis macularius	Spotted sandpiper	State special concern
Agelaius phoeniceus	Red-winged blackbird	
Aix sponsa	Wood duck	
Ammodramus caudatus	Saltmarsh sparrow	
Ammodramus maritimus	Seaside sparrow	
Ammodramus savannarum	Grasshopper sparrow	State threatened
Anas carolinensis	Green-winged teal	
Anas clypeata	Northern shoveler	
Anas discors	Blue-winged teal	
Anas platytrhyncos	Mallard	
Anas rubripes	Black duck	
Anas strepera	Gadwall	
Archilochus colubris	Ruby-throated hummingbird	
Ardea herodias	Great blue heron	State special concern
Asio flammeus	Short-eared owl	State endangered
Baelophus bicolor	Tufted titmouse	
Bartramia longicauda	Upland sandpiper	State endangered
Bombycilla cedrorum	Cedar waxwing	
Botaurus lentiginosus	American bittern	State endangered
Branta canadensis	Canada goose	
Bubo virginianus	Great horned owl	
Bubulcus ibis	Cattle egret	State threatened
Buteo jamaicensis	Red-tailed hawk	
Buteo platypterus	Broad-winged hawk	State special concern
Butorides virescens	Green heron	
Calidris alpina	Dunlin	
Calidris canutus rufa	Red knot	Federally threatened
Calidris pusilla	Semipalmated sandpiper	State special concern
Cardellina (Wilsonia) canadensis	Canada warbler	State special concern
Cardinalis cardinalis	Northern cardinal	
Carpodacus mexicanus	House finch	
Cathartes aura	Turkey vulture	
Catharus fuscescens	Veery	State special concern
Chaetura pelagica	Chimney swift	
Charadrius semipalmatus	Semi-palmated plover	
Charadrius vociferus	Killdeer	
Chordeiles minor	Common nighthawk	
Circus cyaneus	Northern harrier	State endangered
Cistothorus palustris	Marsh wren	
Coccyzus americanus	Yellow-billed cuckoo	
Coccyzus erythropthalmus	Black-billed cuckoo	State special concern
Colaptes auratus	Northern flicker	

Contopus virens	Eastern wood pewee	
Corvus brachyrhynchos	American crow	
Corvus ossifragus	Fish crow	
Cyanocitta cristata	Blue jay	
Dendroica discolor	Prairie warbler	
Dendroica petechia	Yellow warbler	
Dimetella carolinensis	Gray catbird	
Dolichonyx oryzivorus	Bobolink	State threatened
Egretta caerulea	Little blue heron	State special concern
Egretta thula	Snowy egret	State special concern
Egretta tricolor	Tricolored heron	State special concern
Empidonax minimus	Least flycatcher	State special concern
Empidonax traillii	Willow flycatcher	
Eremophila alpestris	Horned lark	State threatened
Euphagus carolinus	Rusty blackbird	
Falco peregrinus	Peregrine falcon	State endangered
Falco sparverius	American kestrel	State threatened
Fulica americana	American coot	
Gavia immer	Common loon	
Geothypis trichas	Common yellowthroat	
Haematopus palliatus	American oystercatcher	State special concern
Haemorhous purpureus	Purple finch	
Haliaeetus leucocephalus	Bald eagle	Federally protected
Helmitheros vermivorum	Worm-eating warbler	State special concern
Hylocichla mustelina	Wood thrush	State special concern
Hirundo rustica	Barn swallow	
Icteria virens	Yellow-breasted chat	State special concern
Icterus galbula	Baltimore (northern) oriole	
Icterus spurius	Orchard oriole	
Ixobrychus exilis hesperis	Least bittern	State special concern
Junco hyemalis	Dark-eyed junco	
Lanius ludovicianus	Loggerhead shrike	
Larus argentatus	Herring gull	
Larus delawarensis	Ring-billed gull	
Larus marinus	Black-backed gull	
Leiothlypis(Oreothlypis) ruficapilla	Nashville warbler	State special concern
Leuconotopicus villosus	Hairy woodpecker	
Leucophaeus atricilla	Laughing gull	
Limosa haemastica	Hudsonian godwit	
Megaceryle alcyon	Belted kingfisher	
Melanerpes carolinus	Red-bellied woodpecker	
Melanerpes erythrocephalus	Red-headed woodpecker	State threatened
Melospiza georgiana	Swamp sparrow	
Melospiza lincolnii	Lincoln's sparrow	
Melospiza melodia	Song sparrow	

Mimus polyglottos	Northern mockingbird	
Mniotilta varia	Black and white warbler	
Molothrus ater	Brown-headed cowbird	
Myiarchus crinitus	Great crested flycatcher	
Nycticorax nycticorax	Black-crowned night-heron	State threatened
Nyctinassa violacea	Yellow-crowned black-heron	State threatened
Oporornis formosus	Kentucky warbler	State special concern
Pandion haliaetus	Osprey	State threatened
Parkesia motacilla	Louisiana water-thrush	
Passerculus sandwichensis	Savannah sparrow	State threatened
Passerella iliaca	Fox sparrow	
Passerina cyanea	Indigo bunting	
Phalacrocorax carbo	Great cormorant	
Picoides pubescens	Downy woodpecker	
Plectrophenax nivalis	Snow bunting	
Plegadis falcinellus	Glossy ibis	State special concern
Pluvialis squatarola	Black-bellied plover	
Podilymbus podiceps	Pied-billed griebe	State endangered
Poecile atricapillus	Black-capped chickadee	
Quiscalus quiscula	Common grackle	
Rallus crepitans	Clapper rail	
Rallus limicola	Virginia rail	
Rhyncops niger	Black skimmer	State endangered
Sayornis phoebe	Eastern phoebe	
Seiurus aurocapilla	Ovenbird	
Setophaga americana	Northern parula	State special concern
Setophaga caerulescens	Black-throated blue warbler	State special concern
Setophaga fusca	Blackburnian warbler	State special concern
Setophaga palmarum	Palm warbler	
Setophaga petechia	Yellow warbler	
Setophaga striata	Blackpoll warbler	
Setophaga virens	Black-throated green warbler	State special concern
Sitta carolinensis	White-breasted nuthatch	
Sphyrapicus varius	Yellow-bellied sapsucker	
Spinus tristis	American goldfinch	
Spizella arborea	Tree sparrow	
Spizella passerina	Chipping sparrow	
Spizella pusilla	Field sparrow	
Stelgidopteryx serripennis	Rough-winged swallow	
Sterna antillarum	Least tern	State endangered
Sterna nilotica	Gull-billed tern	State special concern
Strix varia	Barred owl	State threatened
Sturnella magna	Eastern meadowlark	State special concern
Tachycineta bicolor	Tree swallow	
Toxostoma rufum	Brown thrasher	State special concern

Tringa flavipes	Lesser yellowlegs	
Tringa melanoleuca	Greater yellowlegs	
Tringa solitaria	Solitary sandpiper	
Troglodytes aedon	House wren	
Troglodytes hiemalis	Winter wren	State special concern
Turdus migratorius	American robin	
Tyrannus tyrannus	Eastern kingbird	
Tyto alba	Barn owl	State special concern
Vermivora chrysoptera	Golden-winged warbler	State endangered
Vermivora cyanoptera (V. pinus)	Blue-winged warbler	
Vireo gilvus	Warbling vireo	
Vireo griseus	White-eyed vireo	
Vireo olivaceus	Red-eyed vireo	
Zenaida macroura	Mourning dove	
Zonotrichia albicollis	White-throated sparrow	

APPENDIX IV

Reptiles and Amphibians of the Study Area

Scientific Name	Common Name	Status
Order: Testudines (Turtles)		
Chelydra serpentina	Common snapping turtle	
Chrysemys picta picta	Eastern painted turtle	
Chrysemys scripta elegans	Red-eared turtle	Introduced
Kinosternon subrubrum	Eastern mud turtle	
Sternotherus odoratus	Stinkpot (musk turtle)	
Terrapene carolina carolina	Eastern box turtle	
Order: Squamata (Lizards and Snakes)		
Coluber constrictor	Northern black racer	
Diadophis punctatus edwardsi	Northern ringneck snake	
Elaphe obsoleta obsoleta	Black rat snake	
Lampropeltis triangulum triangulum	Eastern milk snake	
Nerodia sipedon sipedon	Northern water snake	
Opheodrys vernalis vernalis	Eastern smooth green snake	
Storeria dekayi dekayi	Northern brown snake	
Thamnophis sirtalis sirtalis	Eastern garter snake	
Thamnophis sauritus sauritus	Eastern ribbon snake	

Scientific Name	Common Name
Order: Caudata (Salamanders)	
Desmognathus fuscus fuscus	Northern dusky salamander
Eurycea bislineata bislineata	Northern two-lined salamander
Plethodon cinereus	Red-backed salamander
Plethodon glutinosus glutinosus	Slimy salamander
Order: Anura (Toads and Frogs)	
Acris crepitans crepitans	Northern cricket frog
Bufo americanus	American toad
Bufo woodhousei fowleri	Fowler's toad
Hyla versicolor	Common gray treefrog
Pseudoacris (Hyla) crusifer	Northern spring peeper
Pseudacris triseriata kalmi	New Jersey chorus frog
Rana catesbeiana	Bullfrog
Rana palustris	Pickerel frog
Rana pipiens	Northern leopard frog

APPENDIX V

Preferred Roost Trees for Indiana and Northern Long-Eared Bats

Scientific Name	Common Name
Acer rubrum	Red maple
Acer saccharinum	Silver maple*
Acer saccharum	Sugar maple *
Betula alleghaniensis	Yellow birch
Betula populifolia	Gray birch
Carya cordiformis	Bitternut hickory
Carya ovalis	Sweet pignut hickory
Carya ovata	Shagbark hickory *
Fraxinus americana	White ash
Fraxinus pennsylvanica	Green ash*
Pinus strobus	White pine
Populus deltoids	Eastern cottonwood*
Quercus alba	White oak*
Quercus palustris	Pin oak
Quercus rubra	Northern red oak
Quercus stellata	Post oak
Ulmus americana	American elm*
Ulmus rubra	Slippery elm

* preferred roost tree species

APPENDIX VI

Coordination with the New Jersey Division of Fish and Wildlife

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NATURAL & HISTORIC RESOURCES
DIVISION OF FISH & WILDLIFE
P.O. Box 420; Mail Code: 501-03
Trenton, NJ 08625-0420
TEL. (609) 292-2965 FAX. (609) 984-1414
VISIT OUR WEBSITE WWW.NJFISHANDWILDLIFE.COM

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

August 31, 2017

Mr. Eric Schrading
Field Supervisor
United States Fish & Wildlife Service
4 E. Jimmie Leeds Road, Unit 4
Galloway, NJ 08205

Dear Mr. Schrading:

The NJ Division of Fish & Wildlife (DFW) generally concurs with the conclusions and recommendations found in U.S. Fish and Wildlife Service's (Service) draft Fish and Wildlife Coordination Act report entitled *Draft Integrated Feasibility Report and Environmental Assessment, Rahway River Basin, New Jersey, Coastal Stann Risk Management, Feasibility Study.* Specifically for the Corps' Tentatively Selected Plan (TSP) - Alternative 4a [10% Annual Chance Exceedance (ACE) nonstructural plan - wet and dry flood proofing, elevations], in conjunction with Alternative 1 (Segment D Levee, no ringwall), the DFW would supply the following.

For section VII. Conclusions and Summery of Recommendations, B. Recommendations to Avoid Impacts to Fish and Wildlife Resources (4), our Endangered and Non-Game Species Program believes Wood Turtle will not be found below the Lawrence St. Bridge over the Rahway River. Waters below this point are brackish, so no protective measures for them would be recommended. Minor omission, Sycamore is listed in section V, B, 6 Vegetation, but not in the table under Appendix V, Preferred Roost Trees.

Lastly your letter references a "flap gate" on the pipe passing through the proposed levee, but describes it in a manner that DFW would recognize it as a "flood gate".

If there are any questions concerning these comments, please feel free to contact Kelly Davis of my staff (908-236-2118). We hope this information is of service to you.

Sincerely,

Larry Herrighty, Director
Division of Fish & Wildlife

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

Appendix A.3
November 7, 2018 USACE Letter to USFWS

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

Environmental Analysis Branch

November 7, 2018

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,

This letter serves as a status update regarding the Rahway River Basin Coastal Storm Risk Management Study being conducted by the U.S. Army Corps of Engineers (USACE), New York District (District), and as a response to your July 24, 2017 Draft Fish and Wildlife Coordination Act Report (DFWCAR)(Encl.1) prepared for the Tentatively Selected Plan described in the *Draft Integrated Feasibility Report/Environmental Assessment Rahway River Basin, New Jersey, Coastal Storm Risk Management, Feasibility Study* (DIFR/EA).

The public/agency review of the DIFR/EA occurred from May 31 through June 30, 2017. During this time, the District became aware of contamination issues within the Joseph Medwick Park, where the TSP and associated compensatory mitigation is located. Although remediation activities within the park were completed in 2012, some of the remediation techniques used within the TSP project area include capping and/or access exclusion (e.g. fencing).

Per U.S. Army Corps of Engineers (USACE) regulations, the New Jersey Department of Environmental Protection (NJDEP), as the non-federal sponsor for the project, is responsible for providing all lands and easements required to construct, operate and maintain the project. The USACE regulations further stipulate that the lands must be free from contamination and that the non-federal sponsor is responsible for costs for the cleanup and response should contamination be discovered and the non-federal sponsor wishes to proceed with the project.

The study was paused while the District coordinated with NJDEP and USACE Headquarters (HQ) to determine the path forward. Based on the coordination, the NJDEP has agreed to fully remediate the area within the TSP footprint and associated compensatory mitigation prior to the District initiating construction of the TSP. As part of the remediation effort, the NJDEP will be responsible for preparing any required environmental assessments and acquiring the necessary permits for the remediation work. This decision has been coordinated with the USACE HQ, and the study has resumed.

As a result, we are requesting that your office finalize the Fish and Wildlife Coordination Act Report. District responses to the recommendations in the DFWCAR are provided in Enclosure 2.

The District will continue to coordinate with your agency closely to assist in your preparation of the Final Fish and Wildlife Coordination Act Report. Should any questions arise, or additional information is needed, please contact Ms. Kimberly Rightler at (917) 790-8722 or kimberly.a.rightler@usace.army.mil.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

Enclosure 2: District Response to 24 July 2017 Draft Fish and Wildlife Coordination Act Report

1) Recommendation for Federally Listed Species #1: *Further consultation pursuant to Section 7 of the ESA will be required if vegetation removal cannot be accomplished outside of the April 1 to September 30 timing restriction.*

   The District concurs. The tree clearing restriction will be included within the construction specifications. Should it be determined during construction that clearing must occur within the tree clearing restriction period, the District will coordinate with your office to determine if a mist net survey to verify the presence/absence of Indiana bat and northern long-eared bat will be required.

2) Recommendation for Federally Listed Species #2: *The Corps should be aware of species under review for Federal listing under the ESA and include them in future field surveys and impact assessments for project with long planning horizons and/or long operational lives.*

   The District concurs. The Final Feasibility Report/Environmental Assessment will be updated to include species under review and will take into consideration any potential positive and/or negative effects the TSP will have on these species.

3) Recommendation Fish and Wildlife Resources #1: *Conduct surveys in coordination with ENSP to document occurrences of State-listed birds and other birds of special concern within the study area.*

   The District is not currently planning to conduct any bird surveys for the study. In addition, comments submitted by the New Jersey Department of Environmental Protection on the DIFR/EA and did not include any requests by the Endangered and Nongame Species Program (ENSP) for such surveys. However, there are birding clubs that operate within the Study Area that the District could collaborate with in future phases of the project (i.e. PED Phase, post-construction monitoring) to obtain the information suggested in the recommendation.

4) Recommendation for Fish and Wildlife Resources #2: *Implement a time restriction in the project area to protect migratory birds from tree or shrub removal from April 1 to August 31. Expand the timing restriction from April 1 to March 1 if raptors are found to be nesting in areas proposed for tree removal.*
   The District concurs. The DIFR/EA cited the April 1 to August 31 tree clearing restriction. Should the project be authorized and appropriated for construction, this restriction will be included in the construction specifications and will be extended to March 1 to August 31 if raptors are found to be nesting in areas proposed for tree removal.

5) Recommendation for Fish and Wildlife Resources #3: *Conduct activities in accordance with the National Bald Eagle guidelines.*

   The District concurs. The District will maintain coordination with your office and with the NJ ENSP during PED Phase to determine if any measures related to the protection of bald eagle during construction needs to be included within the construction specifications.

6) Recommendations for Fish and Wildlife Resources #4: *Contact NJDFW to discuss protective measures for wood turtle.*

The NJDFW had the opportunity to review the DIFR/EA and noted that no known populations of endangered and threatened species within the TSP project area. Should the project be authorized for construction, additional coordination with the office will occur during the Pre-construction Engineering and Design Phase.

7) Recommendations for Fish and Wildlife Resources #5: *Provide in-kind mitigation at a ratio of 2:1.*

   The District concurs with the provision of in kind mitigation which may be conducted through the purchase of credits from a state approved mitigation bank, if available, or through off-site habitat creation, restoration and/or enhancement within the Rahway River watershed.

   However, the USACE Civil Works Planning Policy requires that the appropriate level of compensatory mitigation be determined through a functional value assessment and an incremental cost analysis, not through the use of ratios. Further discussion of how compensatory mitigation is determined and the proposed models to be used is located in Appendix A.9.

8) Recommendation to Enhance Habitat #1: *Plant native trees that provide suitable roosts for Indiana bats and northern long-eared bats.*

   The District concurs. The mitigation plan developed for any compensatory mitigation related to tree removal will place an emphasis on establishing native tree species that provide suitable habitat for Indiana and northern long-eared bat.

9) Recommendation to Enhance Habitat #2: *Plant only native species for mitigation purposes. Monitor for invasive plant species and provide control.*

   The District concurs, In accordance with state and Corps policy, only native plant species will be used for habitat mitigation. The draft Compensatory Mitigation, Monitoring and Adaptive Management included in the DIFR/EA contains preliminary monitoring and adaptive management efforts that will be conducted. This plan will be refined as the plan is optimized and the conceptual mitigation plan is developed.

10) Recommendation to Enhance Habitat #3: *Abide by President Obama's June 20, 2014 memorandum by planting vegetation beneficial to native pollinators.*

    The District concurs and will reference guides such as the USFWS guide on recommended native New Jersey Plants for Pollinators and the Natural Resource Conservation Service *New Jersey Biology Technical Note on Habitat for Pollinators* when developing the mitigation planting plan.

11) Recommendation to Enhance Habitat #4: *Include milkweed and other native plant species beneficial to monarch butterflies in a proposed vegetation planting.*

    The District concurs. Milkweed and other native plant species that support monarch butterflies will be included as appropriate within mitigation planting plans.

12) Recommendation to Enhance Habitat #5: *Plant locally-sourced, native genotypes to prevent introducing maladapted plants into local ecosystems.*

As part of the construction specifications, the District includes language requiring the contractor to obtain planting material from nurseries within a 50-mile radius from the project area to ensure regionally native planting stock.

13) Recommendation to Enhance Habitat #6: *Develop a strategy to provide sufficient quantities of genetically diverse native plant material for all Corps' related resilience and coastal protection projects in New Jersey.*

The District typically issues a pre-solicitation to plant nurseries within a 50-mile radius when either multiple projects with overlapping construction schedules occur within the same vicinity, or if there is a project that will require a large quantity of native plant material. The pre-solicitation typically contains an approximate date the material will be needed to ensure availability of native plant material when construction occurs. The District will assess the need for doing this in the PED Phase and will issue a pre-solicitation for this project if warranted.

14) Recommendation to Enhance Habitat #7: *Forward results of any sediment testing to the Service for review. Include information on sediment sources and disposal sites where fill or excavation may be required.*

The District anticipates conducting sediment testing during the PED Phase. Results of any testing performed will be forwarded to the Service for review. It should be noted that any excavated material not used on-site will be disposed of at a facility that has been approved and permitted by the state to accept that specific type of material.

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

Appendix A.3
April 14, 2017 USACE Letter to USFWS

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

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

Appendix A.3
April 18, 2016 USFWS Letter to USACE

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**

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

Appendix A.3
February 4, 2016 USACE Letter to USFWS

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,

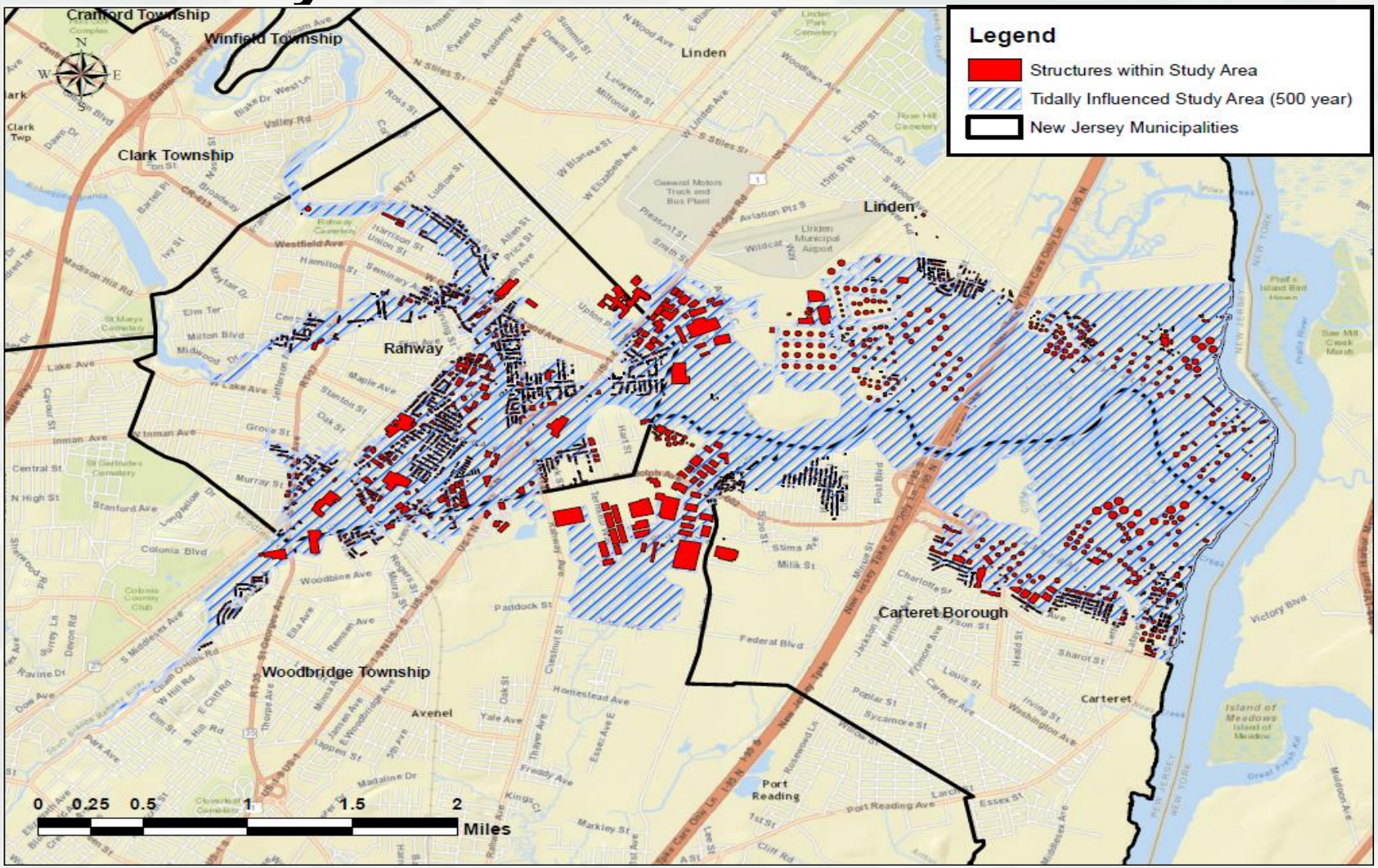
Peter Weppler
Chief, Environmental Analysis Branch

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

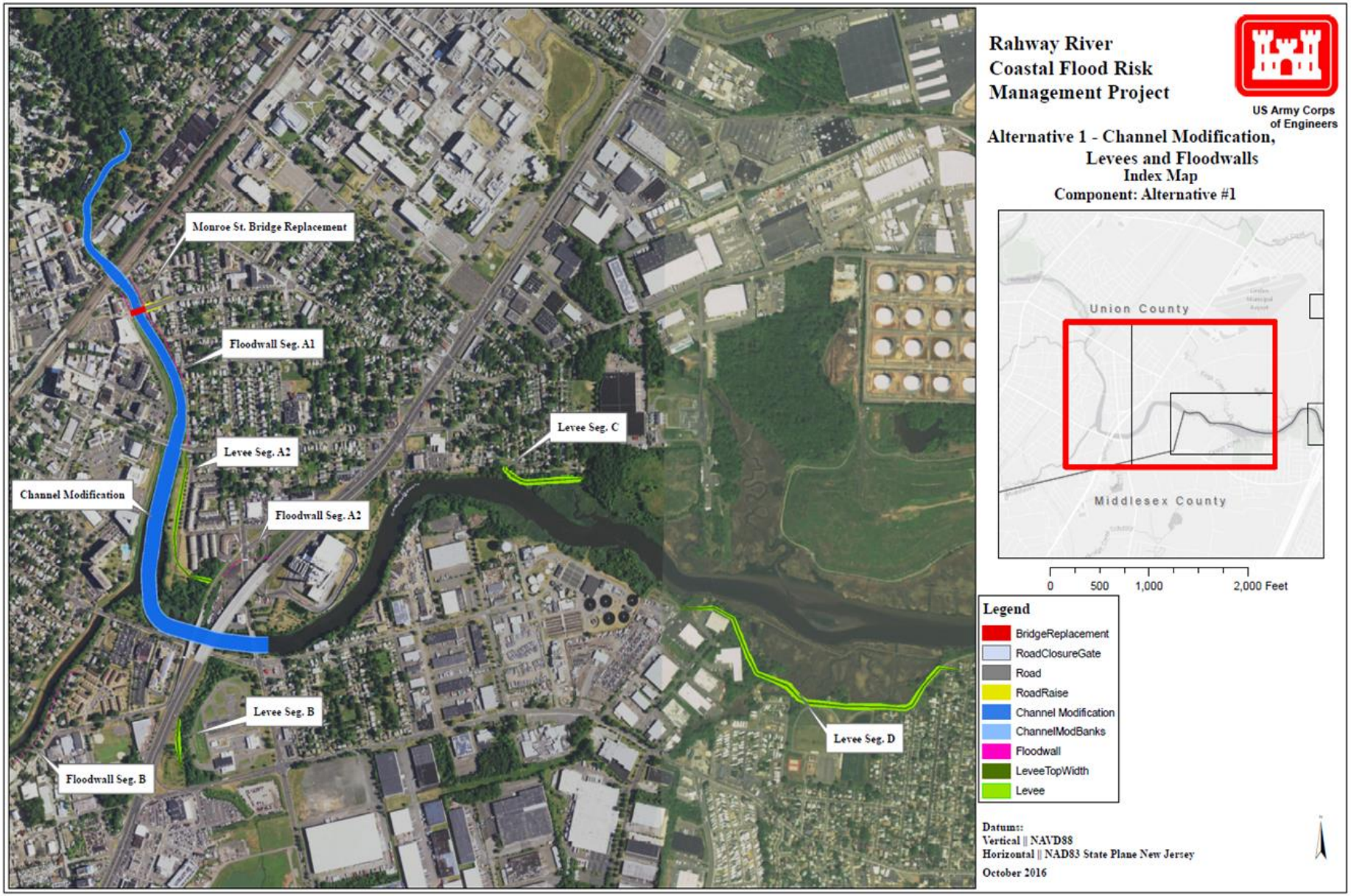
- Determine Tentatively Selected Plan (TSP)
  - The alternative that maximizes net benefits relative to other alternatives is identified as the Tentatively Selected Plan (TSP).
- The non-Federal sponsor can request a Locally Preferred Plan (LPP).
- A TSP or a LPP must have a BCR >1.
- Optimize & Select 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

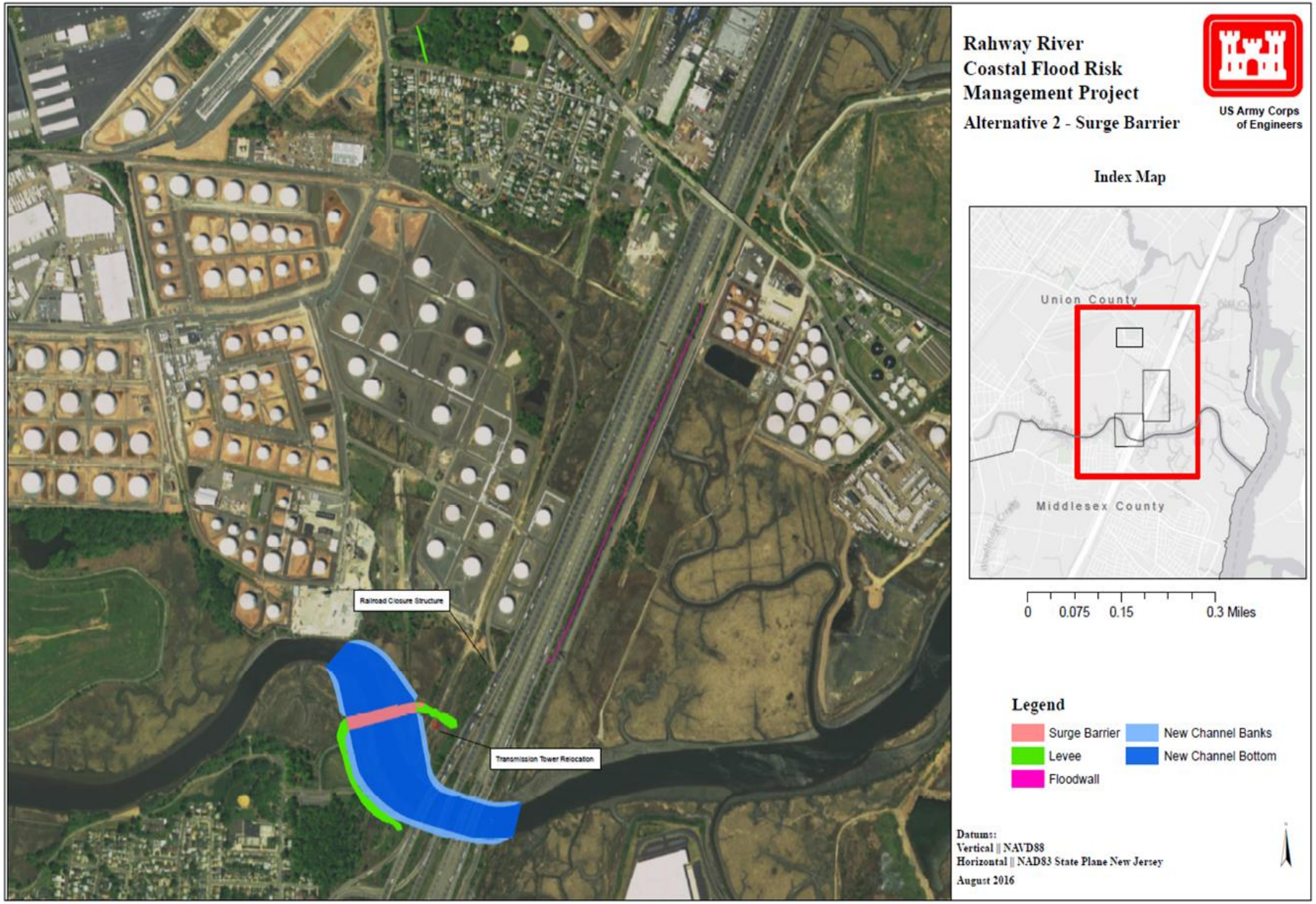
Alternative #1: Levee/Floodwall

- 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

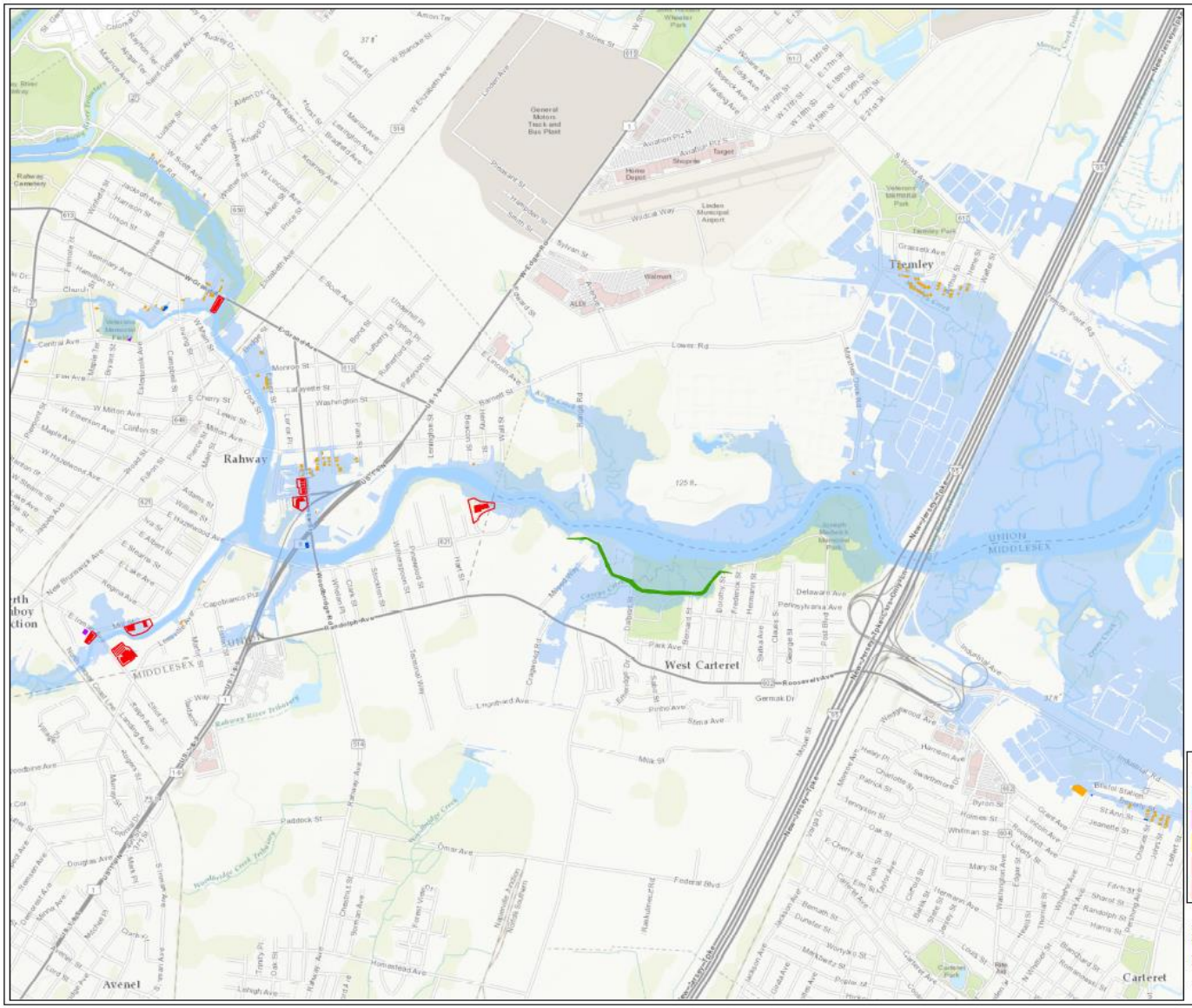
Alternative #3a/b: Nonstructural Alternative (10% & 2%, respectively)

- 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.

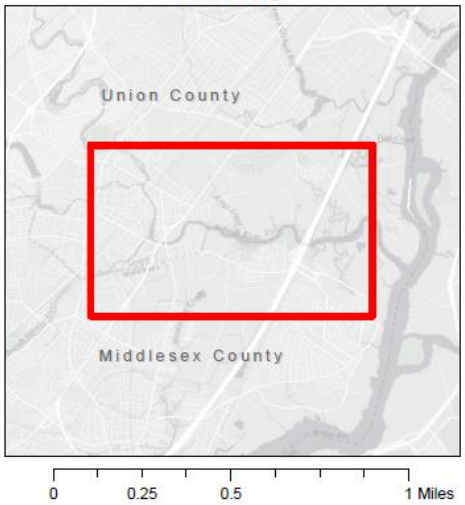


Rahway River Coastal Flood Risk Management Project

US Army Corps of Engineers

Alternative 4 - 10 Year NonStructural Combination Plan

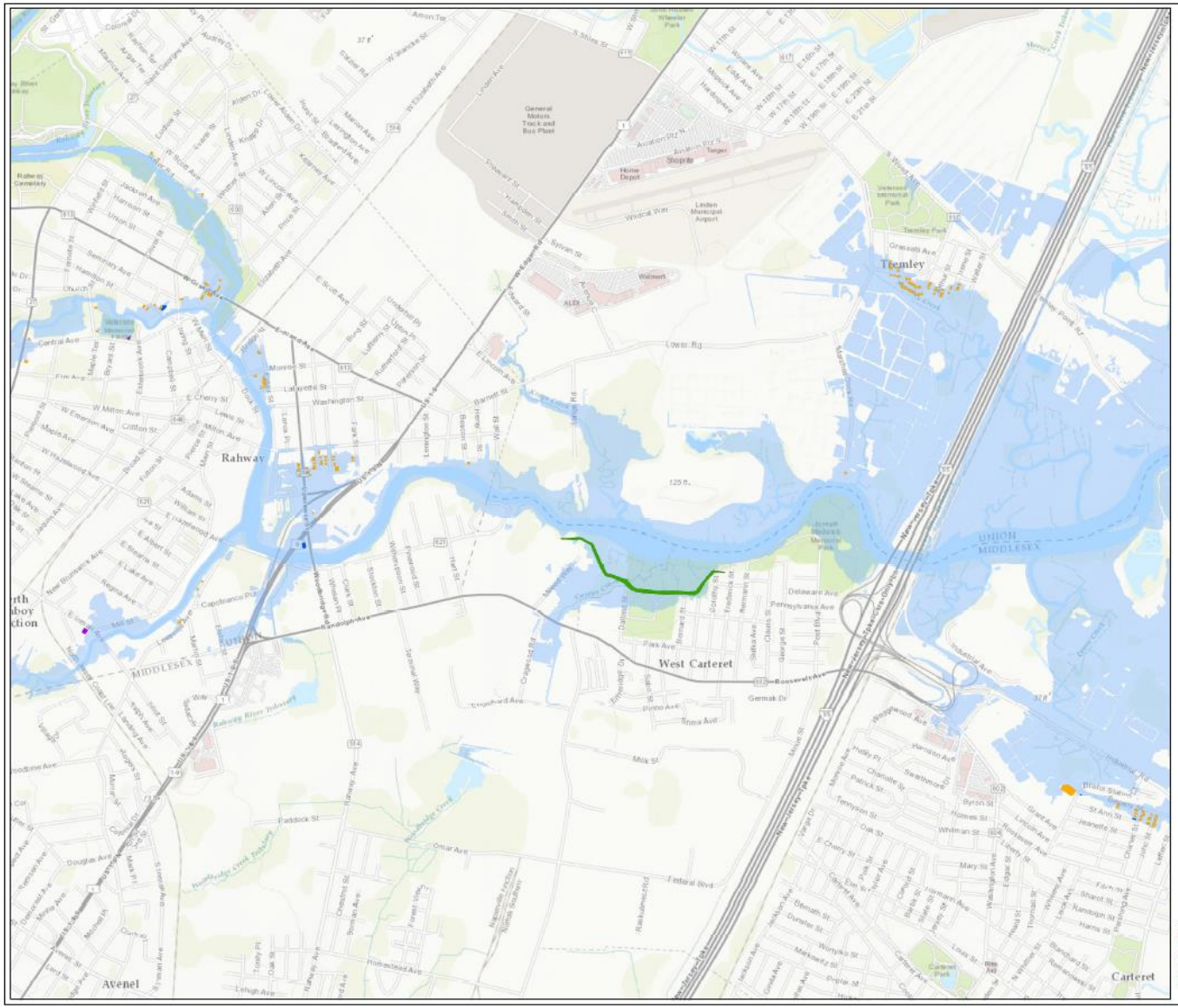
Index Map



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 River Coastal Flood Risk Management Project

US Army Corps of Engineers

Alternative 4a - 10 Year NonStructural Plan with Levee Segment

Index Map

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

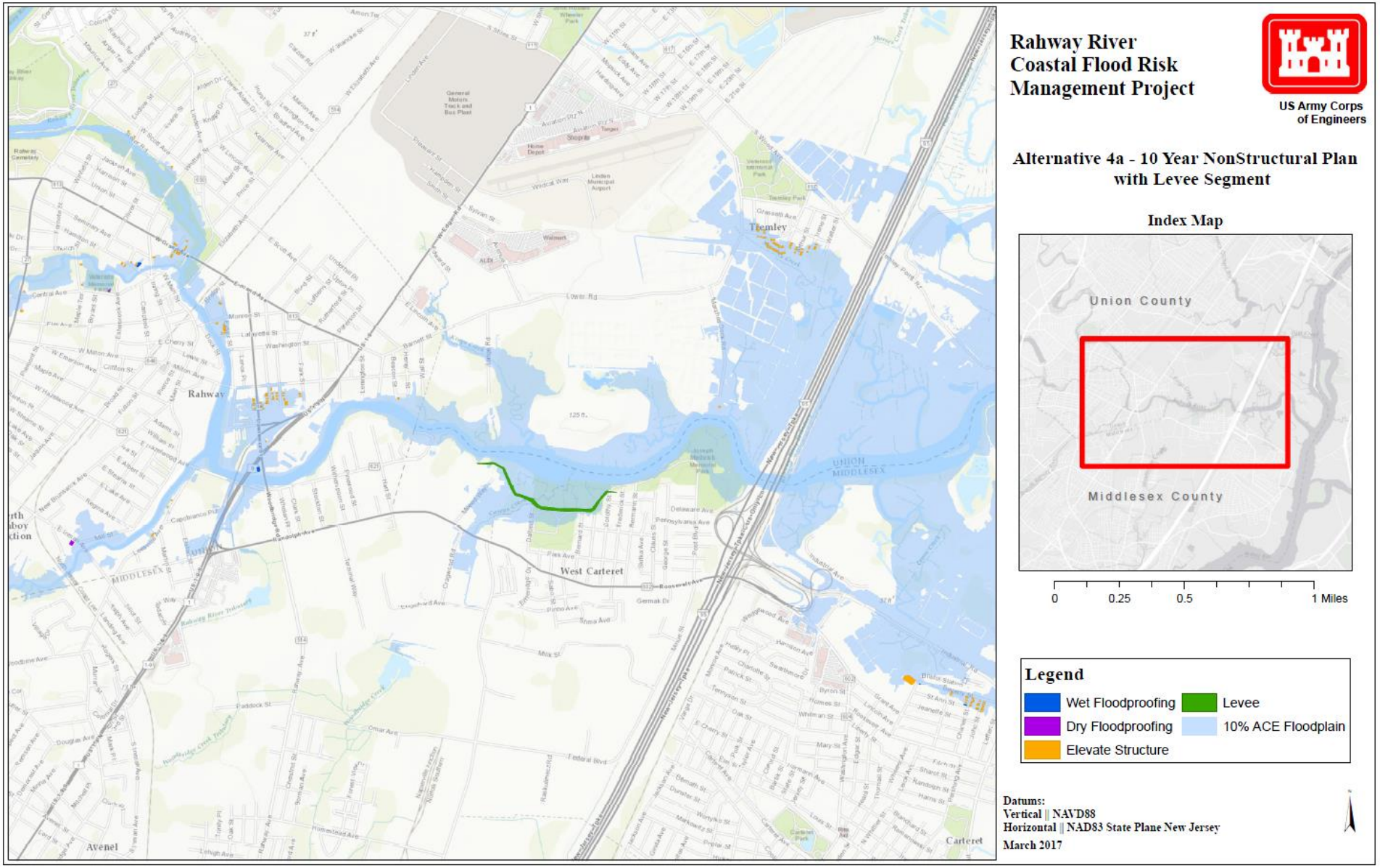
	Equivalent Annual Damages		Equivalent		Equivalent		
	Without Project	With Project	Annual Benefits	First Costs	Annual Costs	Net Benefits	BCR
Segment A	$17,526,500	$14,632,600	$2,893,900	$71,406,967	$3,225,110	-$331,210	0.90
Segment B	$17,526,500	$17,464,100	$62,400	$11,958,487	$522,185	-$459,785	0.12
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.


Rahway River
Coastal Flood Risk
Management Project
US Army Corps
of Engineers
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
Datums:
Vertical || NAVD88
Horizontal || NAD83 State Plane New Jersey
March 2017
Rahway
Avenel
West Carteret
Carteret
Tremley

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

- Rifat Salim, Project Manager
  U.S. Army Corps of Engineers, New York District
  917-790-8215
  Rifat.Salim@usace.army.mil
- Nancy Brighton
  Chief, Watershed Section, Environmental Analysis Branch
  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

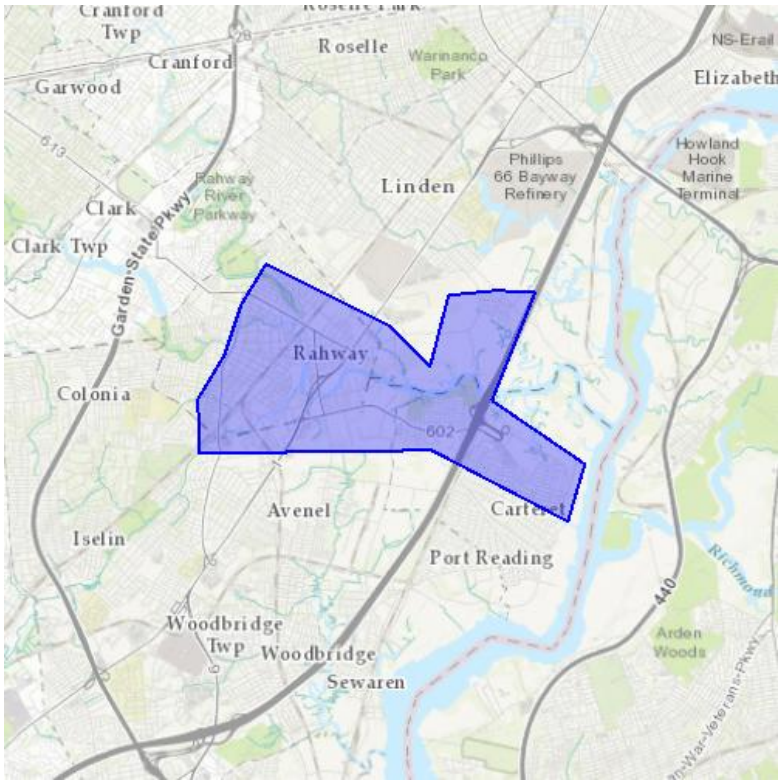
Consultation Code: 05E2NJ00-2017-SLI-0612
Event Code: 05E2NJ00-2017-E-00992

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

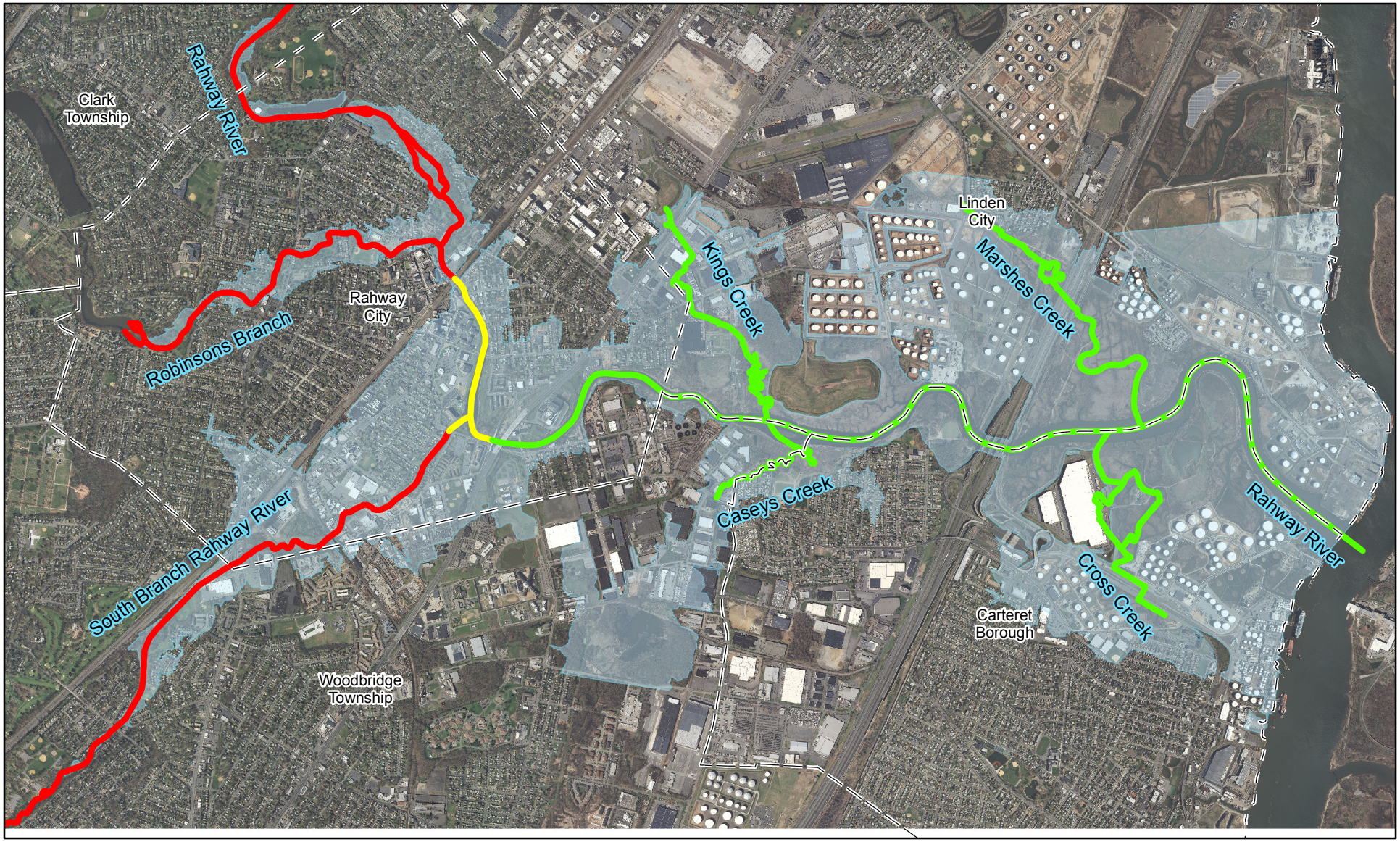
2.4.1. Indiana and Northern Long Eared Bat:

- 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

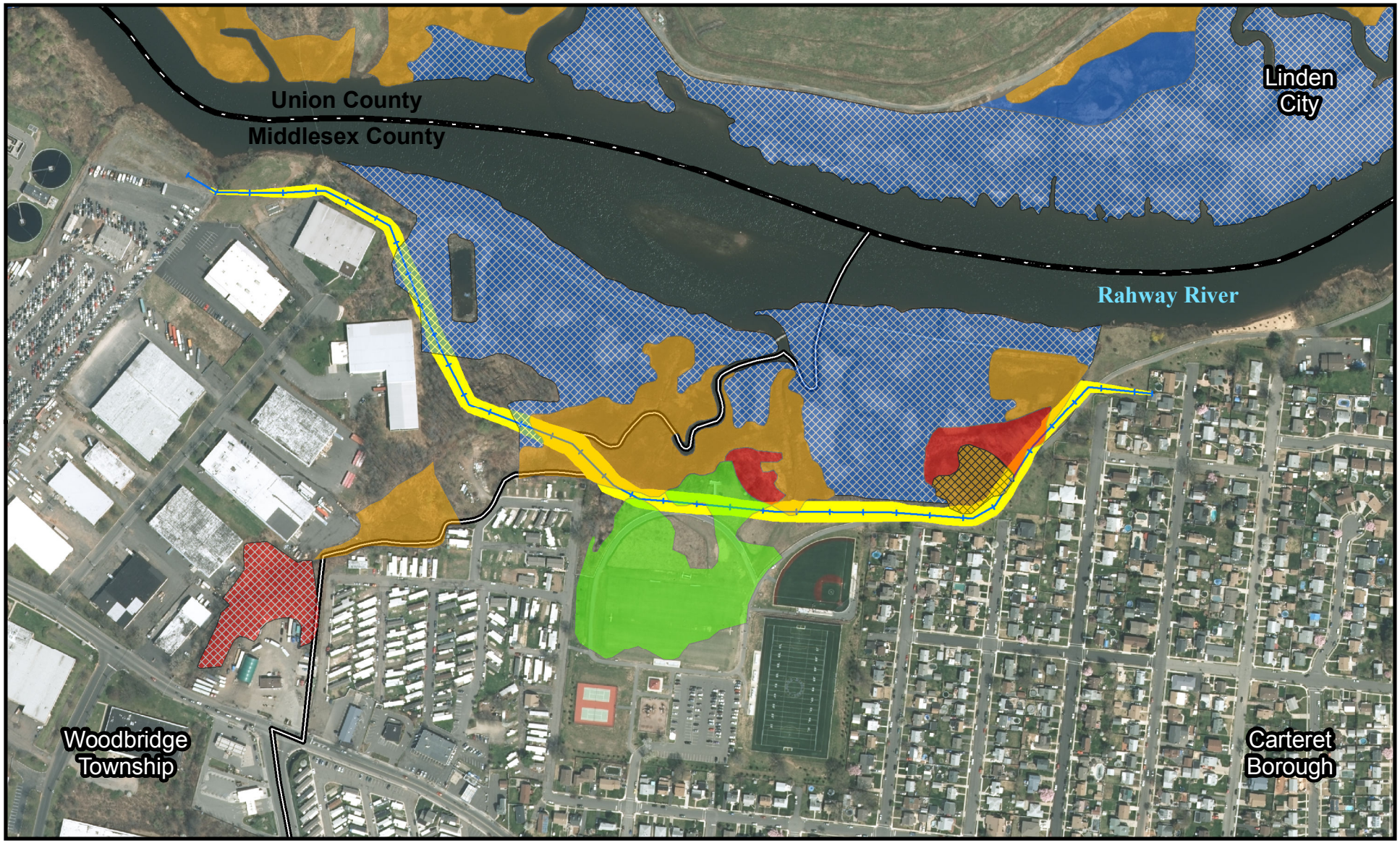
N W E S

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)