US Army Corps
of Engineers ®
Wilmington District

FINAL ENVIRONMENTAL ASSESSMENT
&
FINDING OF NO SIGNIFICANT IMPACT (FONSI)

EAGLE ISLAND IMPROVEMENTS
DIKE RAISE TO ELEVATION 50 FEET

Eagle Island Confined Disposal Facility,
Upper Wilmington Harbor, Cape Fear River

Brunswick and New Hanover Counties
North Carolina

APRIL 2017

Finding of No Significant Impact (FONSI)

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The U.S. Army Corps of Engineers, Wilmington District (Corps), has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The Corps assessed the effects of the following actions in the *Final Environmental Assessment, Eagle Island Improvements, Dike Raise to Elevation 50 Feet, Brunswick and New Hanover Counties, North Carolina, dated April 2017*.

As District Commander, U.S. Army Corps of Engineers, Wilmington District, it is my duty in the role of responsible Federal official to review and evaluate, in light of public interest, the stated views of other interested agencies and concerned public, the environmental effects of this proposed action.

My evaluation and findings are as follows:

1. PROJECT DESCRIPTION

The focus of the Environmental Assessment (EA), is the improvements to Eagle Island Confined Disposal Facility (CDF) Cells 1, 2, and 3 to increase their capacity for future disposal. Without the improvements, the Eagle Island CDF will reach its full capacity by 2024. Raising the dikes to elevation 50 feet will provide adequate disposal capacity through 2032.

The project involves the construction of a “toe berm” around portions of the outer footprint of each cell to ensure dike stability. These perimeter toe berms will serve as a buttressing-type of support for the dike, allowing additional dike raises in increments of 3 to 5 feet, eventually reaching a maximum elevation of 50 feet North Atlantic Vertical Datum 1988 (NAVD 88). The toe berms and dike raises will be constructed utilizing existing material in the cells.

The affected environment consists of resources in the vicinity of Eagle Island and the impacts associated with implementation of the proposed action as compared to No Action. Project construction will result in permanent impacts to 35.5 acres of tidal freshwater marsh and approximately 3 acres of upland tree/shrub habitat, for a total of 38.5 acres of permanent impacts. Temporary impacts related to toe berm construction may affect up to 6.3 acres of tidal freshwater marsh within the proposed 10-foot construction corridor.

Within the 35.5 acre footprint of impacts to tidal freshwater marsh, 2.85 acres are located below the Mean High Water (MHW) line, and therefore are subject to the ebb and flow of daily tides. Construction within these in-water areas is proposed to occur outside of the Primary Nursery Area Moratorium dates of April 1 – July 31 to avoid death or harm to anadromous fish. Mitigation proposed to offset the 35.5 acres of impacts will be through purchase of 35.5 credits

of riparian/tidal wetlands from the Lower Cape Fear Umbrella Mitigation Bank. This mitigation will result in no net loss of wetlands.

Overall benefits of the dike improvements include long-term socio-economic benefits as a result of providing a financially feasible dredged material disposal facility for the next 16 years. If the planned improvements are not implemented, after 2024, all dredged material from the Upper Harbor reaches of Wilmington Harbor will have to be transported approximately 38 miles, one way, to the Offshore Dredged Material Disposal Site (ODMDS), which will greatly increase the costs of maintaining the navigation channel.

2. COORDINATION

In July 2016, the Wilmington District coordinated the recommended proposed action with Federal, state, and local agencies through circulation of the EA for a 30-day review period. By letter dated August 29, 2016, the State Historic Preservation Office of North Carolina indicated that the Draft EA adequately addressed their concerns for historic resources. The U.S. Fish and Wildlife Service provided a "not likely to adversely affect" determination in a letter dated August 30, 2016, satisfying requirements of Section 7 of the Endangered Species Act (see Appendix C).

Since the proposed project includes significant discharge of fill in tidal freshwater marsh, a consistency concurrence is required from the North Carolina Coastal Management Program (CMP). By letter dated February 24, 2017, the N.C. Division of Coastal Management found the project consistent with the CMP (see Appendix F).

A Section 401 Water Quality Certificate under the Clean Water Act (CWA) of 1977 (P.L. 95-217), as amended, is required for the construction of the toe berms. The proposed action has been coordinated with the N.C. Department of Environmental Quality (DEQ), Division of Water Resources (DWR) and there are no issues of concern. A 401 Pre-Construction Notice was submitted to DWR in January 2017 and a 401 certification will be received prior to start of construction. All conditions of the 401 will be met.

All comments received during public review of the Draft EA were considered during the preparation of the Final EA. Appendix C includes all correspondence related to the Eagle Island Improvements Project, and Appendix D includes the Corps' responses to comments received on the Draft EA. The Final EA is available on the Wilmington District Website at: http://www.saw.usace.army.mil/Missions/Navigation/Dredging/Wilmington-Harbor/Eagle-Island/.

3. DETERMINATION

Based on the EA prepared for this project, I have determined that this action does not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, the action does not require the preparation of a detailed statement under Section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.). My determination was made considering the following factors discussed in the EA, to which this document is attached:

a. The proposed action would not significantly impact any threatened or endangered species potentially occurring in the project area.

b. No significant cumulative or secondary impacts would result from implementation of this action.

c. The proposed action would not significantly impact cultural resources.

d. The proposed action would result in no significant impacts to air or water quality.

e. The proposed action would result in no significant adverse impacts to fish and wildlife resources.

f. The proposed action would not cause any environmental health risks or safety risks that may disproportionately affect children and complies with Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks."

g. The proposed action will not cause any disproportionately high and adverse human health or environmental effects on minority populations and low-income populations and complies with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

4. FINDINGS AND CONCLUSIONS

The proposed action to raise existing dikes at the Eagle Island CDF to elevation 50 feet, construct supportive, perimeter toe berms, and mitigate accordingly would result in no significant environmental impacts.

Date: 2 Apr 2017

Kevin P. Landers Sr.
Colonel, U.S. Army
District Commander

FINAL ENVIRONMENTAL ASSESSMENT

EAGLE ISLAND IMPROVEMENTS, DIKE RAISE TO 50 FEET
BRUNSWICK AND NEW HANOVER COUNTIES, NORTH CAROLINA

APRIL 2017

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1.0 INTRODUCTION

Wilmington Harbor, located on North Carolina's southeast coast, is one of the state's two deep-draft ports and a major contributor to its economy. The Wilmington Harbor navigation project connects deep water of the Atlantic Ocean with North Carolina State Ports Authority facilities at Wilmington, waterfront facilities in downtown Wilmington, and several businesses north of the City of Wilmington, by way of a 38-mile-long channel along the Cape Fear River. The U. S. Army Corps of Engineers (USACE), Wilmington District, is responsible for maintaining the federally authorized Wilmington Harbor navigation project. The primary disposal facility for dredged material from the Upper Harbor reaches of the Wilmington Harbor is the Eagle Island Confined Disposal Facility (CDF), which is located on the peninsula between the Cape Fear and Brunswick Rivers, south of U.S. Highway 74/76 (Figure 1). Improvements to the Eagle Island CDF are required to provide adequate dredged material disposal capacity for continued maintenance dredging of the Wilmington Harbor navigation project. This Environmental Assessment (EA) addresses the improvement of Cells 1, 2, and 3 of the Eagle Island CDF in relation to other alternatives.

The National Environmental Policy Act (NEPA) of 1969, as amended, requires consideration of the environmental impacts for major federal actions. The purpose of this EA is to ensure the environmental consequences of the proposed action are considered and that environmental and project information are available to the public. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) parts 1500-1508), and Engineering Regulation (ER) 200-2-2.

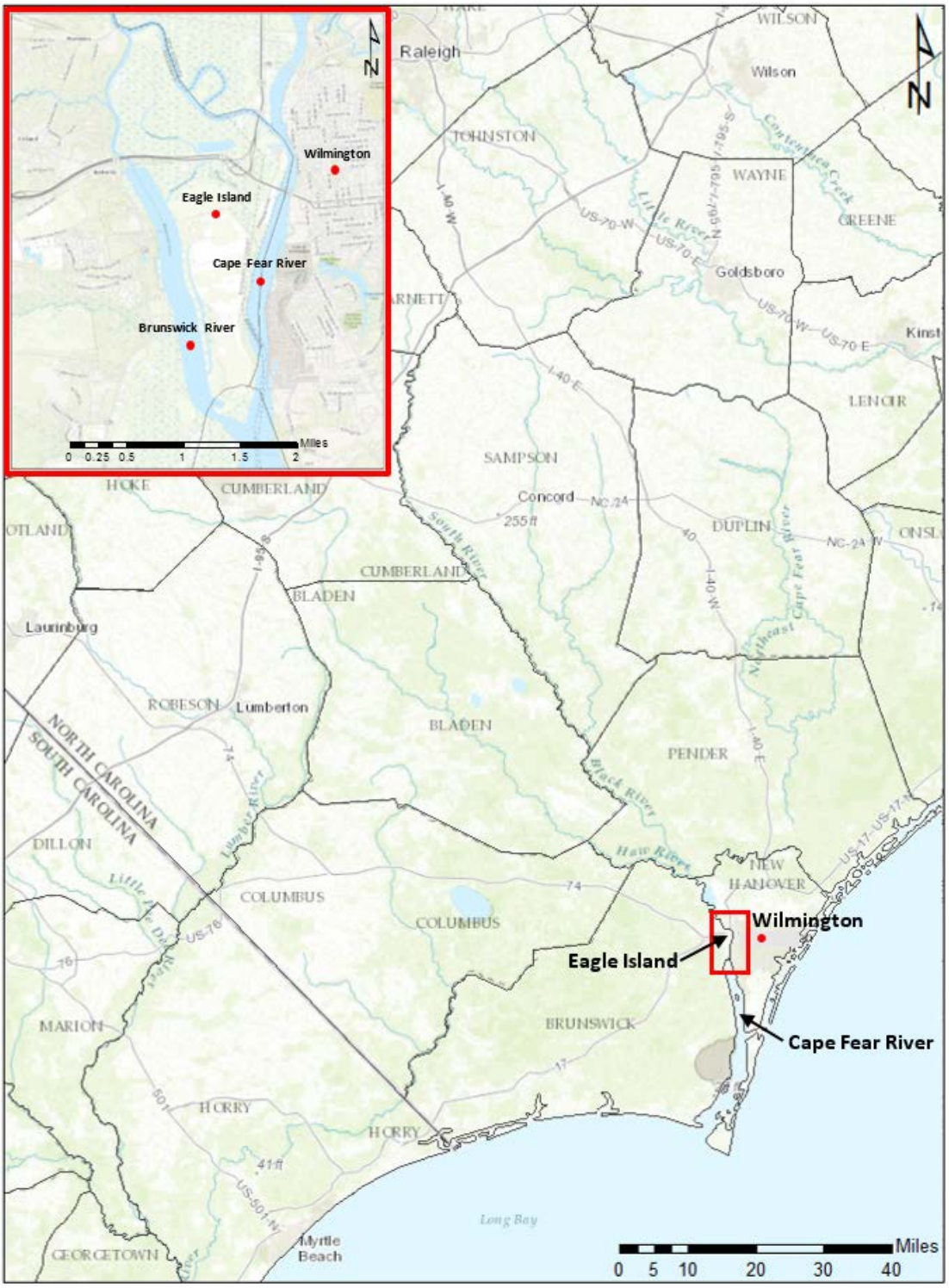

Figure 1. Geographical location of Eagle Island, Wilmington, North Carolina

1.1 Incorporation by Reference

The USACE has produced a number of environmental and planning reports that describe the Wilmington Harbor Federal navigation project, its ongoing and proposed improvements, the details of dredging and disposal operations required for its construction and maintenance, and the environmental aspects of the project. A number of these reports, which contain extensive background information, are listed below and are incorporated by reference.

U.S. Army Corps of Engineers, Wilmington District. October 1989. Final Environmental Impact Statement (FEIS). Long-Term Maintenance of Wilmington Harbor, North Carolina.

U.S. Army Corps of Engineers, Wilmington District. June 1996. Final Feasibility Report and Environmental Impact Statement on Improvement of Navigation, Cape Fear - Northeast Cape Fear Rivers Comprehensive Study, Wilmington, North Carolina, Volumes I, II, and III.

U.S. Army Corps of Engineers, Wilmington District. June 1996. Final Supplement I to the Final Environmental Impact Statement for Wilmington Harbor Channel Widening, New Hanover and Brunswick Counties, North Carolina.

U.S. Army Corps of Engineers, Wilmington District. 1996. Preliminary Assessment, Dredged Material Management Plan (DMMP), Wilmington Harbor, NC.

U.S. Army Corps of Engineers, Wilmington District. 1997. Dredged Material Management Plan, Phase I Study, Wilmington Harbor, NC.

U.S. Army Corps of Engineers, Wilmington District. February 2000. Environmental Assessment, Preconstruction Modifications of Authorized Improvements, Wilmington Harbor, NC.

U.S. Army Corps of Engineers, Wilmington District. August 2000. Finding of No Significant Impact, Preconstruction Modifications of Authorized Improvements, Wilmington Harbor, NC.

U.S. Army Corps of Engineers, Wilmington District. 2001. Phase II Dredged Material Management Plan Study, Volumes I-V, Upper Portion of Wilmington Harbor, NC.

U.S. Environmental Protection Agency and U. S. Army Corps of Engineers, Wilmington District. November 2001. Final Environmental Impact Statement, New Wilmington Ocean Dredged Material Disposal Site Designation.

U.S. Army Corps of Engineers, Wilmington District. June 2012. Environmental Assessment, Continued Construction of Authorized Improvements, Wilmington Harbor 96 Act, Wilmington Harbor, NC.

U.S. Army Corps of Engineers, Wilmington District. August 2012. Finding of No Significant Impact, Continued Construction of Authorized Improvements, Wilmington Harbor 96 Act, Wilmington Harbor, NC.

U.S. Army Corps of Engineers, Wilmington District. June 2014. Draft Integrated Feasibility Report and Environmental Assessment, Wilmington Harbor Navigation Improvements, Wilmington Harbor, NC.

1.2 Wilmington Harbor Project Background

The Wilmington Harbor Federal navigation project begins at the ocean bar at the entrance of the Cape Fear River. It extends through the approximate center of the river, and small islands border the channel for much of its length. These islands were created by disposal of dredged material in open water prior to the early 1970s. The Wilmington Harbor navigation channel is divided into "reaches" or segments of river, and dredging methods and disposal options vary depending on the reach location and sediment type/ quality of material to be dredged (Figure 2).

The following are the authorized dimensions and approximate dredging intervals of the Upper Harbor reaches that utilize Eagle Island for the disposal of dredged material:

- Lower Brunswick Channel through the Anchorage Basin channel to the Cape Fear River Memorial Bridge, including the 1200-foot wide turning basin that consists of an authorized depth of -42 feet mlw with an allowable overdepth of 2 feet to -44 feet. This portion is dredged every one to two years;
- From the Cape Fear Memorial Bridge up to 750 feet above the Hilton Railroad Bridge on the Northeast Cape Fear River consists of an authorized width of 250 feet and a depth of -38 feet (-39 feet required in areas containing rock) with allowable overdepth of 2 feet to -40 feet, to include the 800-foot wide turning basin. The turning basin is located at the northern end of downtown Wilmington. This portion is dredged every three to four years;
- From 750 feet above the Hilton Railroad Bridge to the project's northern terminus, to include the most northern 800-foot wide turning basin, consists of an authorized depth of -34 feet with an allowable overdepth of 2 feet to -36 feet. This portion is has not been dredged since 1994.

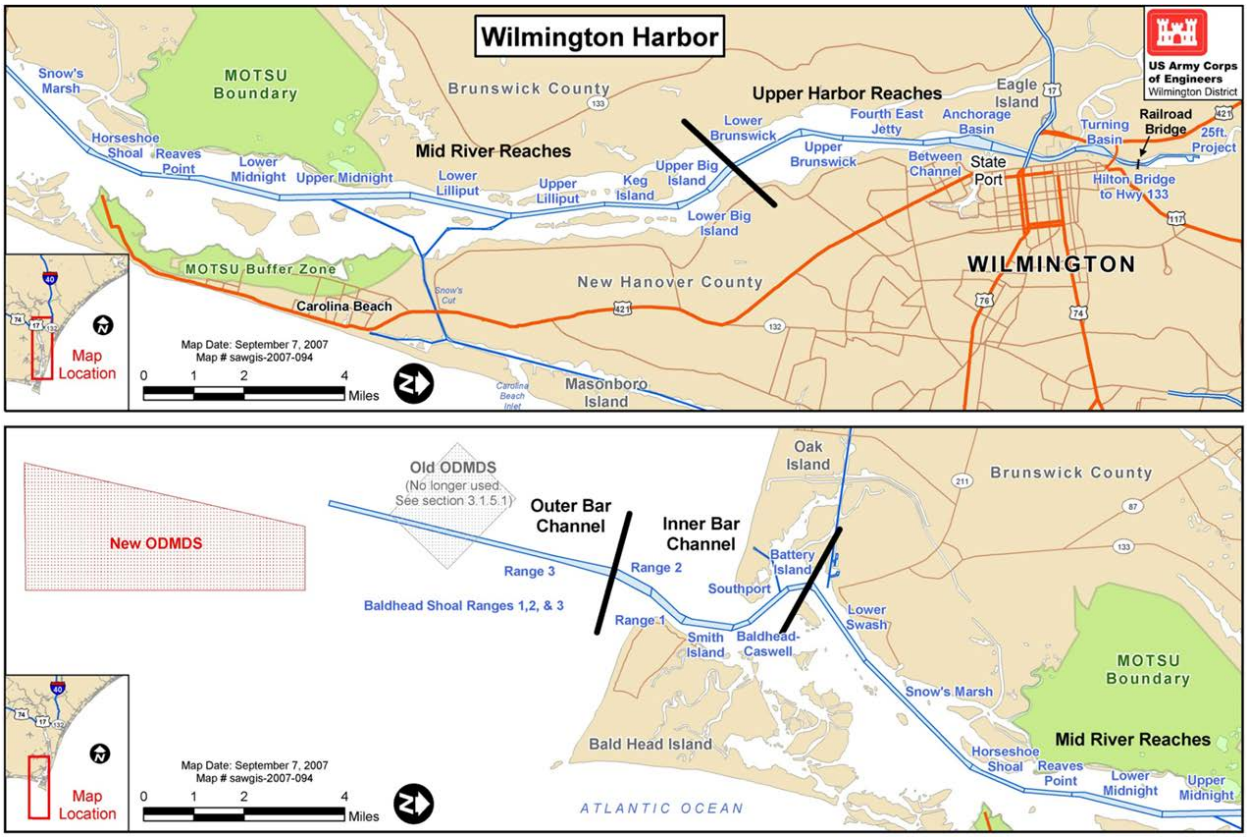

Figure 2. Reaches of the Wilmington Harbor Navigation Project

Eagle Island is divided into 5 cells, of which 3 cells are in active use. Measured from the top of dike inward, from South to North, Cell 1 consists of approximately 230 acres, Cell 2 is approximately 260 acres, and Cell 3 is approximately 265 acres. Each cell contains spillway structures that allow for the discharge of effluent (water from dredged material) into either the Brunswick River or the Cape Fear River (see Figure 3). For each dredging event, typically only one cell is used. This allows for a revolving schedule of dewatering, ditching, drying, maintenance, and dike-raising of the other two cells.

Figure 3. Eagle Island Cells 1 - 3

In a typical dredging project, material is dredged by a hydraulic cutter suction dredge and pumped into a disposal area cell. The calculated capacity of the receiving cell includes a minimum of two feet of freeboard (the vertical distance between the maximum elevation of the effluent inside the cell and the top of the dike). This freeboard allows safe inspection of the dike, prevents overtopping and minimizes the chances of a dike breach. The effluent is contained within the cell while suspended sediment settles. The “clear” effluent flows out of the cell via one or more spillways, or by pumping. Turbidity, or cloudiness, of the receiving water is analyzed in order to verify compliance with NC Department of Water Resources water quality standards. The flow of effluent is manually controlled at the spillway riser and by the rate of pumping of dredged material into the cell.

2.0 PURPOSE AND NEED

Since the early 1900's, the Upper Harbor reaches of Wilmington Harbor have been dredged using a hydraulic cutter suction dredge with disposal of the dredged material in designated disposal areas located adjacent to the channel. The Eagle Island CDF, which has been the primary disposal site for this dredged material, is rapidly filling up. Phase I of the Eagle Island Dike Improvement Project is currently underway. Phase I includes the increase of the dike heights at each of the 3 cells. The existing dikes at Cell 1 have been raised to elevation 40 feet North American Vertical Datum 1988 (NAVD 88), and Cells 2 and 3 are being raised to 42 feet (NAVD 88). Cell 1 is complete and Cells 2 and 3 will be under construction through the summer of 2018. These dike raises will not increase the footprint of the Eagle Island CDF; rather, they will be done with dike step-ins and raises to the interior of the existing dikes. Although these improvements will increase disposal capacity, the increased capacity will only last approximately 5-6 years (allowing for another 6 dredging and disposal cycles, at most). Therefore, the need remains for additional dredged material disposal capacity for the Upper Harbor reaches, beyond the dike raises currently underway.

The purpose of this project is to ensure that adequate disposal capacity is available for continued maintenance of the Upper Harbor reaches of the Wilmington Harbor navigation project, and that dredged material disposal meets the federal standard. Pursuant to 33 C.F.R. § 335.7, the federal standard mandates that the dredged material disposal alternative(s) identified by the USACE represent the least costly alternative(s), consistent with sound engineering practices and meeting the environmental standards established by the Clean Water Act, Section 404(b)(1) evaluation process or ocean dumping criteria.

3.0 PROPOSED ACTION

The Eagle Island CDF is located on a 1,473-acre tract owned by the Department of the Army. The original property boundary for the site was defined by a series of rivers and creeks, some of which still exist and serve as property boundaries for the site. Eagle Island dikes were initially constructed in the late 1970's and now encompass approximately 755 acres of diked uplands, which were originally composed of uplands and tidal marsh, as well as, several tidal creeks. Over successive years of dredged material disposal, the marsh and creeks were filled and the CDF was created. Outside of the existing CDF dikes, the majority of acreage within the 1,473-acre tract is considered jurisdictional wetlands. Historically, the site was divided into two cells, a north and a south cell. However, as part of the improvements to the CDF in 2000, the north cell was subdivided into two cells of approximately equal size. As a result, material dredged from the Upper Harbor reaches is disposed of in Eagle Island Cells 1, 2, and 3.

The most feasible alternative for providing future disposal capacity is to increase the capacity of Cells 1, 2 and 3 at Eagle Island by raising the dikes to elevation 50 feet NAVD 88. To ensure dike stability, this additional raise will require the construction of a "toe berm" around portions of the outer footprint of each cell (Figure 4). These perimeter toe berms will serve as a buttressing-type support for the dike, allowing additional dike raises in increments of 3 to 5 feet, eventually reaching a maximum elevation of 50 feet NAVD 88. The toe berms and dike raises will be constructed utilizing existing material in the cells. Doing so will also increase the capacity of each cell, providing additional storage space for future disposal.

The construction of the toe berms would be accomplished in a phased approach that may occur over a period of up to 5-6 years beginning in 2019, as Federal funding becomes available for the Wilmington Harbor Navigation Construction project. The proposed dike raise to elevation 50 feet NAVD 88 would provide disposal capacity for an additional 10-12 years (until year 2032).

The affected environment consists of resources in the vicinity of Eagle Island and the impacts associated with implementation of the proposed action as compared to No Action. Project construction will result in permanent impacts to 35.5 acres of tidal freshwater marsh and approximately 3 acres of upland tree/shrub habitat, for a total of 38.5 acres, and will result in short-term impacts to water quality, air quality, and noise levels in the project area.

Within the 35.5 acre footprint of impacts to tidal freshwater marsh, 2.85 acres are located below the Mean High Water (MHW) line, and therefore are subject to the ebb and flow of daily tides (see colored areas identified below the 2-foot contour elevation, Appendix E, Figure 1). Construction within these in-water areas is proposed to occur outside of the Primary Nursery Area Moratorium dates of April 1 – July 31 to avoid death or harm to anadromous fish. Mitigation proposed to offset the 35.5 acres of impacts is discussed in Section 5.16 and Appendix E, and will result in no net loss of wetlands.

Some temporary impacts are also anticipated with the construction of the toe berms, therefore, a 10-foot construction corridor has been identified to capture any additional disturbance in jurisdictional areas: cutting back of *Phragmites*, silt fence installation, placement of coir logs/hay bales, and use of logging mats if heavy equipment will be working within wetlands. To address construction impacts within the 2.85 acres of vegetated and open water areas located below MHW, coffer dams may be erected to isolate the area from tidal influence during toe berm construction. Rock (rip-rap) may be used within the toe berm footprint to minimize turbidity and provide long-term stabilization of the toe berm. Turbidity curtains may also be erected and kept in place until construction areas are stabilized to prevent turbidity within the receiving waters. Affected areas will be brought back to original grade and restored. Toe berms will be layered with erosion control matting and seeded for stability. Once the toe berms are stable, the silt fencing will be removed.

The proposed improvements to Eagle Island CDF fulfill the purpose and need described above, as it ensures that adequate disposal capacity is available for continued maintenance of the Upper Harbor reaches of the Wilmington Harbor navigation project, and that the dredged material disposal meets the Federal standard.

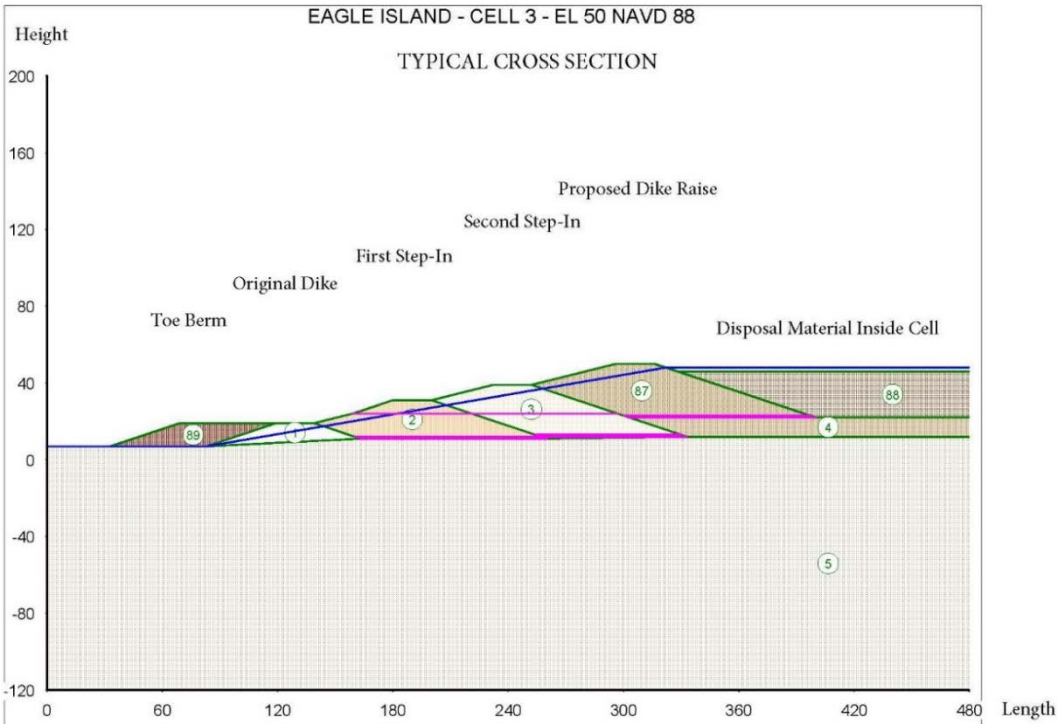

Figure 4. Typical Cross Section of Proposed Dike Raise and Toe Berm

4.0 ALTERNATIVES CONSIDERED BUT ELIMINATED

4.1 NO ACTION - Disposal in the Wilmington Ocean Dredged Material Disposal Site (ODMDS)

The No Action alternative would be the continuance of currently utilized disposal practices at Eagle Island CDF and completion of the current dike raises at Cells 2 and 3 to elevation 42 feet NAVD 88. The Cell 1 dike cannot be raised above 40 feet without the construction of toe berms. Dike raises at Cells 2 and 3 to 42 feet NAVD 88 are being done with step-ins to the interior of the dike. Since toe berms are not required for this raise, the overall footprint would not change. These improvements will add approximately 1 year of capacity for a total of six years of volume life at Eagle Island CDF. Beyond that time, Eagle Island will no longer have the capacity to accept dredged material. Therefore, maintenance dredging projects that have historically disposed of dredged material at Eagle Island CDF will require transport to another approved disposal location. Currently, the only disposal area suitable for this fine-grained dredged material is the ODMDS. The ODMDS is located in the Atlantic Ocean, offshore of the mouth of the Cape Fear River, approximately 38 miles from the upper reaches of the Wilmington Harbor navigation project.

Once capacity at Eagle Island CDF is exhausted, the only other currently available disposal method is to perform bucket and barge dredging and dispose of the material in the ODMDS. The assumed dredge for this is a 21 cubic yard (CY) clamshell dredge and the barges are assumed to be 3,000 CY dump scows. Environmental restrictions prohibit overflow from the barges, which limits the amount of dredged material that can be placed in each scow. A 90% capacity and 50% fill ratio are assumed as average. This would result in an additional 1.2 million cubic yards of material going to the ODMDS every year, and a rough order of

magnitude (ROM) cost estimate for transporting material from the Anchorage Basin reach to the ODMDS at $11.90/CY (unescalated), resulting in an annual cost of approximately $14,280,000. Disposal of dredged material from the Anchorage Basin and upper reaches into the ODMDS would cost significantly more than dike improvements and disposal in the Eagle Island CDF. The estimated cost to dredge the Anchorage Basin and pump material to the Eagle Island CDF is $3.25/CY (an annual cost of $3.9 million). Dike raises to 50 feet with supportive toe berms are estimated to cost a total of $64,330,000 (unescalated, including the cost of mitigation), resulting in average annual costs of $8,041,000 over a period of 8 years.

4.2 Development of Cells 4 & 5

This alternative would involve the development of two new cells (Cells 4 and 5) located just to the north of Cell 3. Cells 4 and 5 would act as a direct dredged material disposal site or as storage area for dry material from Cells 1, 2 and3. The former would require construction of perimeter dikes and spillway structures to facilitate the disposal of excess water from the dredged material slurry. Dike construction would likely require a minimum of 3 years and would need to start within the next 4 years to be available for use before Cells 1, 2 and 3 are full. Dikes at Cells 4 and 5 would have to be constructed to an approximate elevation of 40 feet NAVD 88 to provide a 15-year project life, and to elevation 60 feet NAVD 88 to provide capacity for up to 20 years.

Cells 4 and 5 could also be developed as a dry storage area. This would be accomplished by drying material in Cells 1-3 and dry hauling to Cells 4 and 5 to restore some capacity in Cells 1, 2 and 3. Material would be placed in small layers across the site, eliminating the need for dikes and spillways. Erosion control would be provided as required.

Use of Cells 4 and 5 for disposal or storage will require upfront mitigation. It is estimated that the majority of the footprint of the proposed cells (approximately 160 acres) contains intertidal wetlands that are of relatively high function and value. The current cost to mitigate for one acre is $175,147 according to the 2017 NC Division of Mitigation Services (DMS) In-Lieu Fee (ILF) Program, resulting in a mitigation cost of roughly $28 million. This mitigation cost is significantly higher than mitigation costs for Eagle Island dike raise to 50 feet, and for this reason, construction of Cells 4 and 5 was eliminated from further consideration.

4.3 New Upland CDF

Another measure considered was the construction of a new upland disposal site. To be viable, a new site would have to be at least 1,000 acres and similar in proximity to the harbor as the Eagle Island disposal site. Aerial photography of the area was used to identify any potential future sites 1,000 acres in size within a radius of 2 miles of the Harbor. Analysis revealed that there are no undeveloped uplands of the size available to construct a new disposal site. Undeveloped wetlands would require mitigation fees as stated above, that would render the project impracticable.

Due to a lack of undeveloped uplands in the harbor vicinity, construction of a new disposal site is not viable. Moreover, if directly pumping into the disposal area is not possible due to the distance, material may have to be double-handled and trucked to the disposal area. Due to the close proximity of Eagle Island, an upland alternative farther inland would be more costly to construct and utilize than disposal in the Eagle Island CDF or the ODMDS. For these reasons, construction of a new upland disposal site was eliminated from further consideration.

4.4 Raise Eagle Island Dikes to Elevation of 52 feet and 62 feet

Raising the Eagle Island dikes to the elevation of either 52 feet or 62 feet was also analyzed. These were the original elevations considered for the project; however, there were significant stability and settlement issues with raising the Cell 1, 2 and 3 dikes above elevation 50 feet NAVD 88. Raising the dikes to these elevations may result in stability issues or a breach of the dikes, which would result in potential impacts to water quality and wetlands or impediments to navigation in the river. Geotechnical evaluations indicate that neither of these heights are economically feasible; therefore, this plan was eliminated from further consideration.

5.0 AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

The focus of this EA is the improvements to Eagle Island Cells 1, 2 and 3 to increase their capacity for future disposal. Therefore, the affected environment consists of resources in the vicinity of Eagle Island and the impacts associated with implementation of the proposed action as compared to No Action. Impacts associated with continuing dredging and disposal operations will not be addressed, as they have been addressed in previous NEPA documents.

Based on detailed vegetation analysis that was completed in 2015, the Eagle Island dike improvements will result in permanent impacts to 35.5 acres of jurisdictional wetlands. The vegetation mapping effort conducted in 2015 categorized the areas within the toe berm impacts into five classes: "Native", "Majority Phrag", "Mix - Native/Phrag", "Tree/Shrub", and "Water" (Appendix E, Figure 1). As demonstrated in this figure, the majority of impacts are to Phragmites-dominated wetlands (34.79 ac). Areas identified in green as tree/shrub were ground-truthed and determined to be uplands. Native, mixed, and open water impacts were combined to equal 0.66 acre, and together, jurisdictional impacts total 35.5 acres.

5.1 Geology and Sediments.

Dredged material deposited in the Eagle Island CDF is from dredging work in the Anchorage Basin and upper reaches of the Wilmington Harbor project. Sediments in the Wilmington Harbor project area have been routinely tested and evaluated and grain-sizes have been, and continue to be, periodically characterized throughout the life of the project. Sediments previously deposited in Cells 1, 2 and 3 of Eagle Island will be used to construct the proposed improvement project.

The physical and chemical character of Wilmington Harbor shoaled material was most recently evaluated in 2016. Multiple composite samples, representing specific dredging units throughout the Wilmington Harbor project, underwent physical and chemical testing where applicable. For sediment originating in the project's upper reaches (near the NC State Ports facilities and the Anchorage Basin), about 76% of material was organic silt and clay, about 23.7% was sand, and about 0.3% was gravel, by weight. Arsenic was the primary contaminant of concern for this material, and was detected above both the threshold effect level (TEL) and effects range-low (ERL) in at least one of the two composited samples.

Dike Raises to 50 Feet. The proposed dike raise would increase the footprint of Cells 1, 2 and 3 by approximately 80 acres (Figures 5 and 6). This will be due to the construction of a necessary support berm at the toe of the existing dike. The toe berms will be at varying elevations ranging from a top elevation of approximately 20-27 feet and surround portions of all 3

cells, and will be constructed from existing material from the inside of the cells. Depending on the condition of the existing dikes, the top surface width of the toe berm would vary from 25 to 120 feet. Sections of the dike around Cell 1 appear to be the most unstable, requiring the most added width for support.

The proposed dike raise should have no impact on the project area's geology or sediments. Once toe berms are in place and dike raises are achieved, disposal practices for the Wilmington Harbor navigation project will continue as normal and dredged material composition is not expected to change.

No Action. Continuing dredged material disposal with no dike raise will have no impact on the project area's geology or sediments as the footprint of the cells and dikes on Eagle Island would not change.

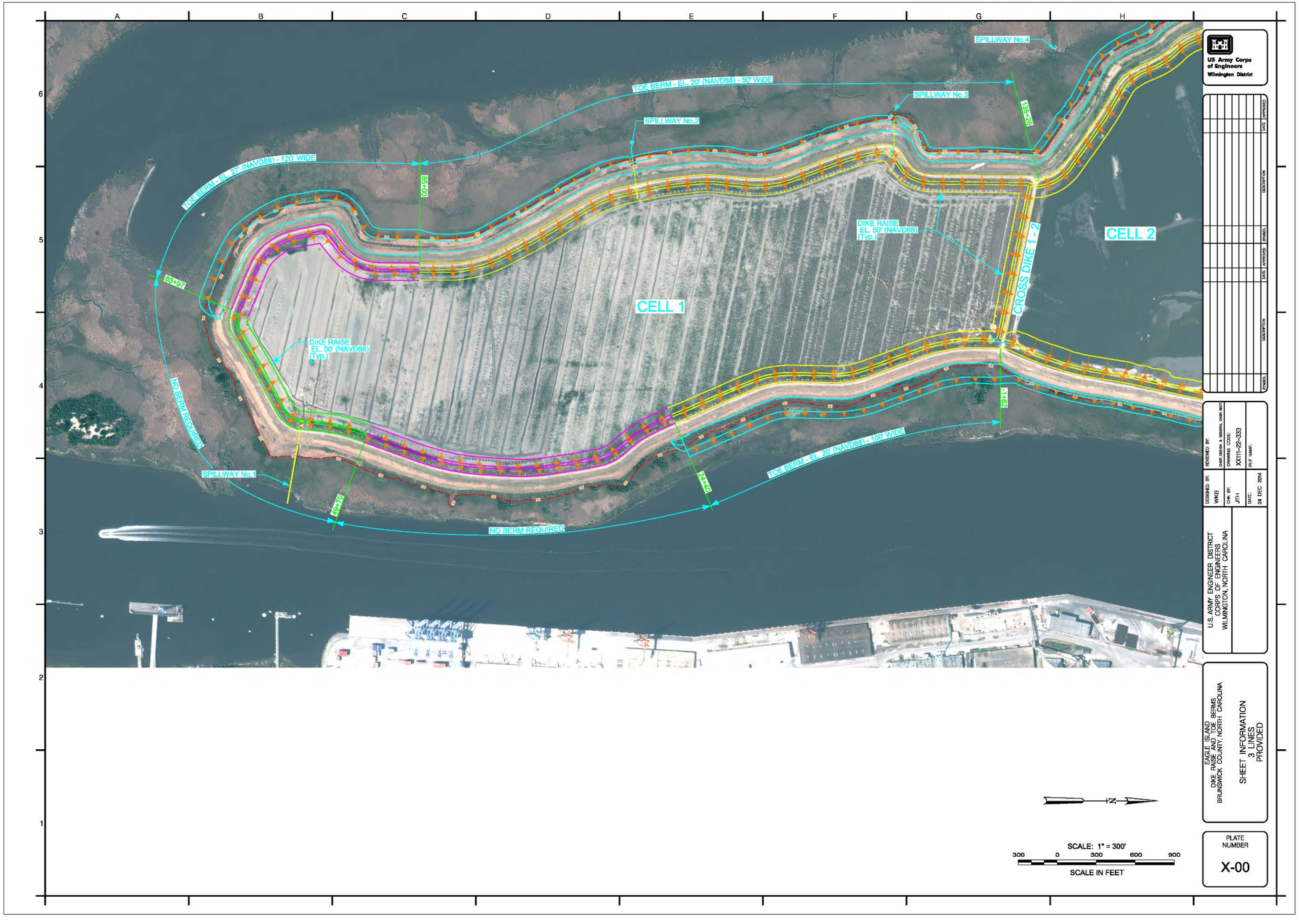

Figure 5. Footprint of the Toe Berm Required to Support Cell 1 Dikes at Elevation 50ft

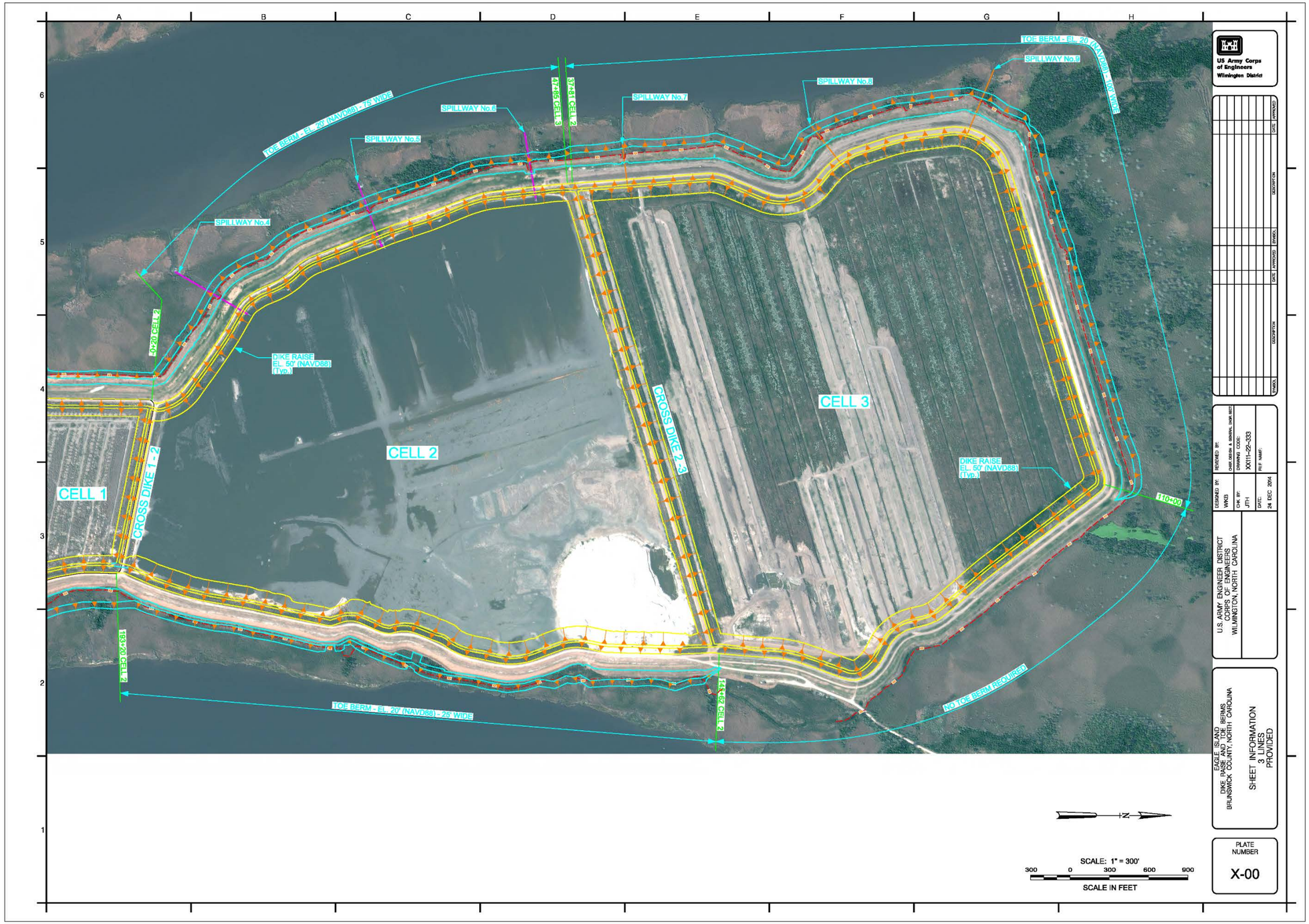

Figure 6. Footprint of the Toe Berm Required to Support Cell 2 & 3 Dikes at Elevation 50ft

5.2 Water Resources.

5.2.1 Water Quality. The Cape Fear River naturally carries a large amount of sediment from inland to the Atlantic Ocean and drains broad areas of coastal plains. The relatively slow moving water allows higher concentrations of tannins, essentially making the river a blackwater system. These, combined with the relatively heavy marine industrial traffic and urban development along both sides of the River and its tributaries, can affect the River's water quality, including clarity. During times of poorer water quality due to high suspended sediment loads, pollution, and runoff; submerged aquatic vegetation and associated fauna, marshes, and nektonic communities (fish, shellfish, and marine reptiles and mammals) may be adversely impacted.

The EPA has developed a system to identify drainage areas by assigning a Hydrologic Unit Code (HUC) to watersheds. The Cape Fear River's HUC is 03030005. The NC Division of Water Resources designates classifications for surface water bodies in the State. These classifications define the best uses to be protected within each water body. The Cape Fear River from the mouth of Toomers Creek to Federal Point is SC and HQW; and the Brunswick River is SC.

The classification definitions are:

- Class SC = All tidal salt waters protected for secondary recreation such as fishing, boating, and other activities involving minimal skin contact; fish and noncommercial shellfish consumption, aquatic life propagation and survival, and wildlife.

- High Quality Waters (HQW) = Supplemental classification intended to protect waters which are rated excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, primary and other functional nursery areas designated by the Marine Fisheries Commission.

5.2.2 Hydrology. Tides in the project area are semidiurnal and the mean tidal range (difference between mean high water and mean low water) at downtown Wilmington is approximately 4.3 feet. The mean tidal range in the Atlantic Ocean near its confluence with the Cape Fear River is between 5 and 6 feet.

The River's salinity is approximately 35 parts per thousand (ppt) at its confluence with the Atlantic Ocean. Salinity decreases upstream and near downtown Wilmington fluctuates within the brackish (0.5 – 30 ppt) range; the salinity dependent upon inflow from the upper Cape Fear, the Brunswick River, and the Northeast Cape Fear River.

Dike Raises to 50 Feet. Elevating the dikes around Cells 1, 2 and 3 would require the construction of a perimeter toe berm to support the structure. Estimated impacts of the toe berm are approximately 35.5 acres of freshwater tidal marsh. Filling this low-lying area would convert wetlands into uplands, displacing water and any potential habitat that exists. Adverse impacts to water quality resulting from the toe berm construction would be short-lived and within levels required by the water quality certification. All efforts to reduce sedimentation and turbidity and

control erosion during construction will be implemented. The preferred alternative would have no adverse effect on the project or surrounding area's hydrology.

No Action. Under the No Action alternative, no impacts will occur to wetlands or waters as the footprint of the existing CDF will not change.

5.3 Air Quality. New Hanover and Brunswick Counties are currently listed as "attainment" areas for all Criteria pollutants which have a National Ambient Air Quality Standard (NAAQS) published with the exception of Sulfur Dioxide (SO2). Brunswick County is currently listed as "unclassifiable" for SO2 by the EPA. The project area in New Hanover and Brunswick Counties is considered as having a status of "attainment/unclassifiable". (Personal communication, Mr. Brad Newland, Regional Supervisor, NC Department Environmental Quality, Division of Air Quality, Wilmington Regional Office, February 10, 2017).

Dike Raises to 50 Feet. Temporary increases in exhaust emissions from construction equipment are expected during construction of dike raises and toe berms. The State of North Carolina has a State Implementation Plan ("SIP") approved or promulgated under Section 110 of the Clean Air Act (CAA), as amended. However, a conformity determination is not required because Brunswick and New Hanover Counties have been designated by the State of North Carolina as attainment/unclassifiable areas, and the direct and indirect emissions from the project fall below the prescribed *de minimus* levels (58 Fed. Reg. 93.153(c)(1)). Therefore, no conformity determination would be required. The preferred alternative is not anticipated to result in any adverse effects on the air quality of Brunswick and New Hanover Counties' attainment areas. The project would be in compliance with Section 176 (c) of the CAA, as amended.

No Action. The No Action alternative would not result in any adverse effect on the air quality in this two-county attainment/unclassifiable area other than an increase in fuel consumption and the resultant exhaust emissions due to round trip travel to/from the ODMDS when disposal in Eagle Island CDF is no longer viable. Even with this type of increase, the project would remain in compliance with Section 176 (c) of the CAA, as amended.

5.4 Marine and Estuarine Resources

5.4.1 Nekton Nekton collectively refers to aquatic organisms capable of controlling their location through active movement rather than depending upon water currents or gravity for passive movement. In the project area, there are estuarine and fresh water species such as: largemouth bass (*Micropterus salmoides*), pickerel (*Esox americanus*), sunfish (*Lepomis* spp), crappie (*Pomoxis* spp), bluegill (*Lepomis macrochirus*), and speckled trout (*Cynoscion nebulosus*).

The Cape Fear River is a passageway for the larvae of many species of commercially or ecologically important fish. Spawning grounds for many marine fishes are believed to occur on the continental shelf with immigration to estuaries during the juvenile stage. The shelter provided by the marshes and shallow water habitats within the project area's estuarine waters serves as nursery habitat where young fish undergo rapid growth before returning to the offshore environment.

The State of North Carolina defines Primary Nursery Areas (PNAs) as tidal saltwater, which provide essential habitat for the early development of commercially important fish and shellfish (15 NCAC 3B .1405). It is in these estuarine areas that many fish species undergo initial post-larval development. PNAs are designated by the North Carolina Marine Fisheries Commission. The Cape Fear River PNAs are defined as follows: “all waters north of a line beginning on the west shore at a point 34° 10.4410' N - 77° 57.7400' W; running easterly through Beacon "59" to the east shore to a point 34° 10.4050' N - 77° 57.1310' W; with the exception of the maintained channel, and all waters north of a line beginning on the west shore at a point 34° 04.6040' N - 77° 56.4780' W; running easterly through Beacon "41" to the east shore to a point 34° 04.7920' N - 77°55.4740' W; with the exception of 300 yards east and west of the main shipping channel up to Beacon "59" (mouth of Brunswick River)”. Map #27 from the NC Division of Marine Fisheries’ website, (http://portal.ncdenr.org/web/mf/primary-nursery-areas), depicts the PNAs within the project area (Figure 6).

Secondary Nursery Areas (SNAs) are defined by rule 15 NCAC 3N .0102(c) as: “…. those areas in the estuarine system where later juvenile development takes place. Populations are usually composed of developing sub–adults of similar size which have migrated from an upstream primary nursery area to the secondary nursery area located in the middle portion of the estuarine system.” These areas are located adjacent to PNAs, are generally deeper and contain mixed populations of large juveniles, sub-adults, and adults.

Figure 7. Identified PNA (areas within red lines) in the project area.

5.4.2 Benthos. Aquatic organisms that live in close association with the bottom, or substrate, of a body of water are collectively called the benthos. Common benthic organisms in these sediments would likely include polychaetes, amphipods, decapods, and mollusks. Given the susceptibility of the project area to currents, water movement, water depths, and the amount of suspended sediment, large benthic communities and large numbers of organisms are not expected.

Lawler, Matusky & Skelly Engineers (1975) conducted a benthic investigation at six stations ranging from near the mouth of the Cape Fear River up to the mouth of Smith Creek in the Northeast Cape Fear River. Polychaetes dominated the benthic fauna below MOTSU. Of the 21 species collected, only five species occurred above Snows Cut and only one species at Smith Creek. Species included (*Scolecolepides virdis*), (*Capitella capitata*), (*Branchioasylis americana*), (*Drilonereis longa*) and (*Nereis succinea*). Oligochaetes were the most abundant group in the entire river, comprising 35% of all collected fauna. They were most abundant from Campbell Island to the Anchorage Basin. Amphipods (*Gammarus* spp.) occurred in all samples but were most abundant near MOTSU, the Anchorage Basin and at Smith Creek. Other common species collected were Cumaceans and Isopods.Woodward-Clyde Consultants (1980) surveyed the benthos in the vicinity of the Anchorage Basin. Nematodes, the spionid polychaete (*S viridis*), and the isopod (*Chiridotera almyra*) were dominant in the medium-fine

sand. The silty clay substrate was dominated by the oligochaete (*Peloscoles benedeni*) and by an amphipod (*Gammarus* sp).

Shellfish beds are present in the Cape Fear Estuary; however, they are primarily south of Snows Cut (Woodward-Clyde Consultants 1980) well south of the area of potential effect for the proposed Eagle Island CDF improvements.

5.4.3 Intertidal Macrofauna. Intertidal portions along the fringes of Eagle Island are inhabited by various species of polychaete worms and amphipods. These organisms are important food sources for numerous bird species that may be present in the area.

5.4.4 Submerged Aquatic Vegetation (SAV). A category of Essential Fish Habitat (below), SAV beds form a complex and important ecosystem. SAV are not prolific in the Cape Fear River or adjacent waters and there are none in waters around Eagle Island. Although SAV can quickly populate shallow bottom when conditions are conducive, the currents, deeper depths, and amount of suspended sediments minimizing light penetration in the water column will limit the likelihood that SAV will populate the majority of the project area.

Dike Raises to 50 Feet. Most free-swimming animals, including fish, shellfish, marine mammals, sea turtles, and cephalopod mollusks, are not expected to experience any significant direct effects from the proposed action. Likewise, benthos are not anticipated to be adversely impacted by the proposed project as they are expected to move and avoid areas during construction. Some mortality is inevitable; however, numbers would be negligible in relation to overall populations. Impacts associated with construction are expected to be minimal, temporary, and short-lived. Because SAV is not present in the marsh around Eagle Island, it would not be impacted.

Overall impacts of the proposed action on PNAs are expected to be insignificant. PNA within the project area has been identified by the Mean High Water (MHW) line, which is also the 2-foot elevation contour as shown in Appendix E, Figure 1. The construction of toe berms would permanently impact approximately 2.85 acres of tidal area waterward of MHW surrounding Eagle Island, the majority being adjacent to the Brunswick River (included as part of the total 35.5 acres). To avoid impacts to fisheries within the PNA areas, every effort will be made to construct the toe berms within this 2.85 acres outside the window of April 1 to July 31. If construction within these areas cannot avoid this timeframe, coordination with environmental agencies will occur prior to work in these areas.

The impacted marsh is vegetated primarily with *Phragmites australis,* or common reed, a non-native, aggressive wetland grass. There are benthos and intertidal macrofaunal organisms present here, and those within the footprint of the toe berm would be buried. This impact is unavoidable but is considered to be minimal in comparison to the area's overall populations.

No Action Alternative. The No Action alternative is not expected to adversely affect any marine or estuarine resources.

5.5 Fisheries and Essential Fish Habitat (EFH).

The 1996 Congressional amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (PL 94-265) set forth new requirements for the National Marine

Fisheries Service (NMFS), regional fishery management councils (FMC), and other federal agencies to identify and protect important marine and anadromous fish habitat (those that depend on both freshwater and saltwater). These amendments established procedures for the identification of EFH and a requirement for interagency coordination to further the conservation of federally managed fisheries.

Wilmington Harbor supports several popular recreational and commercial aquatic species. Some species common to the area include: White shrimp (*Litopenaeus setiferus*), blueback herring (Alosa aestivalis), American shad (Alosa sapidissima), hickory shad (Alosa mediocris), alewife (Alosa pseudoharengus), striped bass (Morone saxatilis), shortnose sturgeon (Acipenser brevirostrum) and Atlantic sturgeon (Acipenser oxyrhynchus), and American eel (*Anguilla rostrate*). Anadromous species (herring, shad, alewife, striped bass, and sturgeon) pass through the Cape Fear estuary en route to upper river spawning and nursery areas (Walburg and Nichols, 1967; Nichols and Louder, 1970). Anadromous fish use is highest from mid-winter to mid-spring. The catadromous American eel *(Anguilla rostrata)*, is widely distributed in the Cape Fear River estuary (Schwartz et al, 1981).

Table 1 lists, by life stages, fish and crustacean species which may occur in the vicinity of Wilmington Harbor, and for which Fishery Management Plans (FMPs) have been developed by the South Atlantic Fishery Management Council (SAFMC), Mid-Atlantic Fishery Management Council (MAFMC), and NMFS. These fish species and habitats require special consideration to promote their viability and sustainability.

Table 1. Essential Fish Habitat species in the Eagle Island Improvements Project Area

Common Name	Scientific Name	Life Stag
INVERTEBRATES		
Brown shrimp	*Farfantepenaeus aztecus*	LJA
White shrimp	*Litopenaeus setiferus*	LJA
Pink shrimp	*Farfantepenaeus*	LJA
COASTAL DEMERSALS		
Red drum	*Sciaenops ocellatus*	ELJA
Bluefish	*Pomatomus saltatrix*	JA
Summer flounder	*Paralichthys dentatus*	LJA
COASTAL PELAGICS		
Spanish mackerel	*Scomberomorus*	JA
King mackerel	*Scomberomorus cavalla*	JA
Cobia	*Rachycentron canadum*	JA
SNAPPERS/GROUPERS		
Black sea bass	*Centropristis striata*	J
Rock sea bass	*Centropristis philadelphica*	J
Gag grouper	*Mycteroperca microlepis*	J
Red grouper	*Epinephelus morio*	J
Black grouper	*Mycteroperca bonaci*	J
Lane snapper	*Lutjanus synagris*	J
Mutton	*Lutjanus analis*	J
snapper Gray	*Lutjanus*	J
Yellow jack	*Carangoides bartholomaei*	J
Blue runner	*Caranx crysos*	J
Crevalle jack	*Caranx hippos*	J
Bar jack	*Caranx ruber*	J
Atlantic spadefish	*Chaetodipterus faber*	J
Sheepshead	*Archosargus probatocephalu*	JA

Common Name	Scientific Name	Life Stag
SHARKS		
Smooth dogfish	*Mustelus canis*	J
SMALL COASTAL SHARKS		
Atlantic sharpnose shark	*Rhizoprionodon*	JA
Finetooth shark	*Carcharhinus isodon*	JA
Blacknose shark	*Carcharhinus acronotus*	JA
Bonnethead shark	*Sphyrna tiburo*	JA
LARGE COASTAL SHARKS		
Silky shark	*Carcharhinus falciformis*	JA
Tiger shark	*Galeocerdo cuvieri*	JA
Blacktip shark	*Carcharhinus limbatus*	JA
Spinner shark	*Carcharhinus brevipinna*	JA
Bull shark	*Carcharhinus leucas*	JA
Lemon shark	*Negaprion brevirostris*	JA
Nurse shark	*Ginglymostoma cirratum*	JA
Scalloped hammerhead	*Sphyrna lewini*	JA
Great hammerhead	*Sphyrna mokarran*	JA
Smooth hammerhead	*Sphyrna zygaena*	JA

Legend: E, Egg; L, Larval; J, Juvenile; A, Adult
Source: Habitat Protection Division, Pivers Island,

Table 2 lists categories of EFH and Habitat Areas of Particular Concern (HAPC) for managed species that were identified in the FMP Amendments affecting the South Atlantic area. HAPC's are subsets of EFH which are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. The EFH categories in Wilmington Harbor are indicated by an * in Table 2.

Table 2. Categories of EFH and HAPC identified in FMP Amendments affecting the South Atlantic

EFH	GEOGRAPHICALLY DEFINED HAPC
Estuarine Areas	Area-wide
Estuarine Emergent Wetlands*	Council-designated Artificial Reef
Estuarine Scrub/Shrub Mangroves	Hermatypic (reef-forming) Coral Habitat &
Submerged Aquatic Vegetation	Hard Bottoms
Oyster Reefs & Shell Banks*	Hoyt Hills
Intertidal Flats*	*Sargassum* Habitat
Palustrine Emergent & Forested Wetlands	State-designated Areas of Importance for Managed Species
Aquatic Beds	Submerged Aquatic Vegetation (SAV)
Estuarine Water Column*	
Seagrass	
Creeks	
Mud Bottom	
Marine Areas	North Carolina
Live/Hard Bottoms	Big Rock
Coral and Coral Reefs	Bogue Sound
Artificial/Man-made Reefs	Pamlico Sound at Hatteras/Ocracoke Islands
Sargassum	Capes Fear, Lookout, & Hatteras (sandy
Water Column*	New River
	The Ten Fathom Ledge
	The Point

In addition, the State of North Carolina has prepared FMPs for several fish species that utilize resources within the project area. These species include striped mullet, spotted trout, southern flounder, sea mullet (kingfish) (3 species), striped bass, and red drum. All of these species use the project area during a portion of their life cycle.

According to the NOAA Habitat Conservation EFH Mapper (http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html), Coastal Migratory Pelagic species make their way up the Cape Fear River and beyond the Eagle Island CDF. They utilize areas within the Brunswick and Cape Fear Rivers just beyond the existing dikes at Eagle Island. These areas are also Habitat Areas of Particular Concern.

Dike Raises to 50 Feet. The proposed improvements to Eagle Island CDF will result in filling 35.5 acres of *Phragmites*-dominated tidal marsh and permanently impact mixed estuarine-freshwater emergent wetlands that include EFH and HAPC. Adverse impacts related to the toe berm construction will be offset by purchase of tidal freshwater marsh mitigation credits as described in Section 5.16 and Appendix E. Additional impacts from construction will be avoided

by implementing a construction window of April 1 – July 31 within areas located below MHW (2ft contour elevation), and utilizing best management practices to keep fill material contained. This will aid in reducing turbidity in the surrounding waters and allow fisheries that visit these habitat areas to utilize them unharmed.

No Action. The No Action alternative would not result in impacts to EFH or HAPC.

5.6 Terrestrial Resources. Terrestrial resources found at the Eagle Island CDF are the result of frequent and recurring activities including maintenance and raising of dikes as well as the disposal of dredged material. Dikes are vegetated primarily with various grass species and *Phragmites* and some shrub thickets of wax myrtle (*Myrica cerifera*), silverling (*Baccharis halimiflora*), yaupon (*Ilex vomitoria*), marsh elder (*Iva frutescens*), and Virginia red cedar (*Juniperus virginiana*) are found on the outer portions of the marsh, away from the dikes.

Birds frequenting the Island include marsh hawks (*Falco cyaneus*), kestrels (*Falco sparverius*), bald eagles (*Haliaeetus leucocephalus*), mourning doves (*Zenaida macroura*), fish crows (*Corvus ossifragus*), starlings (*Sturnus vulgaris*), meadowlarks (*Sturnella magna*), boat tailed grackles (*Quiscalus major*), and savannah sparrows (*Passerculus sandwichensis*). Migratory birds include black-necked stilts (*Himantopus mexicanus*), red-winged blackbirds (*Agelaius phoeniceus*), winter sparrows (*Spizella arborea*), common grackles (Q*uiscalus quiscula*), bobolink (*Dolichonyx oryzivorus*), anhinga (*Anhinga anhinga*), painted buntings (*Passerina ciris*), and tree swallows (*Tachycineta bicolor*). A number of species of ducks, wading birds, and other shore birds can be found at various times in the flooded cells and during times of discharge of dredged material.

Gray squirrels (*Sciurus carolinensis*), marsh rabbits (*Sylvilagus palustris*), white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), fox (*Vulpes vulpes*), nutria (*Myocaster coypus*), opossum (*Didelphis virginiana*), coyotes (*Canis latrans*), and bobcats (*Lynx rufus*) are present on or in the vicinity of Eagle Island.

Reptilian and amphibian species observed or likely present on Eagle Island include the southern leopard frog (*Lithobates sphenocephalus*), green tree frog (*Hyla cinerea*), black rat snake (*Pantherophis obsoletus*), eastern cottonmouth (*Agkistrodon piscivorus*), copperhead snake (*Agkistrodon contortrix)*, yellow-bellied slider turtle (*Trachemys scripta scripta*), snapping turtle (*Chelydra serpentina*), and the American alligator (*Alligator mississippiensis*).

Dike Raises to 50 Feet. Construction of the toe berms will permanently impact approximately 3 acres of terrestrial habitat. During construction of the toe berms, temporary adverse impacts will occur to land-based organisms that cannot move or burrow in the ground; however, most will likely vacate the area and return when construction is complete. Following completion of construction, the cells will be periodically filled with dredged material in addition to routine maintenance (mowing, ditching, minor dike repair, travel-way repair, etc). These types of impacts are routine on Eagle Island and have been for approximately the past 50 years. The majority of the terrestrial resources are opportunistic and/or pioneering; therefore, impacts of the proposed project, which are anticipated to be temporary, minimal, and short-lived, will allow for new individuals to utilize the habitat following completion of construction or dredged material disposal events.

No Action. The No Action alternative involves continued use of Eagle Island CDF until no capacity for dredged material remains. Impacts to terrestrial resources will continue as before (periodic filling, ditching, maintenance activities, etc.) until the site can no longer be used. Until then, these impacts are ongoing, and the majority of the terrestrial resources in the area have either adapted or moved north of the cells where there is less disturbance.

5.7 Wetlands.

Eagle Island is fringed by marsh/wetlands suited to brackish water. *Phragmites australis* predominates, while cattails (*Typha latifolia*, *T angustifolia*, and *T domingensis*) are interspersed with *Spartina alterniflora* and *patens*, *Scirpus* spp, *Juncus roermerianus* and various other species of reeds, rushes, and sedges. Areas dominated by *Phragmites* are considered to be of lower quality (refer to Revised Mitigation Plan in Appendix E) and provide less habitat for native species; however, they are still useful for flood protection, erosion control and improving water quality.

Dike Raises to 50 Feet. In 2010 and again in 2015, the USACE conducted preliminary wetland identification surveys around the Eagle Island CDF and determined that there is extensive tidal freshwater marsh fringing the Island. The proposed toe berm construction will fill approximately 35.5 acres of freshwater tidal marsh vegetated almost exclusively with *Phragmites* which will be mitigated, so there is a no net loss of wetlands (refer to section 5.16 and Appendix E for details). Temporary impacts may occur to approximately 6.3 acres of wetlands within a 10-foot construction corridor (refer to section 5.17), however this area will be fully restored once construction is complete.

No Action. The No Action alternative would not require impacts outside of the existing dikes, therefore no impacts to wetlands would occur.

5.8 Floodplains.

A floodplain is an area of land adjacent to a body of water that is inundated during flood events. The 100-year flood is a flood event that has a 1% probability of occurring in any given year. The 100-year flood plain is established by the Federal Emergency Management Agency (FEMA) and is identified on Federal Insurance Rate Maps. Base flood elevations for flood zones and velocity zones are also identified by FEMA, as are designated floodways.

Adverse impacts to floodplains occur when an activity removes an area that flood waters could otherwise occupy, thereby raising the elevation of flood waters and possibly increasing flooding at another location.

Dike Raises to 50 Feet. The proposed project involves the construction of a toe berm with a footprint of approximately 80 acres. Approximately 35.5 acres of this impact are located in tidal freshwater marsh around the base of the Eagle Island CDF. While this impact is unavoidable, it may adversely impact the floodplain by slightly increasing the chance or severity of flooding at nearby locations. Looking at a cross-sectional image of the river where it intersects with the widest portion of the toe berm (on the southwest side of Cell 1 adjacent to the Brunswick River), would give an approximate idea of volumes of material displacing tidal marsh and the affect it would have on the river system in the event of a flood. Given the size of the Cape Fear, Northeast Cape Fear, and Brunswick Rivers, and the acreage of tidal wetlands in the project area, this impact is negligible.

No Action. Under No Action, the Eagle Island dikes would not be expanded beyond 42 foot elevation; therefore, toe berms would not be required and no changes to the floodplain would occur.

5.9 Endangered and Threatened Species. The Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531–1543), provides a program for the conservation of threatened and endangered (T&E) plants and animals and the habitats in which they are found. In accordance with section 7 (a)(2) of the ESA, the USACE is initiating consultation with the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to ensure that effects of the proposed project would not jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat of such species.

Updated lists of endangered and threatened species for the project area were obtained from NMFS (Southeast Regional Office, St. Petersburg, FL) and the USFWS (Field Office, Raleigh, NC). These were combined to develop the composite list shown in Table 3, which includes T&E species that could be present in the area based upon their historical occurrence or potential geographic range. However, the actual occurrence of a species in the area depends upon the availability of suitable habitat, the season of the year relative to a species' temperature tolerance, migratory habits, and other factors.

For the upper Wilmington Harbor portion of the Cape Fear River, the only species that may occur in the project area are two endangered sturgeon species: shortnose (*Acipenser brevirostrum*) and Atlantic (*Acipenser oxyrinchus oxyrinchus*). Whales, manatee, and sea turtles species are not likely to occur in the project area or be affected by the proposed project. Furthermore, the Eagle Island CDF does not provide habitat for any of the listed bird species in the area: piping plovers and red knots prefer oceanfront beaches, red cockaded woodpeckers are accustomed to long leaf forests, and the wood stork favors cypress trees and mangrove swamps.

Table 3. Endangered and Threatened Species Potentially Impacted by the Eagle Island Improvements Project (Brunswick and New Hanover Counties)

Species Common Names	Scientific Name	Federal Status
MAMMALS		
Blue whale	(*Balaenoptera musculus*)	Endangered
Finback whale	(*Balaenoptera physalus*)	Endangered
Humpback whale	(*Megaptera novaeangliae*)	Endangered
Right whale	(*Eubaleana glacialis*)	Endangered
Sei whale	(*Balaenoptera borealis*)	Endangered
Sperm whale	(*Physeter macrocephalus*)	Endangered
W Indian manatee	(*Trichechus manatus*)	Endangered
BIRDS		
Piping plover	(*Charadrius melodus*)	Threatened
Red cockaded woodpecker	(*Picoides borealis*)	Endangered
Red knot	(*Calidris canutus rufa*)	Threatened
Wood stork	(*Mycteria Americana*)	Threatened
REPTILES		
Green sea turtle	(*Chelonia mydas*)	Threatened[1]
Hawksbill sea turtle	(*Eretmochelys imbricata*)	Endangered
Kemp's ridley sea turtle	(*Lepidochelys kempii*)	Endangered
Leatherback sea turtle	(*Dermochelys coriacea*)	Endangered
Loggerhead sea turtle	(*Caretta caretta*)	Threatened
FISHES		
Atlantic sturgeon	(*Acipenser oxyrinchus oxyrinchus*)	Endangered
Shortnose sturgeon	(*Acipenser brevirostrum*)	Endangered

[1]Green turtles are listed as threatened, except for breeding populations in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

5.9.1 Status, Distribution, and Habitat

Shortnose Sturgeon

The shortnose sturgeon inhabits large Atlantic coast rivers from New Brunswick, Canada south to northeastern Florida. Adults in southern rivers are estuarine anadromous, foraging at the freshwater-saltwater interface and moving upstream to spawn in the early spring. Although the shortnose sturgeon is anadromous, they spend most of their life in their natal river systems and rarely migrate to marine environments. Spawning habitats include river channels with gravel, gravel/boulder, rubble/boulder, and gravel/sand/log substrates. Spawning in southern rivers begins in later winter or early spring and lasts from a few days to several weeks. Juveniles occupy the freshwater-saltwater interface, moving back and forth with the low salinity portion of the salt wedge during summer. Juveniles typically move upstream during the spring and summer and downstream during the winter, with movements occurring above the freshwater-saltwater interface. In southern rivers, both adults and juveniles are known to congregate in cool, deep thermal refugia during the summer. The shortnose sturgeon is a benthic omnivore, feeding on crustaceans, insect larvae, worms, and mollusks. Juveniles

randomly vacuum the bottom and consume mostly insect larvae and small crustaceans. Adults are more selective feeders, feeding primarily on small mollusks (NMFS 1998).

Atlantic Sturgeon
The Atlantic sturgeon was listed as endangered under the ESA on February 6, 2012 (77 FR 5914, 77 FR 5880). The spawning population in the Cape Fear River system is thought to number less than 300 adults [Atlantic Sturgeon Status Review Team (ASSRT) 2007]. Atlantic sturgeon spawn in freshwater but spend most of their adult life in the marine environment. Spawning adults generally migrate upriver in the spring/early summer (Smith and Clugston 1997). Spawning is believed to occur in flowing water between the salt front and fall line of large rivers. Post-larval juveniles move downstream into brackish waters and eventually move to estuarine waters where they reside for a period of months or years (Moser and Ross 1995). Sub-adult and adult Atlantic sturgeons emigrate from rivers into coastal waters where they may undertake long range migrations. Migratory sub-adult and adult sturgeon are typically found in shallow (10 to 50 m) nearshore waters with gravel and sand substrates (Collins and Smith 1997, Stein et al. 2004). Although extensive mixing occurs in coastal waters, Atlantic sturgeons return to their natal river to spawn (ASSRT 2007).

5.9.2 Occurrence in the Action Area

Shortnose Sturgeon
The shortnose sturgeon was thought to be extirpated from NC waters until an individual was captured in the Brunswick River in 1987 (Ross et al. 1988). Subsequent gill-net studies (1989-1993) resulted in the capture of five shortnose sturgeon, thus confirming the presence of a small population in the lower Cape Fear River (Moser and Ross 1995). The current distribution of the shortnose sturgeon in NC is thought to include only the Cape Fear and Pee Dee Rivers, and no reproducing populations have been documented in the state [Shortnose Sturgeon Status Review Team (SSSRT) 2010].

Atlantic Sturgeon
The Atlantic sturgeon occurs in the Cape Fear River system adjacent to the action area. Based on incidental capture data from tagging cruises, shallow nearshore ocean waters along the NC coast may represent a winter (January-February) aggregation site for Atlantic sturgeon (Laney et al. 2007). Incidental captures typically occurred over sand substrate in nearshore waters that were less than 59 feet deep.

5.9.3 Threats
Potential effects include direct impacts on benthic habitats and food resources, hydrological modifications, turbidity and siltation, and hopper dredge entrainment.

5.9.4 Project Effects
Toe berm construction would not have a direct impact, but could potentially impact Atlantic and shortnose sturgeons indirectly through sediment suspension and soft bottom habitat modification. The shortnose sturgeon is typically found in the upper portions of rivers above the freshwater-saltwater interface; based on its low probability of occurrence in the action area, impacts on shortnose sturgeon would not be expected under the proposed action.

Two incidental takes of Atlantic sturgeon occurred at Wilmington Harbor: including one in the upper Cape Fear River near the State Port in 1998, and one in the lower river near Horseshoe Shoals in 2010, both by hopper dredge entrainment. The potential for impacts related to discharge of material in lowland marsh would be minimal. Based on this, it is anticipated that the risks to Atlantic sturgeon during toe berm construction would be very low.

5.9.5 Determination of Effect

Dike Raises to 50 Feet. Based on its low probability of occurrence in the action area, it is determined that the proposed action may affect, but is not likely to adversely affect, the shortnose sturgeon.

Although there is no critical habitat designated for the Atlantic sturgeon, it has been documented to occur in the Cape Fear and Northeast Cape Fear Rivers, indicating that it is present within the action area. Considering the impacts associated with the proposed project involve a discharge of fill material into tidal, brackish marsh, it is determined that the proposed action may affect, but is not likely to adversely affect, the Atlantic sturgeon.

The proposed toe berm construction would not affect any other federally listed species.

No Action. The No Action alternative would result in no adverse impacts to threatened or endangered species.

5.10 Cultural Resources.

The Cape Fear River has a long and active history as one of the earliest and most significant waterways in North Carolina. Spanish explorers sighted the river in the early 16th century and European settlement began in 1664 with the establishment of Charles Town near the mouth of Town Creek. By 1733, the town of New Carthage, later renamed Wilmington, had been laid out, and became the main cultural and maritime center. During the years leading up to the Revolution, numerous confrontations took place between the American patriots and British loyalists and troops, and Wilmington itself became occupied by the British in October of 1781.

During the 19th century, up to 40 ships per month were visiting Wilmington's harbor, and by the mid-19th century there were over 140 named landings located along the 115 miles of river between Wilmington and Fayetteville. The importance of Wilmington to the Confederacy is reflected in the fortifications used to protect the city and her approaches. Fort Fisher, Fort Holmes, Zekes Island Battery, Camp Wyatt, Fort Hendrick, Fort Campbell, Fort Johnston, Fort Caswell, Battery Buchanan, Fort Anderson, Shaw Battery, Mound Battery, and Battery Lamb were located on the Cape Fear River at and below Wilmington, or faced the ocean and river in Brunswick County, and all were important elements in the coastal defenses. The defenses at Wilmington were not defeated until late in the war when Fort Fisher finally fell in 1865; Wilmington was occupied by Union troops soon afterward.

After the Civil War, Wilmington's major water courses began to reflect the transition from plantation and agrarian economies to the commercial agriculture and industrial enterprises that would dominate throughout the 20th century. By 1905, channel improvements made the Northeast Cape Fear River navigable for pole boats all the way to Kornegays Bridge, 103 miles above the river's mouth, and ship building, fertilizer and brick factories, shipping terminals, and

other capital intensive industries began to replace commercial fishing, hunting, forestry, and agriculture as the economically dominant businesses.

In the early days of World War II, the North Carolina Shipbuilding Company began building Liberty ships in shipyards along the east bank of the Cape Fear River just south of Eagle Island. By 1946 the company built 243 ships in all. By 1949, when the war was over, the returned ships were stationed in the Brunswick River. A total of 648 ships were, at varying times, moored in the reserve fleet, known as the “Mothball Fleet”. Over the years many were scrapped, sold to private concerns, sunk for artificial reefs, or recommissioned. The last ship to be removed from the “graveyard” was the Liberty Ship "USS Dwight W. Morrow", which was scrapped in February 1970 (Memorieshop, 2013).

Archaeologically, the importance of the area as a maritime center is shown by the large number of shipwrecks and abandoned shipyards. Thirty-seven historic shipwrecks are listed on the 1985 National Register of Historic Places Registration addendum for the Wilmington Historic District prepared by the North Carolina Division of Archives and History (NCDAH). In addition, over 130 shipwrecks are known from the lower Cape Fear to the Northeast Cape Fear River vicinity, as well as historic remains of numerous shipyards, Liberty Ships, marine railways, and dry docks.

Dike Raises to 50 Feet. No known adverse impacts to cultural or archaeological resources would occur as a result of the toe berm construction. No previously identified shipwrecks or other culturally significant remains are within the proposed project footprint. It is always possible during the course of a project that vessel remains or other cultural resources could be encountered. All USACE construction contracts would require that contractors and others involved in the project be aware that the possibility exists that work may encounter cultural materials. In the event that this occurs, work would be required to move to another area and the USACE and the NCDCR Underwater Archaeology Unit (telephone number 910-458-9042) would be contacted immediately to determine a course of action.

No Action. The No Action alternative would result in no change to the existing footprint of the project and; therefore, result in no adverse impacts to cultural or archaeological resources.

5.11 Aesthetic and Recreational Resources.

While the Cape Fear River is, overall, a scenic setting, the Eagle Island CDF is a man-made feature whose purpose is to receive dredged material. A substantial portion of the Eagle Island CDF is located across the River from the NC State Ports facility, so commercial shipping, channel maintenance, marine construction, and other activities, not commonly associated with what many consider to be aesthetically pleasing vistas, frequently occur.

The Eagle Island CDF is considered an active construction site, so for safety and security reasons, unauthorized persons are not allowed on the premises. Therefore, recreational activities, aside from bird watching from afar, are not permitted.

Dike Raises to 50 Feet. Construction of the preferred alternative would result in an increase of construction-related equipment and impacts. However, such activity is not uncommon to the area. Raising the dikes to 50 feet would block the viewshed of approximately 15 homeowners on the Brunswick River looking east, since they would no longer be able to see beyond Eagle

Island to the NC State Ports facility, marine terminals, and other industrial sites. However, most of this view beyond Eagle Island is already blocked by the existing dikes.

No Action. The No Action alternative would result in no additional adverse impacts to aesthetics or recreation than already exist.

5.12 Socio-Economic Resources.

Demographic Profiles

New Hanover and Brunswick Counties are located at the Southeastern portion of the state of North Carolina. The counties include 192 and 847 square miles, respectively, in land and water area. Table 4 provides population data for the United States, North Carolina, New Hanover and Brunswick Counties over the last 20 years for which data is available.

Table 4. New Hanover and Brunswick Counties Statistical Area - Total Population Data

Area	% Change '90 - '12	2012	2000	1990
United States	25.76%	313,914,040	282,162,400	249,622,800
North Carolina	46.34%	9,752,073	8,081,600	6,664,000
New Hanover	72.72%	209,234	160,842	121,140
Brunswick County	118.95%	112,257	73,756	51,271

*population estimates provided by U.S. Census

An estimated 321,000 residents lived in New Hanover and Brunswick Counties in 2012. This represents a population increase of 35 percent since 2000 and an increase of 86 percent since 1990.

The residents of New Hanover and Brunswick Counties contain a mix of races and ethnicities. Based on 2012 census figures, 79.1 percent of New Hanover County residents were white, 15.0 percent were black, 5.3 percent were Hispanic, 1.2 percent Asian, and 0.6 percent identified as Native American. The census of Brunswick County estimates that 85.4 percent of its residents were white, 11.6 percent were black, 5.1 percent were Hispanic, 0.6 percent were Asian, and 0.8 percent identified as Native American.

In the state of North Carolina, 72.1 percent of the population was white, 22.0 percent of the population was black, 8.6 percent Hispanic, 2.3 percent were Asian, and 1.5 percent were Native American. Table 6 displays racial demographics for the Nation, State, New Hanover and Brunswick Counties.

Table 5. Population by Race

	New Hanover County	Brunswick County	North Carolina	United States
Population, 2012	206,189	112,257	9,752,073	313,914,040
White persons, percent	79.1%	85.4%	72.10%	78.1%
Black persons, percent	14.8%	11.6%	22.0%	13.1%
Hispanic	5.3%	5.1%	8.6%	16.7%
Asian persons, percent	1.2%	0.6%	2.3%	5.0%
Native (American Indian, Alaska Native, Hawaiian, etc)	0.6%	0.8%	1.5%	1.2%
Two or More Races	2.0%	1.5%	1.9%	2.3%

*population estimates provided by U.S. Census

Approximately 48 percent of the population for New Hanover County was sixteen years and over, with 53.2 percent of the population in the labor force. The unemployment rate for the County was 10.4 percent. A total of 37.2 percent of Brunswick County's population was sixteen or over, with 45.5 percent of the population in the labor force, and unemployment rate of 11.0 percent. The unemployment rates for North Carolina and the United states were 10.6 and 9.3 percent, respectively.

Table 6. Civilian Labor Force by Occupation

	New Hanover County	Brunswick County	North Carolina	United States
Civilian employed population 16 years and over	98,896	41,791	4,128,576	139,033,928
OCCUPATION				
Agriculture Forestry, Fishing, Hunting, Mining	0.18%	0.66%	1.37%	1.90%
Construction	6.89%	12.89%	6.85%	6.25%
Manufacturing	6.28%	6.94%	12.41%	10.39%
Wholesale Trade	3.10%	1.78%	3.03%	2.83%
Retail Trade	12.54%	16.60%	11.99%	11.65%
Transportation, Warehousing, Utilities	3.80%	5.02%	4.25%	4.92%
Information	3.15%	1.78%	1.69%	2.17%
Finance, Insurance, Real Estate, Rental, Leasing	5.43%	7.44%	6.35%	6.67%
Professional, Scientific, Management, Administrative, Waste Management Services	10.84%	9.03%	9.51%	10.58%
Educational Services, Healthcare, Social Assistance	25.15%	18.25%	23.41%	23.24%
Arts, Entertainment, Recreation, Accommodation, Food Services	13.54%	10.94%	9.25%	9.25%
Public Administration	3.28%	4.41%	4.86%	5.17%
Other Services, Except Public Administration	5.83%	4.26%	5.04%	4.97%

In 2010, the median household income of Brunswick County was $45,806. This is higher than the State's average of $43,326, but lower than the national average of $50,046. The mean household income was $57,088. The median household income of New Hanover County was $46,130 and the mean household income was $63,093. Table 7 shows the number of households in the New Hanover and Brunswick Counties, North Carolina, and the United States by the percentage of their respective incomes.

Table 7. Number of households and the percentage of their respective incomes

Total Households	New Hanover County	Brunswick County	North Carolina	United States
Less than $10,000	10.47%	7.64%	8.97%	7.64%
$10,000 to $14,999	9.98%	17.45%	13.01%	11.46%
$15,000 to $24,999	12.07%	10.86%	12.47%	11.17%
$25,000 to $34,999	10.85%	8.82%	11.59%	10.41%
$35,000 to $49,999	9.90%	11.76%	10.20%	9.27%
$50,000 to $74,999	17.91%	19.15%	18.39%	18.28%
$75,000 to $99,999	11.35%	11.36%	10.79%	11.81%
$100,000 to $149,999	11.15%	8.62%	9.05%	11.82%
$150,000 to $199,999	3.12%	2.04%	2.88%	4.20%
$200,000 or more	3.21%	2.30%	2.66%	3.94%

Source: http://www.usa.com/brunswick-county-nc.htm
http://www.usa.com/new-hanover-county-nc.htm

Economic Characteristics of Wilmington Harbor

Navigation

A thorough analysis of the existing fleet data for vessels calling at Wilmington Harbor in 2009 revealed six typical vessel types: (1) Containerships, (2) Bulk Carriers, (3) General Cargo Vessels, (4) Petroleum Tankers (5) Chemical Tankers, and (6) Ro-Ro Vessels (includes Vehicle Carriers).

Containerships made up nearly 35% of the deep-draft vessels calls at Wilmington Harbor in 2009. The largest vessels that call at Wilmington Harbor at the present time are containerships of 62,000 to 65,000 deadweight tons (DWT). They are between 950 and 965 feet long, 106 feet in beam, and have design drafts of between 42 and 44 feet. Their actual sailing drafts were 38 feet or less when calling at Wilmington Harbor in 2009. Containerships maintain an under keel clearance of at least 10 percent of sailing draft in the channel at all times. They can carry between 4,400 and 4,800 Twenty Foot Equivalent Units (TEUs); however, they generally transfer less than 1,500 TEUs at the port, which are split between imports and exports. These larger ships typically travel between the Far East and East Coast of the US. Since this time, Post-Panamax vessels (those larger than the original Panama Canal locks can accommodate) have called in Wilmington, with the first arriving in July of 2016. At this time, current published Waterborne Commerce statistics do not reflect this, but

should be modified in the next data update.

Additional Container subclasses that call in Wilmington include smaller vessels in the 50,000 DWT class. These are generally about 850 feet long, have design drafts of about 41-42 feet, and can carry up to about 4,000 TEU's. An even smaller sub-class of container vessel typically service Europe and Central/South America. These vessels are generally between 20,000 DWT and 22,000 DWT. They are typically 525 to 550 feet in length, with beams ranging from 82 to 93 feet, and design drafts between 32 and 35 feet. They can carry up to approximately 1,300 TEUs.

The largest Bulk Carriers were rated at about 55,000 DWT with a length of 656 feet, a beam of 106 feet, and a design draft of 38 feet. The largest General Cargo vessels were rated at about 47,000 DWT with a length of 656, a beam of 102 feet and a design draft of 40.4 feet.

The largest non-container vessels that call at the port are Oil Tankers. These vessels are range in size from 70,000 DWT to 76,000 DWT, a length of 700 to 750 feet, with beams of 106 to 131 feet, and design drafts ranging from 40 to 46 feet. The actual sailing drafts of these vessels in Wilmington Harbor were 38 feet or less in 2009.

Hinterland

The Port of Wilmington's hinterland is primarily within the state of North Carolina. It includes Raleigh, Durham, Greensboro, Fayetteville, and the Wilmington area. The port is connected to the Raleigh-Durham area by Interstate 40 (I-40) and to Greensboro by I-74. The primary Port facilities are approximately 75 miles from I-95 and 200 miles from I-85, which are the primary north/south transportation corridors through North Carolina. These highways connect the Port of Wilmington to Charlotte, Greensboro, and Raleigh/Durham. Improvements to I-74 have added vehicle capacity between the port and I-85, which connects to Charlotte, North Carolina.

Landside transportation to and from the Port of Wilmington is primarily by truck. Trucks must pass through residential areas to reach the interstates. They must traverse Burnett Boulevard (two-lane road) to reach I-74, or Shipyard Boulevard and College Road (four lane bi-directional roads) with a series of stop lights to reach I-40. CSX provides daily rail service to the port through one line connecting to the main line at Hamlet. The rail route is through the City of Wilmington and crosses many of the city's major roads. Most crossings within the city are "at-grade."

Port Facilities

Wilmington Harbor has a variety of marine facilities located on both the left and right banks of the Cape Fear River between river miles 26 and 31. The marine facilities listed below, beginning with the terminal located furthest upstream, include: Kinder Morgan, Colonial Oil, Amerada Hess, , North Carolina State Port Authority berths one through nine, Apex Oil, the Invista Terminal, Carolina Marine Terminal, South Wilmington Terminal, National Gypsum Terminal, and the Military Ocean Terminal at Sunny Point, also known as MOTSU, and Archers Daniels Midland.

Economic Impact of Proposed Action

Eagle Island is the least cost disposal option for dredged material from the upper reaches of the

Wilmington Harbor project. It is important that the NC State Ports have feasible disposal options in order to keep costs of maintaining the harbor down, which helps keep the costs of goods in the Wilmington area affordable to the public. The Anchorage Basin reach of the project requires maintenance every year, and costs roughly $4.5 million per dredge cycle (with disposal in Eagle Island). The National ranking of State Ports determines the priority of funding from the Federal Government. An increase in costs of dredging (transporting material to the ODMDS in lieu of Eagle Island) would likely impact the Port of Wilmington's relative ranking, thus having the potential to impact annual funding.

Dike Raises to 50 Feet. Increasing the dredged material capacity of Cells 1, 2 and 3 will provide a feasible disposal site for Wilmington Harbor maintenance dredging for the next 16 years. It is important to continue using Eagle Island as a disposal facility as long as possible, as its access and proximity make it the least cost option.

No Action. Without raising dike elevations beyond 42 feet, once Cells 1, 2 and 3 reach capacity, there will be no other feasible alternative than to dispose of dredged material in the ODMDS. The costs associated with transporting material approximately 70 miles round trip would inevitably increase the costs to maintain the upper reach of the Wilmington Harbor. If USACE contracts for maintenance become too costly to be awarded, dredging will happen less frequently which would affect the draft of ships that can access the Port. Ultimately, this could raise the cost of goods and have a widespread effect on the regional economy.

5.13 Hazardous, Toxic, and Radioactive Waste.

The United States Environmental Protection Agency's (EPA) Envirofacts website was queried to identify the presence of EPA-regulated facilities within three miles of the proposed project area. The Envirofacts website contains information collected from regulatory programs and other data relating to environmental activities with the potential to affect air, water, and land resources in surrounding areas. One site was reported within a three mile radius, and was identified as the WWTP immediately adjacent to the proposed project area (U.S. Environmental Protection Agency 2015).

Multiple on-site inspections of the project area and surroundings have been performed by USACE, Wilmington District staff. Based on the site visit on March 18, 2015 and an investigation of historic aerial photographs, no evidence of improperly-managed hazardous and/or toxic materials or indicators of those materials were present in the proposed project area. USACE construction specifications require contractors to provide a solid waste disposal plan identifying methods and locations for solid waste disposal, clean and remove all contaminants, and provide evidence of the disposal facility's acceptance of the solid waste.

Dike Raises to 50 Feet. Construction of the toe berm and dike raise would not impact nor produce hazardous and toxic materials in the project area.

No Action. The No Action alternative would not directly result in any impacts to or produce any hazardous and toxic materials.

5.14 Noise.

In the proposed project area vicinity, noise levels are typically dependent on activity occurring at the State Ports or on Eagle Island itself. The cells are in a constant state of maintenance, as they are ditched and drained on a rotating basis and material is used to raise the dikes. Large

excavators, backhoes, dump trucks, utility trucks, and pumps are commonly found working on Eagle Island. Noise levels are elevated during construction activities, as expected within commercial/industrial areas.

According to Section 6-28 of the City of Wilmington Noise Ordinance Code: a sound or noise shall be deemed a noise disturbance if, when measured as prescribed herein, it exceeds the levels set forth below:

Commercial/industrial area: 75 decibels (daytime level) between the hours of 7:00 a.m. and 10:00 p.m., or 70 decibels (nighttime level) between the hours of 10:00 p.m. and 7:00 a.m. On Friday and Saturday, the daytime level shall remain in effect until 12:00 midnight.

Similarly, in accordance with Section 23-33 of the New Hanover County code of ordinances, it would be unlawful for sounds to exceed 75 decibels during the day and 70 decibels at night in non-residentially zoned districts.

Dike Raises to 50 Feet. Construction activity associated with the recommended plan is expected to comply with Section 6-28 and Section 22-33, NC code of ordinances.

No Action. The No Action alternative would comply with all published noise ordinances as well.

5.15 Environmental Impact Comparison of Alternatives.

The table below provides a brief summary and comparison of impacts to the physical and natural environment for the alternatives considered.

Table 8. Comparison of Impacts to Resources

Resource	Alternatives	
	Proposed Action (Dike Raises to 50 Ft)	**No Action**
Geology and Sediments	Disposal practices will continue as normal and dredged material composition is not expected to change. No significant adverse impacts.	No Impacts/status quo.
Water Resources	Impacts would be temporary due to minor increases in turbidity during construction; no significant adverse impacts expected.	No Impacts/status quo.
Air Quality	Temporary impacts during construction due to increases in emissions from heavy equipment. No significant adverse impacts expected.	Potential increase in fuel consumption emissions due to round trip travel to/from the ODMDS. No adverse impacts expected.
Aquatic Resources	No significant adverse impacts expected as life forms are anticipated to move and avoid areas during construction (though some mortality is inevitable). Construction in areas below the 2ft elevation contour will take place outside the window of April 1 to July 31 to avoid adverse impacts to aquatic resources.	No impacts/status quo.
Essential Fish Habitat	Permanent impacts to estuarine emergent wetlands EFH due to filling of 2.85 acres below the MHW line. Mitigation consists of 35.5 acres of riverine/tidal freshwater marsh, and construction will occur outside the April 1 – July 31 environmental window, therefore, only temporary impacts are expected.	No impacts/status quo.
Terrestrial Resources	Temporary adverse impacts will occur to organisms during construction however most will vacate the area. Potential benefits to terrestrial resources in the long-term.	No impacts/status quo.
Wetlands	Permanent impacts to 35.5 acres of tidal marsh. Mitigation consists of purchasing 35.5 credits of riverine/tidal freshwater marsh habitat resulting in a no net loss of wetlands.	No impacts/status quo.
Floodplains	Placement of 35.5 acres of fill within tidal wetlands of CFR floodplain. No significant adverse impacts to floodplains expected.	No impacts/status quo.
E&T Species in Project Area	Potential indirect impacts through sediment suspension and soft bottom habitat modification. No significant adverse impacts to Atlantic or shortnose sturgeon expected.	No impacts to Atlantic or shortnose sturgeon expected.
Cultural Resources	No known cultural resources present; no adverse impacts expected.	No impacts/status quo.
Aesthetic and Recreational Resources	Temporary impacts expected during construction, however no adverse impacts expected.	No impacts/status quo.
Socio-economic Resources	Status quo (maintain access of ships to Wilmington Harbor Port). Positive impacts to the local economy.	Potential negative impacts to local economy.
Hazardous Waste	No known hazardous wastes in affected area; No adverse impacts expected.	No impacts.
Noise	Minor increases in noise during construction. Impacts temporary and not adverse.	No impacts/status quo.

5.16 Mitigation.

Based on detailed vegetation analysis that was completed in 2015, the Eagle Island dike improvements will result in permanent impacts to 35.5 acres of jurisdictional wetlands. The vegetation mapping effort conducted in 2015 categorized the areas within the toe berm impacts into five classes: "Native", "Majority Phrag", "Mix - Native/Phrag", "Tree/Shrub", and "Water" (Appendix E, Figure 1). As demonstrated in this figure, the majority of impacts are to *Phragmites*-dominated wetlands (34.79 ac). Areas identified in green as tree/shrub were ground-truthed and determined to be uplands. Native, mixed, and open water impacts were combined to equal 0.66 acre, and together, jurisdictional impacts total 35.5 acres.

The Corps plans to mitigate for the 35.5 acres of toe berm impacts by purchasing credits from the Lower Cape Fear Umbrella Mitigation Bank, Sneeden Tract. The Sneeden Tract is in the project's HUC, located directly adjacent to the Cape Fear River, 5 miles upstream of Eagle Island (Appendix E, Figure 4). This site has tidal freshwater marsh incorporated into its credits; as such, it is considered in-kind to the toe berm wetland impacts on Eagle Island. For this reason and reasons further discussed in the Revised Mitigation Plan (Appendix E), impacts will be mitigated for at a ratio of 1:1 (purchase of 35.5 mitigation credits) and would result in a no net loss of wetlands.

5.17 Temporary Impacts

Construction of the proposed toe berms is anticipated to have 6.3 acres of temporary impacts to aquatic resources in addition to the 35.5 acres of impacts being mitigated for. As mentioned, a majority of the permanent impacts are to wetlands overgrown with *Phragmites,* and temporary impacts related to construction will occur within a 10ft corridor of the footprint of the toe berm (see Figure 8). It is within this 10ft construction buffer that disturbance is likely to occur: cutting back of *Phragmites*, silt fence installation, placement of coir logs/hay bales, and use of logging mats if heavy equipment will be working within wetlands. Affected areas will be brought back to original grade and restored. Toe berms will be layered with erosion control matting and seeded for stability. Once the toe berms are stable, the silt fencing will be removed.

To address construction impacts within the 2.85 acres of vegetated and open water areas located below MHW, coffer dams may be erected to isolate the area from tidal influence during toe berm construction. Rock (rip-rap) may be used within the toe berm footprint to minimize turbidity and provide long-term stabilization of the toe berm. Turbidity curtains may also be erected to prevent turbidity within the receiving waters and kept in place until construction areas are stabilized. As mentioned in Section 5.4.4, an environmental window of April 1 – July 31 will apply to these areas to avoid threat or harm to anadromous fish; this includes federally listed sturgeon. The contractor may also wish to work only during low/out-going tide to minimize impacts to water quality during construction.

Figure 8. Eagle Island Toe Berm Impacts and 10 foot Construction Corridor.

Some or all of these proactive measures will be taken and any materials/structures used/installed will be removed upon stabilization of the toe berm. Temporary impacts during construction will not permanently alter wetland functions and; therefore, will not be mitigated for.

5.18 Cumulative Impacts.

The Federal Executive Branch's Council on Environmental Quality defines cumulative impact as "the impact on the environment [that] results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7, National Environmental Policy Act of 1969, as amended).

Cumulative impacts of implementing the no action alternative, over time, would have the potential to cause significant adverse impacts to the local economy. Additionally, not increasing the capacity of Eagle Island CDF would possibly increase levels of water and air pollution due to the increased barge traffic that will result from transporting dredged material from the Upper Harbor reaches to the ODMDS.

Eagle Island, originally composed of natural uplands, coastal marsh, and tidal creeks, was used as a disposal area even before the USACE began disposing of dredged material from the river in the early 1900s. On average, approximately 1.2 million cubic yards (CYs) of material are dredged from the Anchorage Basin portion of the river and deposited in Eagle Island CDF annually. The deepening of the river in 2002-2003 resulted in an additional 1.75 million CYs, and again in 2012-2013 with approximately 800,000 CYs being placed in Cell 2.

The NC State Ports Authority (NCSPA) also utilizes Eagle Island CDF for the material dredged from their berths (1-9) and the non-federally maintained portion of the 42' turning basin. These areas are critical to ships turning and docking at the ports and require maintenance annually. The new Post-Panamax ships, which outsize the existing cargo vessels that frequent the Wilmington Harbor, will be calling on the port more frequently. In response to the widening of the Panama Canal, the Port of Wilmington requested and received permits to widen the turning basin at the former Vopak terminal just north of the Ports. Dredging an additional width of 200 feet to a depth of -42 +2 feet occurred during June 2016, and material was disposed of in Cell 1 of Eagle Island. The NCSPA was required to provide compensatory mitigation for this action since the dredging occurred within Primary Nursery Area. Mitigation included the preservation of 13.4 acres of coastal marsh property owned by NCSPA on the Brunswick River, located directly across from the cross-dike between Cells 2 and 3.

A good percentage of the banks of the Cape Fear and Brunswick Rivers are undeveloped and contain low-lying coastal marsh and wetlands. This pervious natural floodplain is essential for allowing flood waters to flow over and slowly drain as sea levels recede after a storm. The filling and heightening of the toe berms and dikes on Eagle Island CDF will take away approximately 35.5 acres from this natural floodplain, but that is nominal in comparison to what remains.

It is reasonably foreseeable that dredging of the past projects and ongoing maintenance of the Federal project would be expected to continue. The use of the area for commercial and recreational navigation is expected to continue and increase as the mariner population in the area continues to grow. New marinas currently under construction include the 200-slip Port

City Marina on the upper Wilmington Harbor portion of the Cape Fear River, and the 64-slip Hawkeswater Marina on the Brunswick River.

The preferred alternative, in conjunction with any past, present, or reasonably foreseeable future projects, is not expected to result in any significant adverse cumulative impacts to the environment. Future dredging actions in the project area and the above-mentioned reasonably foreseeable future projects would be subject to regulatory requirements and federal actions would be evaluated in accordance with NEPA. The proposed action is expected to have minimal impact on overall functionality and quality of coastal riparian vegetation and available wildlife habitat in the proposed project area.

The components of the proposed action are expected to cause only very minor effects. The proposed action will:
• not significantly impact water quality,
• not significantly impact marine or estuarine life,
• not significantly impact cultural resources, and
• not cause significant adverse impacts for any other aspects of the environment.

Cumulative impacts of the proposed action appear negligible. Furthermore, increased capacity of the Eagle Island CDF will have a long term positive impact on the local economy.

5.19 Public Laws and Executive Orders.

Table 9 lists the compliance status of all executive orders considered for the proposed Eagle Island CDF improvement project. Further descriptions of proposed project compliance with executive orders are below.

Table 9. Compliance of the proposed action with executive orders.

Executive Orders	Number	Compliance Status
Protection and Enhancement of Environmental Quality	11514	Full*
Protection and Enhancement of the Cultural Environment	11593	Full*
Floodplain Management	11988	Full*
Protection of Wetlands	11990	Full*
Federal Compliance with Pollution Control Standards	12088	Full*
Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	12898	Full*
Protection Of Children from Environmental Health Risks and Safety Risks	13045	Full*
Invasive Species	13112	Full*
Protection of Migratory Birds	13186	Full*

** - Compliance Status shall be considered 'Full Compliance' following completion of the NEPA process.*

5.19.1 Protection and Enhancement of Environmental Quality

The Federal Government shall provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies shall initiate measures needed to direct their policies, plans, and programs to meet national environmental goals.

The preferred alternative will not violate any provisions relating to the protection and enhancement of environmental quality, and will be in full compliance with Executive Order 11514 following completion of the NEPA process.

5.19.2 Protection and Enhancement of the Cultural Environment

The Federal Government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation. Federal agencies will administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations. Federal agencies will initiate measures necessary to direct their policies, plans, and programs in such a way that federally owned sites, structures, and objects of historical, architectural or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people. In consultation with the Advisory Council on Historic Preservation (16 U.S.C. 470i), federal agencies will institute procedures to assure that federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures, and objects of historical, architectural or archaeological significance.

The preferred alternative will not adversely affect cultural resources and will be in full compliance with Executive Order 11593 following completion of the NEPA process.

5.19.3 Floodplain Management

In order to avoid, to the extent possible, the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative, federal agencies shall take action to reduce the risk of flood loss and minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Since the project includes fill within the designated floodplain, the EO 11988 8-step process was used to evaluate compliance. The project has undergone public review, alternatives to floodplain development were considered, and impacts have been minimized and will be mitigated for accordingly.

It has been determined that the preferred alternative would not adversely affect floodplains or alter their function, and will be in full compliance with Executive Order 11988 following completion of the NEPA process.

5.19.4 Protection of Wetlands

In order to avoid, to the extent possible, the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands, wherever there is a practicable alternative, federal agencies will take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities.

The preferred alternative will result in the discharge of fill that will cover 35.5 acres of *Phragmites*-dominated tidal freshwater marsh. This loss will be mitigated through purchase of 35.5 credits of riparian/tidal freshwater wetlands, and will be in full compliance with Executive Order 11990 following completion of the NEPA process.

5.19.5 Pollution Control Standards

Federal agencies are responsible for ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to federal facilities and activities under the control of the agency.

The preferred alternative will not violate applicable pollution control standards and will be in full compliance with Executive Order 12088 following completion of the NEPA process.

5.19.6 Environmental Justice in Minority and Low-Income Populations

Environmental justice is defined as the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA further defines fair treatment to mean that no group of people should bear a disproportionate share of the negative environmental consequences of industrial, governmental, or commercial operations or policies.

The preferred alternative will not have the potential for disproportionate health or environmental effects on minorities or low-income populations or communities, and will be in full compliance with Executive Order 12898 following completion of the NEPA process.

5.19.7 Protection of Children from Environmental Health Risks and Safety Risks

Federal agencies identify and assess environmental health and safety risks that may disproportionately affect children as a result of the implementation of federal policies, programs, activities, and standards.

The preferred alternative will not have the potential to disproportionately affect the safety or health of children, and will be in full compliance with Executive Order 13045 following completion of the NEPA process.

5.19.8 Invasive Species

Introduction of invasive species has the potential to affect the economic, ecological, and human health of areas in which these species become established. The federal government, by presidential authority and the authority of other pertinent statutes, is charged with controlling and preventing introduction of harmful invasive species.

Planting of any potted or stem vegetation will not be a component of this project. For stabilization purposes, the toe berms will be seeded with native grasses to prevent sedimentation into the nearby waters. Seed species type will depend on the time of year to be applied, and seed mixture will not include noxious or invasive species. Therefore, the preferred alternative will not have the potential to introduce or otherwise promote invasive species, and will be in full compliance with Executive Order 13112 following completion of the NEPA process.

5.19.9 Protection of Migratory Birds

The Executive Order directs federal agencies that take actions that either directly or indirectly effect on migratory birds to develop a Memorandum of Understanding (MOU), and to work with

the U.S. Fish & Wildlife Service and other federal agencies to promote the conservation of migratory bird populations.

The Migratory Bird Treaty Act is a United States federal law, first enacted in 1916 to implement the convention for the protection of migratory birds. The statute makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations. The statute does not discriminate between live or dead birds and also grants full protection to any bird parts including feathers, eggs, and nests.

Construction of the dike raise and toe berm will not result in any significant adverse impacts to migratory bird species or their habitat. There may be some temporary displacement during construction; however, there is no anticipated taking of birds. The preferred alternative will not violate applicable migratory bird species, and will be in full compliance with Executive Order 13186 following completion of the NEPA process.

5.20 Conclusion.

Based on findings described in this report, it is in the Federal interest to implement the preferred alternative of raising the existing dikes to an elevation of 50 feet NAVD 88 and constructing supportive, perimeter toe berms. The proposed action will meet the purpose and need by providing long-term dredge material disposal for the Upper Harbor reaches of Wilmington Harbor, and the dredged material disposal meets the Federal standard.

Table 8 details significant environmental factors and impacts taken into consideration. Project construction will result in permanent impacts to 35.5 acres of tidal freshwater marsh, temporary impacts to benthic habitat and terrestrial vegetation and short-term impacts to water quality, air quality, and noise levels in the project area. Overall benefits of the preferred alternative include long-term regional socio-economic benefits by providing a financially feasible dredged material disposal facility for the next 16 years.

6.0 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

Table 10 lists the compliance status of the major Federal Laws, policies, and Executive Orders that were applicable or considered for the project. This project is considered in “Full compliance” once all the requirements of the NEPA process are complete.

Table 10. Relationship of the proposed action to Federal Laws and Policies

Title of Public Law	US Code	Compliance Status*
Abandoned Shipwreck Act of 1987	43 USC 2101	Full
Anadromous Fish Conservation Act of 1965, As Amended	16 USC 757 a et seq.	Full
Antiquities Act of 1906, As Amended	16 USC 431	Full
Archeological and Historic Preservation Act of 1974, As Amended	16 USC 469	Full
Archeological Resources Protection Act of 1979, As Amended	16 USC 470	Full
Clean Air Act of 1972, As Amended	42 USC 7401 et seq.	Full
Clean Water Act of 1972, As Amended	33 USC 1251 et seq.	Full
Coastal Zone Management Act of 1972, As Amended	16 USC 1451 et seq.	Full
Endangered Species Act of 1973	16 USC 1531	Full
Estuary Program Act of 1968	16 USC 1221 et seq.	Full
Equal Opportunity	42 USC 2000d	Full
Farmland Protection Policy Act	7 USC 4201 et seq.	Full
Fish and Wildlife Coordination Act of 1958, As Amended	16 USC 661	Full
Historic and Archeological Data Preservation	16 USC 469	Full
Historic Sites Act of 1935	16 USC 461	Full
Magnuson Fishery Conservation and Management Act – Essential Fish Habitat	16 USC 1801	Full
National Environmental Policy Act of 1969, As Amended	42 USC 4321 et seq.	Full
National Historic Preservation Act of 1966, As Amended	16 USC 470	Full
National Historic Preservation Act Amendments of 1980	16 USC 469a	Full
Native American Religious Freedom Act of 1978	42 USC 1996	Full

* **Full compliance once the NEPA process is complete.**

7.0 AGENCY AND PUBLIC INVOLVEMENT

7.1 Agency and Public Coordination

A scoping meeting and site visit were held on March 4, 2015 with the NC Division of Coastal Management, the NC Division of Water Resources, the US Fish and Wildlife Service, the National Marine Fisheries Service, NC Division of Marine Fisheries, and the NC Wildlife Resources Commission. The purpose was to discuss the proposed project and to assess the potential impact areas for mitigation.

A scoping letter was sent on April 17, 2015 to representatives of the agencies above as well as the NC Division of Cultural Resources. This allowed for a 30 day comment period soliciting comments on the project and proposed mitigation. In addition, a teleconference was held on April 20, 2015 with the NC Division of Mitigation Services and the USACE.

No comments were received on the project design or mitigation proposal during the scoping process.

On July 28, 2016 the draft EA was made available to an extensive list of local, State and federal regulatory agencies and the public for a 30-day review and comment period. A list of recipients has been included as Appendix B of this document. Comments received during the 30-day Public Notice period are included as Appendix C. A table of comments and responses

as well as email correspondence with the agencies have been included as Appendix D. All comments received during public review of the Draft EA were considered during development of this Final EA/FONSI as well as coordination with agencies that occurred throughout the process.

7.2 North Carolina Coastal Management Program

The proposed project is in New Hanover and Brunswick Counties, which is part of the designated coastal zone of the State of North Carolina. Since the proposed project includes significant discharge of fill in tidal freshwater marsh, a consistency concurrence is required from the North Carolina Coastal Management Program. A consistency determination was submitted to the N.C. Division of Coastal Management on January 25, 2017, and concurrence was received on February 24, 2017 (see Appendix F).

7.3 Clean Water Act (CWA)

7.3.1 Section 404. Due to the need to discharge dredged or fill material into Waters of the U.S., a Section 404(b)(1) (P.L. 95-217) evaluation for the proposed project is required and included in Appendix A.

7.3.2 Section 401. A Section 401 Water Quality Certificate under the CWA of 1977 (P.L. 95-217), as amended, is required for the proposed disposal of material to construct the toe berms, and would be obtained from the N.C. Department of Environmental Quality (DEQ), Division of Water Resources, before construction begins. A 401 Pre-Construction Notice was submitted February 3, 2017 and is awaiting response from DEQ.

7.3.3 Sea Level Rise

In accordance with ER 1100-2-8162 dated 31 December 2013, potential relative sea level change must be considered in every USACE coastal activity as far inland as the extent of estimated tidal influence. The Eagle Island CDF in the Cape Fear River is at sea level and water levels are subject to diurnal tidal fluctuations.

In an effort to conform to Engineering Technical Letter 1100-2-1, an analysis of the project impacts relative to increased sea levels over the remaining project life of the Eagle Island Improvements Project (2017-2100) was conducted. The analysis included development of relative sea level rise projection curves, identification of potential impact areas and associated risks, and establishing adaptive measures to adjust to future sea level rise. The recommended plan for this project only includes localized changes to the dike elevation and toe berm with limited exposure to sea level rise. Accordingly, a detailed evaluation of the potential effects, both positive and negative, of sea level rise, on both the federal and non-federal project features (port infrastructure, transportation, etc.) of the overall project is considered inappropriate. Instead, only an abbreviated Tier 1 analysis was performed to help inform project approval. The recommended plan will not meaningfully alter existing coastal processes. So, the evaluation was limited to effects on project maintenance.

Using the methods published in ETL 1100-2-1, the relative sea level rise curves were developed for “low,” “intermediate,” and “high” rates of future sea-level change. The “low” sea level change curve is simply an extrapolation of the observed sea-level trend obtained at the

Wilmington tide gauge station. The “intermediate” curve represents sea level rise using the National Research Council (NRC) Curve I and the “high” curve represents NRC Curve III.

The Wilmington tide gauge used in this analysis is a long term gauge with data collection from 1935 through 2015. This long term gauge has collected greater than 80 years of data and is the closest gauge to the project location, as seen in Figure 7. As shown in Figure 9, the gauge is located within close proximity of the project area and should provide an ideal representation of historic sea level rise affecting the project.

Figure 10 shows the sea level rise curves developed in response to ETL 1100-2-1 using the sea level change curve calculator (v 2015.46) developed by the USACE. The curves cover a 100 year duration of the proposed improvements which are planned for implementation in 2017. The curves shown in Figure 10 include the global eustatic sea level rise, plus increases due to isostatic changes. The trend established at the Wilmington gauge shows sea level change on average is 0.00699 feet/year. Projecting the observed sea level rise rate over the next 20, 50, and 100 years of the project life shows an increase of 0.14, 0.35, and 0.70 feet, respectively, when looking at the historic curve extrapolation. The corresponding time period increases found using the NRC Curve III projection are 0.66, 2.20, and 6.26.

In examining the applications and potential risks of sea level rise as it applies to the dike improvements, the modifications proposed in this project are found to have limited exposure to the effects of sea level rise and no associated risks. The project consists of increasing dike elevation in two foot increments to a maximum elevation of 50 feet by year 2032. The areas of the project exposed to the effects of sea level rise are limited to increased water levels outside of the diked disposal area along the toe berm of the dike.

An increase in sea level would have limited negative impact over the life of the project. The purpose of the dike raise is to increase upland disposal area for the dredging of the upper Wilmington Harbor navigation channel. Increased sea level rise will not impact the available disposal volume within the diked area. Water level increases would not impact dredging quantities placed within the upland disposal area due to the fact that the same depths as related to mean low water would be maintained. Even though water level heights would increase over the life of the project, dredging depths would remain constant below the new mean low water surface elevations. Sea level rise could potentially impact the toe berm construction of the dike, which is used to stabilize the interior dike elevation increases. In the event of extreme water level increases, the toe berm could be relatively easily modified by adding additional material on the top portion of the proposed toe berm without any additional environmental clearances.

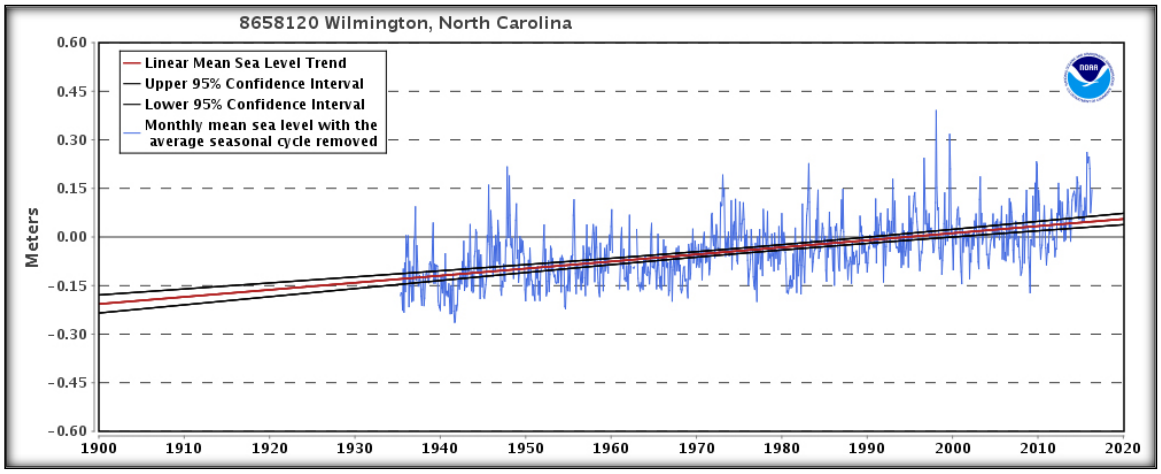

Figure 9. Wilmington Tidal Gauge Historic Sea Level Trend

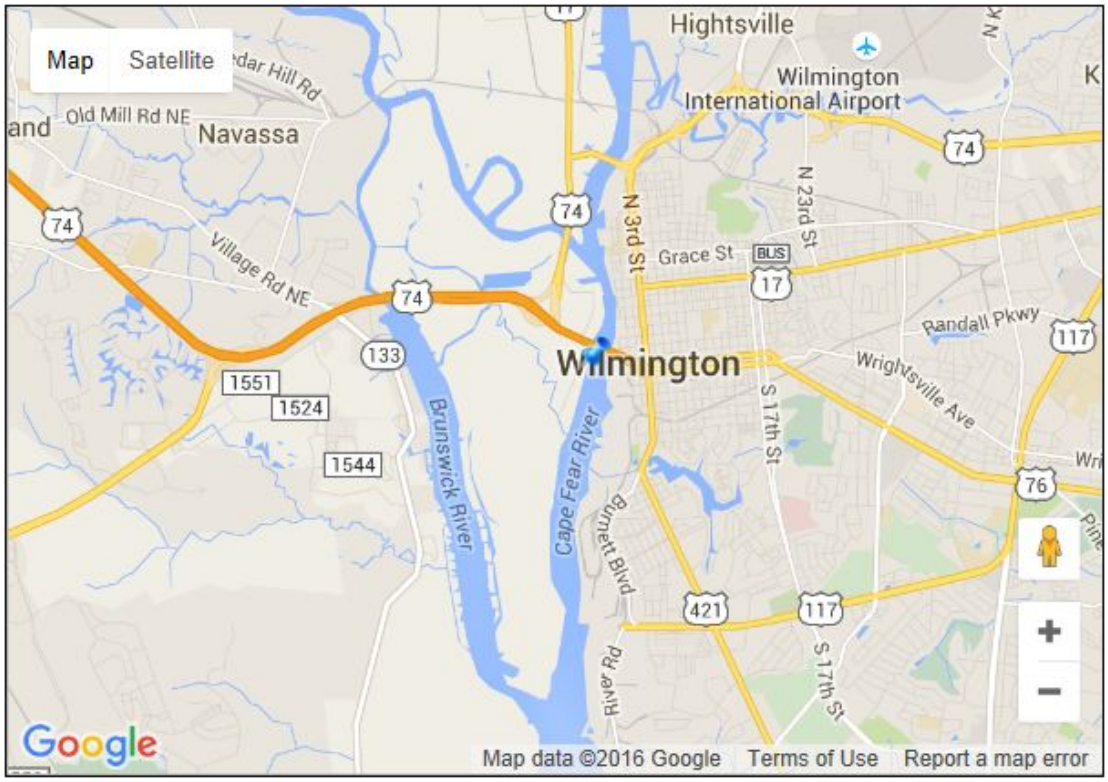

Figure 10. Wilmington Tidal Gauge Location (Blue Pin)

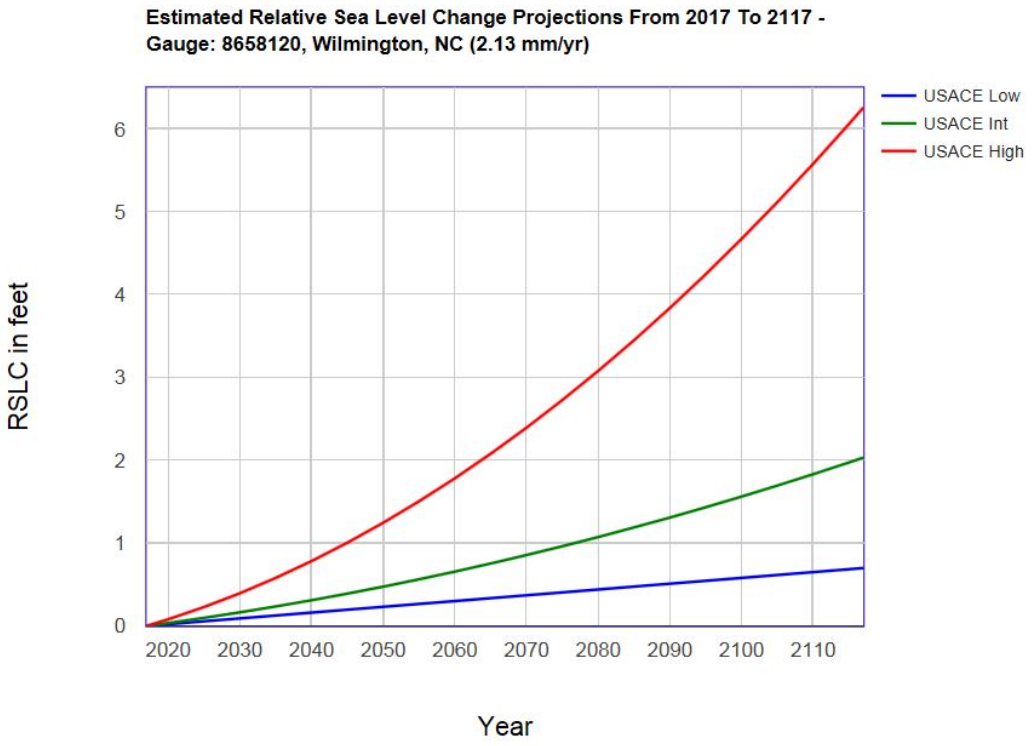

Figure 11. Relative Sea Level Rise Curves

7.4 Coordination of this Document

The Final EA and signed FONSI will be distributed to resource agencies and the public and will be placed on the Wilmington District Website at: http://www.saw.usace.army.mil/Missions/Navigation/Dredging/Wilmington-Harbor/Eagle-Island/.

8.0 POINT OF CONTACT

Ms. Emily Hughes, CESAW-ECP-PE, U.S. Army Engineer District, Wilmington, 69 Darlington Avenue, Wilmington, North Carolina 28403-1343. Telephone (910) 251-4635, email Emily.b.hughes@usace.army.mil

9.0 REFERENCES

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APPENDIX A

EVALUATION OF SECTION 404(b)(1)
(PUBLIC LAW 95-217) GUIDELINES 40 CFR 230

An evaluation of the placement of dredge and/or fill material into waters of the United States includes the standard form.

EAGLE ISLAND DIKE RAISE TO 50FT
BRUNSWICK AND NEW HANOVER COUNTIES, NORTH CAROLINA

Preliminary Evaluation of Section 404 (b) (1) Guidelines 40 CFR 230

This evaluation covers the placement of all fill material into waters and wetlands of the United States required for the improvements to Cells 1, 2, and 3 at Eagle Island Confined Disposal Facility (CDF), Brunswick and New Hanover Counties, North Carolina. The proposed project includes incremental dike raises to elevation 50 feet NAVD88 and requires the construction of a supportive toe berm. The toe berm will require placement of material into approximately 35.5 acres of intertidal marsh. Please note, prior to any construction, the required Section 401 Water Quality Certificates from the NC Division of Water Resources will be obtained for the project and all 401 conditions/restrictions will be met.

		Preliminary 1/	**Final 2/**
1.	Review of Compliance (230.10(a)-(d)) A review of the NEPA Document indicates that:		
a.	The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and NEPA document);	YES ☒ NO☐	YES ☐ NO☐
b.	The activity does not: 1) violate applicable State water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of federally listed endangered or threatened species or their habitat; and 3) violate requirements of any federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies);	YES☒ NO☐*	YES☐ NO☐
c.	The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values (if no, see section 2);	YES☒ NO☐	YES☐ NO☐
d	Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see section 5).	YES☒ NO☐*	YES☐ NO☐

Proceed to Section 2

*, 1, 2

2. Technical Evaluation Factors (Subparts C-F)	**N/A**	**Not Significant**	**Significant**
a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)			

(1) Substrate impacts.		X	
(2) Suspended particulates/turbidity impacts		X	
(3) Water column impacts.		X	
(4) Alteration of current patterns and water circulation.			
		X	
(5) Alteration of normal water fluctuations/hydroperiod.			
		X	
(6) Alteration of salinity gradients.	NA	X	

b. Biological Characteristics of the Aquatic Ecosystem (Subpart D)

(1) Effect on threatened/endangered species and their habitat.			
		X	
(2) Effect on the aquatic food web.		X	
(3) Effect on other wildlife (mammals birds, reptiles, and amphibians).			
		X	

c Special Aquatic Sites (Subpart E)

(1) Sanctuaries and refuges.	NA		
(2) Wetlands.		X	
(3) Mud flats.	NA		
(4) Vegetated shallows.	NA		
(5) Coral reefs.	NA		
(6) Riffle and pool complexes.	NA		

d. Human Use Characteristics (Subpart F)

(1) Effects on municipal and private water supplies.	NA		
(2) Recreational and commercial fisheries impacts		X	
(3) Effects on water-related recreation.		X	
(4) Aesthetic impacts.		X	
(5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves.	NA		

Remarks: Where a check is placed under the Significant category, preparer add explanation below.

Proceed to Section 3

3. Evaluation of Dredged or Fill Material (Subpart G) 3/

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate.)

(1) Physical characteristics ☒

(2) Hydrography in relation to known or anticipated sources of contaminants ☒

(3) Results from previous testing of the material or similar material in the vicinity of the project ☒

(4) Known, significant sources of persistent pesticides from land runoff or percolation ☒

(5) Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances ☒

(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources ☒

(7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities ☒

(8) Other sources (specify). ☐

List appropriate references.

Reference: See Eagle Island Dike Raise to 50ft Final EA

b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to result in degradation of the disposal site. YES ☒ NO☐*

Proceed to Section 4

*, 3

4. Disposal Site Determinations (230.11(f)).

a. The following factors as appropriate, have been considered in evaluating the disposal site.

(1) Depth of water at disposal site. ☒

(2) Current velocity, direction, and variability at disposal site ☒

(3) Degree of turbulence. ☒

(4) Water column stratification ☒

(5) Discharge vessel speed and direction ☒

(6) Rate of discharge ☒

(7) Dredged material characteristics (constituents, amount and type of material, settling velocities). ☒

(8) Number of discharges per unit of time. ☒

(9) Other factors affecting rates and patterns of mixing (specify)

List appropriate references.

Reference: See Eagle Island Dike Raise to 50ft Final EA

b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable. YES ☒ NO ☐*

5. Actions to Minimize Adverse Effects (Subpart H).

All appropriate and practicable steps have been taken, through application of recommendations of 230.70-230.77, to ensure minimal adverse effects of the proposed discharge. YES ☒ NO ☐*

Reference: See Eagle Island Dike Raise to 50ft Final EA

Return to section 1 for final stage of compliance review.
See also note 3/, page 3.

Proceed to Section 6

6. Factual Determinations (230.11).

A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short- or long-term environmental effects of the proposed discharge as related to:

a. Physical substrate at the disposal site (review sections 2a, 3, 4, and 5). YES ☒ NO ☐*

b. Water circulation, fluctuation, and salinity (review sections 2a, 3, 4, and 5). YES ☒ NO ☐*

c. Suspended particulates/turbidity (review sections 2a, 3, 4, and 5). YES ☒ NO ☐*

d Contaminant availability (review sections 2a, 3, and 4). YES ☒ NO ☐*

e. Aquatic ecosystem structure and function (review sections 2b and c, 3, and 5). YES ☒ NO ☐*

f. Disposal site (review sections 2, 4, and 5). YES ☒ NO ☐*

g. Cumulative impact on the aquatic ecosystem. YES ☒ NO ☐*

h. Secondary impacts on the aquatic ecosystem. YES ☒ NO ☐*

7. Findings.

a.The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines. . . . . .☒

b.The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines with the inclusion of the following conditions:. . . . . .☐

c.The proposed disposal site for discharge of dredged or fill material does not comply with the Section 404(b)(1) guidelines for the following reasons(s):

(1)There is a less damaging practicable alternative . . . . . ☐

(2)The proposed discharge will result in significant degradation of the aquatic ecosystem . . . . . ☐

(3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem. . . . . ☐

8.

Kevin P. Landers Sr.
Colonel, U.S. Army
District Engineer

Date: 2 Apr 2017

*A negative, significant, or unknown response indicates that the permit application may not be in compliance with the Section 404(b)(1) Guidelines.

1/ Negative responses to three or more of the compliance criteria at this stage indicate that the proposed projects may not be evaluated using this "short form procedure." Care should be used in assessing pertinent portions of the technical information of items 2 a-d, before completing the final review of compliance.

2/ Negative response to one of the compliance criteria at this stage indicates that the proposed project does not comply with the guidelines. If the economics of navigation and anchorage of Section 404(b)(2) are to be evaluated in the decision-making process, the "short form evaluation process is inappropriate."

3/ If the dredged or fill material cannot be excluded from individual testing, the "short-form" evaluation process is inappropriate.

APPENDIX B

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Joyce Stanley
U.S. Department of Interior
Env. Policy and Compliance
75 Spring St. SW, Ste 1144
Atlanta, GA 30303

Todd Miller
NC Coastal Federation
3609 NC 24.
Newport, NC 28570

APPENDIX C

DRAFT EA COMMENTS

AND AGENCY CORRESPONDENCE

From: Holliman, Daniel
To: Hughes, Emily B SAW
Cc: Militscher, Chris; Bowers, Todd
Subject: [EXTERNAL] EPA Comments on Eagle Island Improvements EA
Date: Tuesday, August 30, 2016 10:37:01 AM

Ms. Hughes,

Consistent with Section 102(2)(c) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency (EPA) appreciates the opportunity to provide comments on the referenced project. It is our understanding that the above referenced draft Environmental Assessment (EA) was submitted for a proposed project in North Carolina for raising a dike at the Eagle Island Confined Disposal Facility (CDF). EPA understands that the CDF is being used for disposal of dredge material from Wilmington Harbor dredging activities.

We also understand that the Eagle Island CDF is located on a 1,473-acre tract owned by the Department of the Army. The original property boundary for the site was defined by a series of rivers and creeks, some of which still exist and serve as property boundaries for the site. Eagle Island dikes were initially constructed in the late 1970's and now encompass approximately 755 acres of diked uplands, which was originally composed of uplands and tidal marsh as well as several tidal creeks. Over successive years of dredged material disposal, the marsh and creeks were filled and the CDF was created. Outside of the existing CDF dikes, the majority of acreage within the 1,473-acre tract is considered jurisdictional wetlands. Historically, the site was divided into two cells, a north and a south cell. However, as part of the 2000 improvement to the CDF, the north cell was subdivided into two cells of approximately equal size. As a result, material dredged from the Upper Harbor reaches is disposed of, on a rotating basis, in Eagle Island Cells 1, 2, and 3. The most feasible alternative (identified by the Corps) for providing future disposal capacity is to increase the capacity of Cells 1-3 at Eagle Island by raising the dikes to elevation 50 feet NAVD 88. This is the proposed action identified in the EA.

EPA Comments on proposed project:

WQS – All project activities proposed under the EA should not cause or contribute to violations of State Water Quality Standards (WQS). EPA recommends coordination with the State of NC to ensure compliance with WQS during construction activities.

Construction BMPs – EPA recommends that the project engineer design and implement Best Management Practices (BMPs) which will minimize stormwater impacts associated with this project. The

construction best management practices plan should include implementable measures to prevent erosion and sediment runoff from the project.

NPDES Stormwater Permit Coverage - All development projects in North Carolina that disturb an acre or more of land require permit coverage and an erosion and sedimentation control plan that has been approved by either the state or a local government with delegated authority. The State of NC has a construction stormwater general permit

- NCG01. See the following website for additional information: Blockedhttp://deq.nc.gov/about/divisions/energy-mineral-land-resources/energy-mineral-land-permits/stormwater-permits/construction-sw

Wetlands Mitigation – EPA notes that 39 acres of impacts to Phragmites-dominated coastal marsh will be mitigated with the purchase of 3.04 acres of coastal marsh "credits" for the NC Division of Mitigation Services (DMS) In-Lieu-Fee Program. These credits are associated with a coastal marsh restoration site in Jacksonville, Onslow County known as Wilson Bay (Sturgeon City), which is in a different HUC than the proposed project. EPA is concerned that the proposed mitigation for impacts to wetlands is not adequate. Since the proposed mitigation is not functionally equivalent and out of watershed, it is unclear to EPA how proposed mitigation presented in the EA is consistent with the 2008 Mitigation Rule. EPA request the Corps provide copies of the NC Wetland Assessment method forms or equivalent for both the impact site (Eagle Island phragmites dominated marsh) and the mitigation site.

Alternatives – When discussing Alternatives Considered But Eliminated, the language regarding cost of the alternatives is very vague and non-informative. In most cases, cost is the reason for eliminating the alternative. If this is the case, then cost should be more clearly described in this section of the EA.

EPA appreciates the opportunity to review the Eagle Island Improvements EA. If the you have any questions related to our comments please give me a call.

Thanks,
Dan

Dan Holliman

USEPA Region 4 | NEPA Program Office

61 Forsyth Street SW | Atlanta, GA 30303

tel 404.562.9531 | holliman.daniel@epa.gov

Region 4 NEPA: Blockedhttp://www.epa.gov/region4/opm/nepa/index.html
<Blockedhttp://www.epa.gov/region4/opm/nepa/index.html>

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

(Sent via Electronic Mail) September 6, 2016 F/SER47:KR/pw

Colonel Kevin P. Landers Sr., Commander
U.S. Army Corps of Engineers Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403-1398

Attention: Emily Hughes

Dear Colonel Landers:

NOAA's National Marine Fisheries Service (NMFS) reviewed the *Draft Environmental Assessment Eagle Island Improvements Dike Raise to Elevation 50 Feet* (EA), dated July 2016, and the corresponding letter dated July 29, 2016. The Wilmington District proposes to raise the dikes at the Eagle Island Confined Disposal Facility (CDF) to provide sufficient dredged material disposal capacity for the Wilmington Harbor Federal Navigation Project until 2032. The new toe berm would vary in width from 50 to 120 feet and permanently impact approximately 39 to 42 acres of emergent coastal wetland consisting primarily of the common reed *Phragmites australis*. As compensatory mitigation, the Wilmington District proposes to purchase 3.04 acres of coastal marsh "credits" from a coastal restoration site known as Wilson Bay Phase I in Jacksonville, Onslow County. The District would purchase the credits through the "In-Lieu-Fee Program" administered by the North Carolina Division of Mitigation Services. The Wilmington District's initial determination is the environmental effects associated with raising the dikes would not have a substantial adverse impact on essential fish habitat (EFH) or federally managed species within the Cape Fear River. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the NMFS provides the following comments pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Description of the Eagle Island CDF
The Eagle Island CDF, located across the Cape Fear River from downtown Wilmington, is the largest upland disposal site for Wilmington Harbor. The Eagle Island CDF has five cells, of which three cells are in active use. The Wilmington District proposes to raise the dikes to elevation 50 feet for the active cells (Cells 1, 2, and 3). Measured from the top of dike inward, Cell 1 is approximately 230 acres, Cell 2 is approximately 260 acres, and Cell 3 is approximately 265 acres. Each cell contains a spillway allowing effluent discharges into either the Brunswick River or the Cape Fear River. For each dredging event, typically only one cell is used. This allows for an offset revolving schedule of dewatering, ditching, drying, maintenance, and dike-raising among the active cells. Raising the dike elevations to 50 feet would increase the disposal capacity for approximately 16 years.

Consultation History
The Wilmington District initiated EFH consultation through a request for a scoping meeting and site visit to Eagle Island on March 4, 2015. At the meeting, the Wilmington District proposed raising the elevation of the dikes to 50 feet and to build a toe berm along the outer edge of the finished dikes. Upon inspection of the site, it was determined the toe berm would vary in width from 50 to 120 feet and would impact approximately 39 to 42 acres of emergent coastal wetlands, which primarily consist of the common reed *Phragmites australis*. The NMFS also participated in a meeting with the Wilmington District on June 14, 2016, to review construction plans and mitigation options for the Eagle Island CDF improvements. The NMFS recommended the Wilmington District provide compensatory mitigation to offset unavoidable impacts to wetlands and EFH and for the mitigation to include projects identified for Eagle Island (*e.g.*, *Eagle Island Conservation Management Plan 2015-2025*) or purchase of mitigation bank credits within the Cape Fear watershed.

Impacts to Diadromous Fish Habitat and Essential Fish Habitat
The NMFS believes the proposed project would eliminate some nursery habitats used by diadromous fishes. This portion of the Cape Fear River and its tributaries have nursery areas used by diadromous fishes including American eel, American shad, Atlantic sturgeon, blueback herring, shortnose sturgeon, and striped bass. Sediment and toxicant input into the river is a major threat to diadromous fish and their habitats. This input can directly impact individuals migrating to spawning grounds and permanently eliminate nursery habitat.

The new toe berm would vary in width from 50 to 120 feet and permanently impact approximately 39 to 42 acres of emergent coastal wetland the South Atlantic Fisheries Management Council (SAFMC) designates as EFH pursuant to the Magnuson-Stevens Act. Further the project occurs within a state-designated Primary Nursery Area, which the SAFMC designates a Habitat Area of Particular Concern (HAPC) under the fishery management plans for shrimp and the snapper/grouper complex. HAPCs are a subset of EFH that are rare, particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally stressed area. The SAFMC identifies these areas as EFH and HAPCs because fish and shrimp concentrate in these habitats for feeding and refuge and experience high growth and survival rates when located in these habitats. The SAFMC provides detailed information on the EFH requirements of federally managed species in amendments to the fishery management plans and in *Fishery Ecosystem Plan of the South Atlantic Region*, which is available at *www.safmc.net*.

The NMFS believes the draft EA minimally addresses EFH and HAPCs and the topic receives no focused discussion. Substantial review of these considerations should be included in the final EA. The EFH and HAPC characterizations should include a summary of designations for each federally managed species in the project area, including habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages) and time of year of occurrence.

Many of the adverse environmental impacts associated with this project are related to construction of toe berms burying approximately 39 to 42 acres of *Phragmites*-dominated intertidal marsh. The draft EA diminishes the value of *Phragmites* for fisheries habitat; however, a *Phragmites*-dominated marsh provides many ecological services and functions as a nursery

area for larval and juvenile finfish, crustaceans, and molluscs, and as a habitat for adult fishes. As demonstrated in this draft EA, some coastal managers believe the shift from *Spartina*-dominated to *Phragmites*-dominated marshes consistently results in a change from a biodiverse, fisheries productive habitat to a less biodiverse, unproductive habitat. Contrary to this opinion, *Phragmites*-dominated marshes can provide many of the same ecological functions as salt marshes, including flood protection, erosion control, water quality, and detrital exchange, and have similar levels of nekton abundance, biomass, and diversity[1]. More recent studies further demonstrate the equivalency of these habitats to juvenile blue crabs[2]. Case-by-case evaluations are needed to assess the ecological services provided by a particular *Phragmites*-dominated marsh.

The Wilmington District proposes to provide compensatory mitigation for the impacts to EFH through the "In-Lieu-Fee Program" administered by the North Carolina Division of Mitigation Services by purchasing 3.04 acres of coastal marsh "credits" from a coastal restoration site known as Wilson Bay Phase I in Jacksonville, Onslow County. The NMFS recommends the District revise the mitigation plan to focus on restoration projects underway on Eagle Island, development of new restoration projects along the Cape Fear River, or purchase of mitigation bank credits within the Cape Fear watershed (HUC 03030005). The amount of mitigation should yield no net loss of coastal wetland function, as demonstrated by Habitat Equivalency Analysis or a similar evaluation.

Recommended Revisions for the Final EA

- Section 1.1 should include reference to the *Draft Integrated Feasibility Report and Environmental Assessment, Wilmington Harbor Navigation Improvements*, dated June 2014.
- Section 5.5, Table 2 incorrectly states that no HAPCs are located in the vicinity of Wilmington Harbor. As noted above the project within a designated Primary Nursery Area.
- Section 5.7 and Section 5.18.4 should demonstrate quantitatively that the 39 to 42 acres of *Phragmites*-dominated coastal marsh is low quality. Section 5.16 should substantiate that *Phragmites*-dominated coastal marsh provides little habitat and food source for native species.

EFH Conservation Recommendations

Section 305(b)(4)(A) of the Magnuson-Stevens Act requires NMFS to provide EFH Conservation Recommendations for any federal action or permit which may result in adverse impacts to EFH. Therefore, NMFS recommends the following to ensure the conservation of EFH and associated fishery resources:

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[1] Meyer, D. L., Johnson, J. M., & Gill, J. W. (2001) Comparison of nekton use of *Phragmites australis* and *Spartina alterniflora* marshes in the Chesapeake Bay, USA. *Marine Ecology Progress Series*, *209*, 71-83.

[2] Long, W. C., Grow, J. N., Majoris, J. E., & Hines, A. H. (2011) Effects of anthropogenic shoreline hardening and invasion by *Phragmites australis* on habitat quality for juvenile blue crabs (*Callinectes sapidus*). *Journal of Experimental Marine Biology and Ecology*, *409*, 215-222.

- The Wilmington District should employ Best Management Practices to prevent discharge of pollutants and to control turbidity throughout construction.
- The Wilmington District should use vegetation to stabilize the toe berm and prevent its erosion.
- The Wilmington District should provide compensatory mitigation that offsets fully the impacts to EFH as demonstrated by a functional assessment. Further, the mitigation should focus on projects along Eagle Island and the Cape Fear watershed. The mitigation plan should identify the specific wetland functions and values the compensatory mitigation is intended to restore or replace. Compensation for interim losses of ecological functions and values should be included if the compensatory mitigation project requires several years to complete.

Section 305(b)(4)(B) of the Magnuson-Stevens Act and implementing regulation at 50 CFR Section 600.920(k) require the Wilmington District to provide a written response to this letter within 30 days of its receipt. If it is not possible to provide a substantive response within 30 days, in accordance with the "findings" with the Wilmington District, an interim response should be provided to the NMFS. A detailed response then must be provided prior to final approval of the action. The detailed response must include a description of measures proposed by the Wilmington District to avoid, mitigate, or offset the adverse impacts of the activity. If the response is inconsistent with the EFH conservation recommendations, the Wilmington District must provide a substantive discussion justifying the reasons for not following the recommendations.

Thank you for the opportunity to provide these comments. Please direct related questions or comments to the attention of Dr. Ken Riley at our Beaufort Field Office, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722, or at (252) 728-8750.

Sincerely,

/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: COE, Emily.B.Hughes@usace.army.mil
USFWS, Pete_Benjamin@usfws.gov
NCDCM, Doug.Huggett@ncmail.net
NCDCM, Gregg.Bodnar@ncdenr.gov
ASMFC, lhavel@asmfc.org
EPA, Bowers.Todd@epa.gov
SAFMC, Roger.Pugliese@safmc.net
F/SER4, David.Dale@noaa.gov
F/SER47, Ken.Riley@noaa.gov

Cape Fear River Watch

617 Surry Street • Wilmington, NC • 28401 • 910.762.5606 • www.CapeFearRiverWatch.org

U.S. Army Corps of Engineers, Wilmington District
ATTN: Ms. Emily Hughes (CESAW-ECP-PE)
69 Darlington Ave.
Wilmington, NC 28403

RE: Comments on: *Draft Environmental Assessment – Eagle Island Improvements Dike Raise to Elevation 50 Feet Brunswick and New Hanover Counties, NC*

Dear Ms. Hughes:

On behalf of the Cape Fear River Watch (CFRW), we are submitting the following comments pursuant to the notice issued by your office July 29, 2016 regarding the subject Draft EA. I just discovered that the subject draft EA was available for comments late last week, so our comments will be brief. Appendix B indicates that I was on the distribution list for the EA, but I did not receive it.

From the information provided in the EA, it appears that raising the Eagle Island dikes to 50 feet in elevation is probably the best alternative, but I have several concerns with the draft EA. My concerns are listed in bullet format below:

- There is no geotechnical appendix providing details for the proposed dike raise.
- Section 4.1 Alternatives: The section lacks detail. For example, the EA indicates that disposal of dredged material in the ODMDS is more expensive than the dike raise. The cost analysis for this conclusion should be included in the EA.
- Figures 5&6 should have a legend indicating what the various symbols and line colors designate.
- Sections 5.7 Wetlands: The EA states *Phragmites* is of lower quality and has less habitat for native species; however, no reference is provided for that conclusion. Yet that conclusion appears to be the key factor for suggesting minimal mitigation requirements.
- Section 5.16 Mitigation: See the comment above for Section 5.7. In previous Corps EAs on other projects, detailed analyses were provided determining the amount of mitigation acreage required for wetland impacts. The same needs to be provided for this project. In other words, how was 3.04 acres of mitigation needs determined?
- Where is the documentation that the 3.04 acres of wetlands at Wilson Bay is a high quality restoration area?
- Mitigation should be performed or credits received in the Cape Fear River Watershed (HU Code 0303005) not another watershed over 50 air miles away.

- According to the EA, the proposed project is much cheaper than other alternatives. Therefore, if additional mitigation (beyond 3.04 acres in another watershed) and associated funding is needed, the proposed project would not be replaced by another cheaper alternative. Potential new mitigation options could include:
    - Setting aside disposal cells 4 and 5 for conservation. The EA indicates that construction of cells 4 and 5 was eliminated from further consideration.
    - Improve striped bass passage at Lock and Dam #1.
    - Restore Alligator Creek on Eagle Island.

Thank you for your consideration and let me know if you have any questions.

Sincerely,

Kemp Burdette

Kemp Burdette
CAPE FEAR RIVERKEEPER®
Cape Fear River Watch

Coastal Management
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

BRAXTON DAVIS
Director

August 31, 2016

Emily Hughes
Department of the Army,
Wilmington District, Corps of Engineers
69 Darlington Ave.
Wilmington, NC 28403

SUBJECT: Comments Concerning the Draft Environmental Assessment, Eagle Island Improvements, Brunswick County, North Carolina

Dear Mrs. Hughes:

The Division of Coastal Management has completed our review of the Environmental Assessment (EA) for the proposed the Eagle Island Improvements, in Brunswick County, North Carolina. Staff have reviewed the EA and ask that it clarify whether the project would result in any Coastal Wetland impacts, and if it would, that it quantify the area of Coastal Wetlands to be impacted by the project. Additionally, the location of the mean (or normal) high water line should also be identified, and any proposed impacts to Public Trust Areas or Estuarine Waters also quantified.

The Division of Coastal Management also recommends the submittal of a federal consistency determination. If you have any questions, please contact Daniel Govoni at 252-808-2808 x233. Thank you for your consideration of the North Carolina Coastal Management Program.

Sincerely,

Daniel Govoni
Policy Analyst

State of North Carolina | Environmental Quality | Coastal Management
127 Cardinal Drive Ext., Wilmington, NC 28405
910-796-7215

North Carolina Department of Natural and Cultural Resources
State Historic Preservation Office
Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

August 29, 2016

Emily Hughes
Wilmington Regulatory Field Office
69 Darlington Avenue
Wilmington, NC 28403

Re: Draft Environmental Assessment, Eagle Island Improvements, Brunswick and New Hanover Counties, ER 11-1391

Dear Ms. Hughes:

We have received a public notice concerning the above project.

We believe the Draft Environmental Assessment adequately addresses our concerns for historic resources.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

Location: 109 East Jones Street, Raleigh NC 27601 **Mailing Address**: 4617 Mail Service Center, Raleigh NC 27699-4617 **Telephone/Fax**: (919) 807-6570/807-6599

State Environmental
Review Clearinghouse
ADMINISTRATION

Kathryn Johnston
Secretary

J. Brian Ratledge
General Counsel

September 8, 2016

Ms. Emily Hughes
Department of the Army
U.S. Army Corps of Engineers
Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403

Re: SCH File # 17-E-0000-0056; EA; Proposed project is for the Eagle Island Improvements, Dike raise to Elevation 50 feet.

Dear Ms. Hughes:

The above referenced environmental impact information has been submitted to the State Clearinghouse under the provisions of the National Environmental Policy Act. According to G.S. 113A-10, when a state agency is required to prepare an environmental document under the provisions of federal law, the environmental document meets the provisions of the State Environmental Policy Act. Attached to this letter for your consideration are comments made by the agencies in the course of this review.

If any further environmental review documents are prepared for this project, they should be forwarded to this office for intergovernmental review.

Should you have any questions, please do not hesitate to call.

Sincerely,

Crystal Best

Crystal Best
State Environmental Review Clearinghouse

Attachments
cc: Region O

Nothing Compares℠
State of North Carolina | Administration
116 West Jones St. | 1301 Mail Service Center | Raleigh, NC 27699-1301
state.clearinghouse@doa.nc.gov | 919 807 2419 T

Environmental Quality

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

MEMORANDUM

To: Crystal Best
State Clearinghouse Coordinator
Department of Administration

FROM: Lyn Hardison LBH
Division of Environmental Assistance and Customer Service
Permit Assistance & Project Review Coordinator

RE: 17-0056
Environmental Assessment
Proposed project is for the Eagle Island Improvements, Dike raise to the elevation of 50 feet
Brunswick and New Hanover Counties

Date: August 29, 2016

The Department of Environmental Quality has reviewed the proposal for the referenced project. Based on the information provided, several of our agencies have identified permits that may be required and offered some guidance. The comments are attached for the applicant's review.

The Department's agencies will continue to be available to assist the applicant through the environmental review processes.

Thank you for the opportunity to respond.

Attachment

Nothing Compares℠

State of North Carolina | Environmental Quality
1601 Mail Service Center | Raleigh, North Carolina 27699-1601
919 - 707 - 8600

From: Coats, Heather
Sent: Wednesday, August 24, 2016 8:53 AM
To: SVC_DENR.SEPA@ncdenr.gov; 'Hughes, Emily B SAW' (Emily.B.Hughes@usace.army.mil)
Cc: Govoni, Daniel
Subject: Draft EA review of Eagle Island Improvements, Brunswick Co

Hello Lyn and Emily,

The Division of Coastal Management has completed our review of the Environmental Assessment (EA) for the proposed the Eagle Island Improvements, in Brunswick County, North Carolina. Staff have reviewed the EA and ask that it clarify whether the project would result in any Coastal Wetland impacts, and if it would, that it quantify the area of Coastal Wetlands to be impacted by the project. Additionally, we ask that the location of the mean (or normal) high water line be identified, in order to quantify any proposed impacts to Public Trust Areas or Estuarine Waters.

The Division of Coastal Management also recommends the submittal of a federal consistency determination. If you have any questions, please contact me or Daniel Govoni at 252 808 2808 x233. Thank you for your consideration of the North Carolina Coastal Management Program.

Best regards,

Heather Coats
Assistant Major Permits Coordinator
Division of Coastal Management
North Carolina Department of Environmental Quality

910 796 7302 *office*
heather.coats@ncdenr.gov

127 Cardinal Drive Extension
Wilmington, NC 28405

From: Bodnar, Gregg
Sent: Tuesday, August 23, 2016 1:56 PM
To: SVC_DENR.SEPA@ncdenr.gov <SEPA@ncdenr.gov>
Subject: #17-0056 Eagle Island Improvements (Dike raise to 50 feet)

I would recommend USACE investigate the potential for coastal wetland planting along the toe of slope and other areas where practical. Wetlands can enhance foraging functions of adjacent habitats, which is why primary (PNA) and secondary (SNA) nursery habitats are closely linked with coastal wetlands. In addition, these wetlands are important to waterfowl feeding and nesting activities. Plantings could be supplemental on-site mitigation and may aid in the displacement of Phragmites. Potential partnerships could be developed to offset investments.

The draft EA identifies an in water work environmental window (1 Oct-31 Jan) and is sufficient and recommended.

Regards,

Gregg Bodnar
Fisheries Resource Specialist
Division of Coastal Management
Department of Environmental Quality

252 808 2808 ext 213 office
Gregg.Bodnar@ncdenr.gov

400 Commerce Ave
Morehead City, NC 28557

Waste Management
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

MICHAEL SCOTT
Director

August 22, 2016

To: Michael Scott, Director
Division of Waste Management

From: Bill Hunneke, Eastern Region Compliance Supervisor,
Compliance Branch, Hazardous Waste Section

Subject: Hazardous Waste Section Comments on Eagle Island Improvements, Dike Raise (Brunswick County)
Project Number: 17-0056

The Hazardous Waste Section (HWS) has reviewed the environmental assessment report for the Eagle Island Improvements, Dike Raise to Elevation 50 feet project. (Brunswick County).

Any hazardous waste generated from the demolition, construction, operation, maintenance, and/or remediation (e.g. excavated soil) from the proposed project must be managed in accordance with the North Carolina Hazardous Waste Rules. The demolition, construction, operation, maintenance, and remediation activities conducted will most likely generate a solid waste, and a determination must be made whether it is a hazardous waste. If a project site generates more than 220 pounds of hazardous waste in a calendar month, the HWS must be notified, and the site must comply with the small quantity generator requirements. If a project site generates more than 2200 pounds of hazardous waste in a calendar month, the HWS must be notified, and the facility must comply with the large quantity generator requirements.

The proposed project site does not currently have an existing EPA Identification numbers for the generation of hazardous waste.

Should any questions arise, please contact me at 252-364-8977.

Kind regards,

William F. Hunneke

William Hunneke
Eastern Region Compliance Supervisor

State of North Carolina | Environmental Quality | Waste Management
1646 Mail Service Center | 217 West Jones Street | Raleigh, NC 27699-1646
919 707 8200 T

Date: August 22, 2016

To: Michael Scott, Director
Division of Waste Management

Through: Dave Lown, Head
Federal Remediation Branch

From: Doug Rumford, Federal Remediation Branch

Subject: NEPA Project #17-0056, Eagle Island Improvements, Wilmington, Brunswick/New Hanover Counties, North Carolina

The Superfund Section has reviewed the proximity of CERCLIS and other sites under their jurisdiction to the improvements of the Eagle Island Confined Disposal Facility (CDF) located between the Cape Fear and Brunswick Rivers, Wilmington, Brunswick/New Hanover Counties. The proposed project will consist of raising the elevation of the dikes surrounding cells 2 and 3 to an elevation of 50 feet NAVD. An area of approximately 525 acres of the 1473-acre Eagle Island CDF will be impacted.

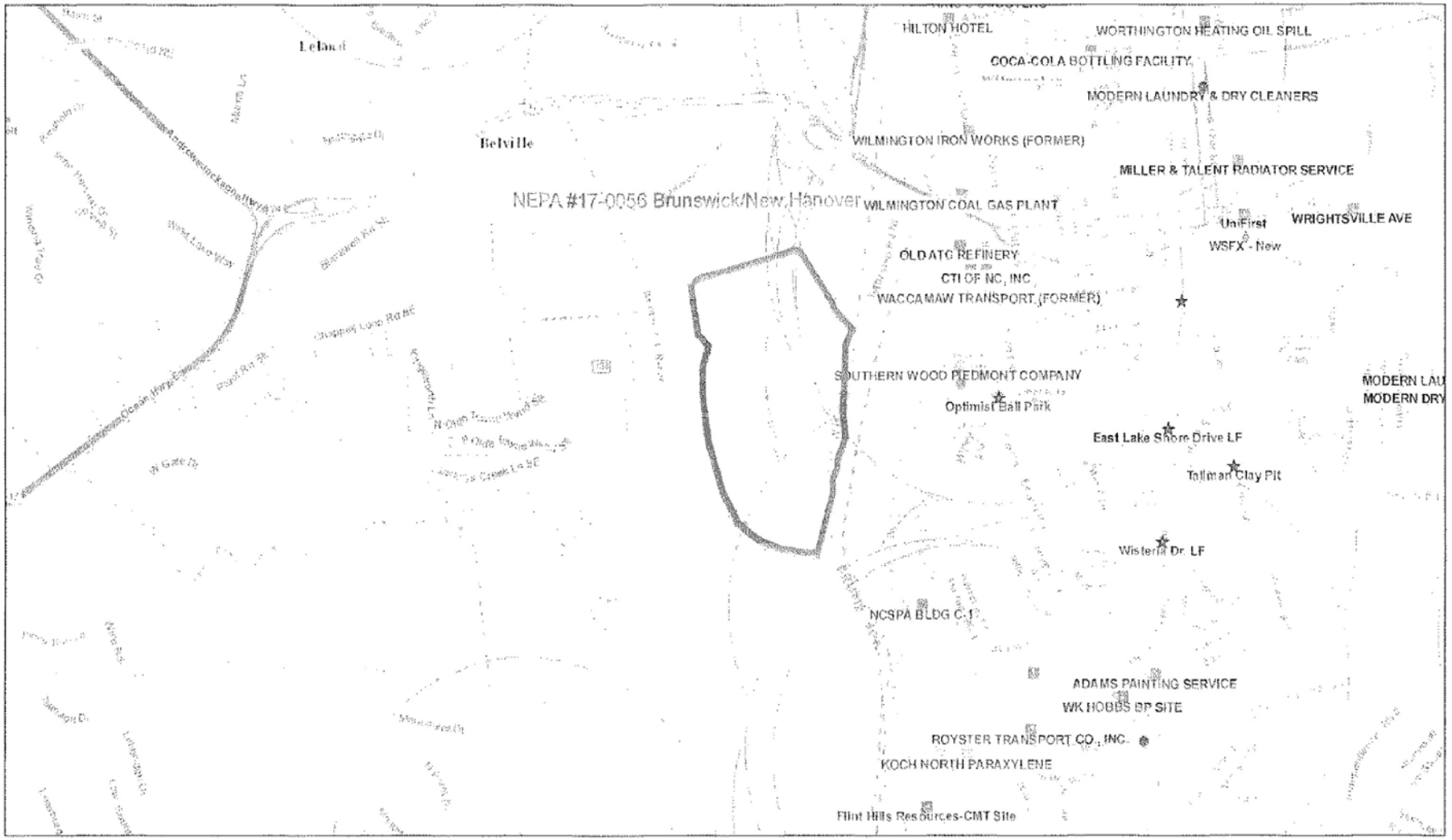
Eight (8) sites were identified within one mile of the project as shown on the attached map and in the table below. The Superfund Section recommends that site files be reviewed to ensure that appropriate precautions are incorporated into any construction activities that encounter potentially contaminated soil or groundwater. Superfund Section files can be viewed at: https://deq.nc.gov/about/divisions/waste-management/waste-management-rules-data/e-documents.

Please contact me at 919.707.8334 if you have any questions.

ID #	Site Name	Status
NCD058517467	SOUTHERN WOOD PIEDMONT CO	Open site on the Inactive Hazardous Sites Inventory
NONCD0002194	NCSPA BLDG C-1	Open site on the Inactive Hazardous Sites Inventory
NCN000407584	SOUTHERN METALS RECYCLING, INC	Open site on the Inactive Hazardous Sites Inventory
NCD986186518	OLD ATC REFINERY	Open site on the Inactive Hazardous Sites Inventory
NONCD0002838	WACCAMAW TRANSPORT (FORMER)	Open site on the Inactive Hazardous Sites Inventory
NONCD0001180	CTI OF NC, INC	Open site on the Inactive Hazardous Sites Inventory
NONCD0000760	Optimist Ball Park	Open site on the Pre-Regulatory Landfill Inventory
NCD986188910	WILMINGTON COAL GAS PLANT	Open site on the Inactive Hazardous Sites Inventory

State of North Carolina | Environmental Quality | Waste Management
1646 Mail Service Center | 217 West Jones Street | Raleigh, NC 27699-1646
919 707 8200 Telephone

Superfund Section SEPA Review



August 18, 2016

1:36,112

- Brownfields Sites
- Federal Remediation Branch Sites
- Pre-Regulatory Landfill Sites
- Dry-Cleaning Solvent Cleanup Act Sites
- Inactive Hazardous Sites
- One Mile Buffer
- All Sites

0 0.45 0.9 1.8 mi

0 0.5 1 2 km

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Web AppBuilder for ArcGIS

State of North Carolina DOT, Esri, HERE, DeLorme, INCREMENT P, Intermap, USGS, METI/NASA, EPA, USDA |

MEMORANDUM

TO: Michael Scott, Division Director through Sharon Brinkley

FROM: Drew Hammonds, Eastern District Supervisor - Solid Waste Section

DATE: August 24, 2016

SUBJECT: Review: Project #17-0056 – Brunswick – New Hanover Counties (Department of the Army: Draft Environmental Assessment – Eagle Island Improvements, Dike Raise to Elevation 50 Feet)

The Division of Waste Management, Solid Waste Section (Section) has reviewed the Department of the Army/US Army Corps of Engineers' Draft Environmental Assessment, for Eagle Island Improvements of dike raise elevation 50 feet, in Brunswick and New Hanover County, North Carolina. Based on the information provided, the Section has seen no adverse impact on the surrounding community and likewise knows of no situations in the community, which would affect this project.

During the construction and maintenance of this project, the US Army Corps of Engineers and/or its contractors should make every feasible effort to minimize the generation of waste, to recycle materials for which viable markets exist, and to use recycled products and materials in the development of this project where suitable. Any waste generated by this project that cannot be beneficially reused or recycled must be disposed of at a solid waste management facility permitted by the Division. The Section strongly recommends that the owner require all contractors to provide proof of proper disposal for all waste generated.

Permitted Facilities are listed on the Division of Waste Management, Solid Waste Section portal site at: https://deq.nc.gov/about/divisions/waste-management/waste-management-rules-data/solid-waste-management-annual-reports/solid-waste-permitted-facility-list

Questions regarding solid waste management for this project should be directed to Mr. Wes Hare, Environmental Senior Specialist, Solid Waste Section, at (910) 796-7405.

cc: Wes Hare, Environmental Senior Specialist
Jessica Montie, Compliance Officer

State of North Carolina | Environmental Quality | Waste Management
225 Green Street | Suite 714 | Fayetteville, NC 28301
910 433 3300

State of North Carolina
Department of Environment and Natural Resources
INTERGOVERNMENTAL REVIEW - PROJECT COMMENTS

Reviewing Office: WIRO

Project Number 17-0056 Due Date: 8/26/2016
County Brunswick

After review of this project it has been determined that the ENR permit(s) and/or approvals indicated may need to be obtained in order for this project to comply with North Carolina Law. Questions regarding these permits should be addressed to the Regional Office indicated on the reverse of the form. All applications, information and guidelines relative to these plans and permits are available from the same Regional Office.

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
☐	Permit to construct & operate wastewater treatment facilities, sewer system extensions & sewer systems not discharging into state surface waters.	Application 90 days before begin construction or award of construction contracts. On-site inspection. Post-application technical conference usual.	30 days (90 days)
☐	NPDES - permit to discharge into surface water and/or permit to operate and construct wastewater facilities discharging into state surface waters.	Application 180 days before begin activity. On-site inspection. Pre-application conference usual. Additionally, obtain permit to construct wastewater treatment facility-granted after NPDES. Reply time, 30 days after receipt of plans or issue of NPDES permit-whichever is later.	90-120 days (N/A)
☐	Water Use Permit	Pre-application technical conference usually necessary	30 days (N/A)
☐	Well Construction Permit	Complete application must be received and permit issued prior to the installation of a well.	7 days (15 days)
☐	Dredge and Fill Permit	Application copy must be served on each adjacent riparian property owner. On-site inspection. Pre-application conference usual. Filling may require Easement to Fill from N.C. Department of Administration and Federal Dredge and Fill Permit.	55 days (90 days)
☐	Permit to construct & operate Air Pollution Abatement facilities and/or Emission Sources as per 15 A NCAC (2Q.0100 thru 2Q.0300)	Application must be submitted and permit received prior to construction and operation of the source. If a permit is required in an area without local zoning, then there are additional requirements and timelines (2Q.0113).	90 days
☐	Permit to construct & operate Transportation Facility as per 15A NCAC (2D.0800, 2Q.0601	Application must be submitted at least 90 days prior to construction or modification of the source.	90 days
☐	Any open burning associated with subject proposal must be in compliance with 15 A NCAC 2D.1900	N/A	60 days (90 days)
☐	Demolition or renovations of structures containing asbestos material must be in compliance with 15 A NCAC 20.1110 (a) (1) which requires notification and removal prior to demolition. Contact Asbestos Control Group 919-707-5950.		
☐	Complex Source Permit required under 15 A NCAC 2D.0800		
☒	The Sedimentation Pollution Control Act of 1973 must be properly addressed for any land disturbing activity. An erosion & sedimentation control plan will be required if one or more acres to be disturbed. Plan filed with proper Regional Office (Land Quality Section) At least 30 days before beginning activity. A fee of **$65** for the first acre or any part of an acre. An express review option is available with additional fees.		20 days (30 days)
☐	Sedimentation and erosion control must be addressed in accordance with NCDOT's approved program. Particular attention should be given to design and installation of appropriate perimeter sediment trapping devices as well as stable stormwater conveyances and outlets.		(30 days)
☐	Mining Permit	On-site inspection usual. Surety bond filed with ENR Bond amount varies with type mine and number of acres of affected land. Any arc mined greater than one acre must be permitted. The appropriate bond must be received before the permit can be issued.	30 days (60 days)
☐	North Carolina Burning permit	On-site inspection by N.C. Division Forest Resources if permit exceeds 4 days	1 day (N/A)
☐	Special Ground Clearance Burning Permit - 22 counties in coastal N.C. with organic soils	On-site inspection by N.C. Division Forest Resources required "if more than five acres of ground clearing activities are involved. Inspections should be requested at least ten days before actual burn is planned."	1 day (N/A)
☐	Oil Refining Facilities	N/A	90-120 days (N/A)
☐	Dam Safety Permit	If permit required, application 60 days before begin construction. Applicant must hire N.C. qualified engineer to: prepare plans, inspect construction. certify construction is according to ENR approved plans. May also require permit under mosquito control program. And a 404 permit from Corps of Engineers. An inspection of site is necessary to verify Hazard Classification. A minimum fee of $200.00 must accompany the application. An additional processing fee based on a percentage or the total project cost will be required upon completion.	30 days (60 days)

February 11, 2015

County Brunswick		Project Number: 17-0056 Due Date: 8/26/2016	Normal Process Time (statutory time limit)
PERMITS		SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	
☐	Permit to drill exploratory oil or gas well	File surety bond of $5,000 with ENR running to State of NC conditional that any well opened by drill operator shall, upon abandonment, be plugged according to ENR rules and regulations.	10 days N/A
☐	Geophysical Exploration Permit	Application filed with ENR at least 10 days prior to issue of permit. Application by letter. No standard application form.	10 days N/A
☐	State Lakes Construction Permit	Application fee based on structure size is charged. Must include descriptions & drawings of structure & proof of ownership of riparian property.	15-20 days N/A
☐	401 Water Quality Certification	N/A	60 days (130 days)
☐	CAMA Permit for MAJOR development	$250.00 fee must accompany application	55 days (150 days)
☐	CAMA Permit for MINOR development	$50.00 fee must accompany application	22 days (25 days)
☐	Several geodetic monuments are located in or near the project area. If any monument needs to be moved or destroyed, please notify: N.C. Geodetic Survey, Box 27687 Raleigh, NC 27611		
☐	Abandonment of any wells, if required must be in accordance with Title 15A. Subchapter 2C.0100.		
☐	Notification of the proper regional office is requested if "orphan" underground storage tanks (USTS) are discovered during any excavation operation.		
☒	Compliance with 15A NCAC 2H 1000 (Coastal Stormwater Rules) is required.		45 days (N/A)
☐	Catawba, Jordan Lake, Randalman, Tar Pamlico or Neuse Riparian Buffer Rules required.		
☐	Plans and specifications for the construction, expansion, or alteration of a public water system must be approved by the Division of Water Resources/Public Water Supply Section prior to the award of a contract or the initiation of construction as per 15A NCAC 18C .0300 et. seq. Plans and specifications should be submitted to 1634 Mail Service Center, Raleigh, North Carolina 27699-1634. All public water supply systems must comply with state and federal drinking water monitoring requirements. For more information, contact the Public Water Supply Section, (919) 707-9100.		30 days
☐	If existing water lines will be relocated during the construction, plans for the water line relocation must be submitted to the Division of Water Resources/Public Water Supply Section at 1634 Mail Service Center, Raleigh, North Carolina 27699-1634. For more information, contact the Public Water Supply Section, (919) 707-9100.		30 days

Other comments (attach additional pages as necessary, being certain to cite comment authority)

Division	Initials	No comment	Comments	Date Review
DAQ	DAC	☒		8/24/16
DWR-WQROS (Aquifer & Surface)	CCC	☐ ☐	This project will require an Individual Permit Certification under Section 401	8/17/16 / /
DWR-PWS	HLC	☐	Be advised that there are water lines located under the river in the area to be dredged that are owned by Cape Fear Public Utility Authority. Please contact CFPUA Engineering Department at (910) 332-6560.	8/24/16
DEMLR (LQ & SW)	des	☐	new construction and earthwork will require DEMLR permits	8/19/16
DWM - UST	wer	☒		8/19/16

REGIONAL OFFICES

Questions regarding these permits should be addressed to the Regional Office marked below.

☐ **Asheville Regional Office**
2090 US Highway 70
Swannanoa, NC 28778
(828) 296-4500

☐ **Fayetteville Regional Office**
225 North Green Street, Suite 714
Fayetteville, NC 28301-5043
(910) 433-3300

☐ **Mooresville Regional Office**
610 East Center Avenue, Suite 301
Mooresville, NC 28115
(704) 663-1699

☐ **Raleigh Regional Office**
3800 Barrett Drive, Suite 101
Raleigh, NC 27609
(919) 791-4200

☐ **Washington Regional Office**
943 Washington Square Mall
Washington, NC 27889

☒ **Wilmington Regional Office**
127 Cardinal Drive Extension
Wilmington, NC 28405
(910) 796-7215

☐ **Winston-Salem Regional Office**
450 West Hanes Mill Road, Suite 300
Winston-Salem, NC 27105
(336) 771-9800

February 11, 2015

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: BRUNSWICK
NEW HANOVER

H12: OTHER

STATE NUMBER: 17-E-0000-0056
DATE RECEIVED: 08/03/2016
AGENCY RESPONSE: 08/29/2016
REVIEW CLOSED: 09/02/2016

RECEIVED
AUG 12 2016
HISTORIC PRESERVATION OFFICE

MS RENEE GLEDHILL-EARLEY
CLEARINGHOUSE COORDINATOR
DEPT OF NATURAL & CULTURAL RESOURCE
STATE HISTORIC PRESERVATION OFFICE
MSC 4617 - ARCHIVES BUILDING
RALEIGH NC

ER 11-1391

A EA ADDRESSES CULTURAL RESOURCES.
NC on EA
NCH + JCS/CRS
8/18/16

REVIEW DISTRIBUTION

CAPE FEAR COG
DEPT OF ENVIR. QUALITY - COASTAL MG
DEPT OF ENVIRONMENTAL QUALITY
DEPT OF NATURAL & CULTURAL RESOURCE
DEPT OF TRANSPORTATION
DNCR - DIV OF PARKS AND RECREATION
DPS - DIV OF EMERGENCY MANAGEMENT

DL= 8/22/16

PROJECT INFORMATION

APPLICANT: Department of the Army
TYPE: National Environmental Policy Act
Environmental Assessment

DESC: Proposed project is for the Eagle Island Improvements, Dike raise to Elevation 50 feet. - View documents at:
http://www.saw.usace.army.mil/Missions/Navigation/Dredging/Wilmington-Harbor/Eagle-Island/

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☒ NO COMMENT ☐ COMMENTS ATTACHED

SIGNED BY: RGledhill-Earley DATE: 8-19-16

AUG 2016 RECEIVED

NORTH CAROLINA STATE CLEARINGHOUSE Natasha Earle-Young
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: BRUNSWICK
NEW HANOVER

H12: OTHER

STATE NUMBER: 17-E-0000-0056
DATE RECEIVED: 08/03/2016
AGENCY RESPONSE: 08/29/2016
REVIEW CLOSED: 09/02/2016

MS CARRIE ATKINSON
CLEARINGHOUSE COORDINATOR
DEPT OF TRANSPORTATION
STATEWIDE PLANNING - MSC #1554
RALEIGH NC

REVIEW DISTRIBUTION

CAPE FEAR COG
DEPT OF ENVIR. QUALITY - COASTAL MG
DEPT OF ENVIRONMENTAL QUALITY
DEPT OF NATURAL & CULTURAL RESOURCE
DEPT OF TRANSPORTATION
DNCR - DIV OF PARKS AND RECREATION
DPS - DIV OF EMERGENCY MANAGEMENT

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If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☑ COMMENTS ATTACHED

SIGNED BY: Natasha Earle-Young DATE: 8/19/2016

Transportation

PAT McCRORY
Governor

NICHOLAS J. TENNYSON
Secretary

August 19, 2016

Department of the Army

State Number : 17-E-0000-0056

Project Title: National Environmental Policy Act Environmental Assessment

After reviewing your application it has been determined that the proposed Eagle Island Improvements is located near a facility that is being widen. To avoid any potential conflicts to TIP Project R-3601, please coordinate with Patrick Riddle who is the Division Planning Engineer in Highway Division 3. Patrick Riddle can be reached by phone at (910) 346-2040 or by email priddle@ncdot.gov.

Sincerely,

Nastasha Earle-Young

Nastasha Earle-Young
Transportation Planning Branch
Eastern Planning Team 1

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

AUG 0 5 2016

COUNTY: BRUNSWICK
NEW HANOVER

H12: OTHER

STATE NUMBER: 17-E-0000-0056
DATE RECEIVED: 08/03/2016
AGENCY RESPONSE: 08/29/2016
REVIEW CLOSED: 09/02/2016

MS PAULA CUTTS
CLEARINGHOUSE COORDINATOR
DPS - DIV OF EMERGENCY MANAGEMENT
FLOODPLAIN MANAGEMENT PROGRAM
MSC # 4218
RALEIGH NC

REVIEW DISTRIBUTION

CAPE FEAR COG
DEPT OF ENVIR. QUALITY - COASTAL MG
DEPT OF ENVIRONMENTAL QUALITY
DEPT OF NATURAL & CULTURAL RESOURCE
DEPT OF TRANSPORTATION
DNCR - DIV OF PARKS AND RECREATION
DPS - DIV OF EMERGENCY MANAGEMENT

PROJECT INFORMATION

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If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☒ COMMENTS ATTACHED

SIGNED BY: John D Bunkelow DATE: 16 AUGUST 2016

AUG 2016
RECEIVED
Secretary's Office
DOA

North Carolina Department of Public Safety
Emergency Management

Pat McCrory, Governor
Frank L. Perry, Secretary

Michael A. Sprayberry, Director

August 16, 2016

State Clearinghouse
N.C. Department of Administration
1301 Mail Service Center
Raleigh, North Carolina 27699-1301

Subject: Intergovernmental Review State Number: 17-E-0000-0056
Eagle Island Improvements, Raise Dike to 50', Brunswick and New Hanover Counties

As requested by the North Carolina State Clearinghouse, the North Carolina Department of Public Safety Division of Emergency Management Risk Management National Flood Insurance Program (NCNFIP) staff reviewed the proposed project to raise the Eagle Island perimeter dike to 50'. The site is located alongside the Cape Fear River and Brunswick River near Wilmington. NCNFIP offers the following comments:

Executive Order 11988 of May 24, 1977 (Floodplain Management) requires executive departments and agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Executive Order 11988 requires an eight-step review process that agencies should carry out as part of their decision-making on projects that have potential impacts to or within the floodplain. Any work within the SFHA of studied streams, based on the current Flood Insurance Rate Map, should follow these guidelines in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains. The eight steps are summarized below. It is noted that several of these actions have already taken place with the preparation of the Description of Proposed Action.

1) Determine if a proposed action is in the base floodplain (that area which has a one percent or greater chance of flooding in any given year).
2) Conduct early public review, including public notice.
3) Identify and evaluate practicable alternatives to locating in the base floodplain, including alternative sites outside of the floodplain.
4) Identify impacts of the proposed action.
5) If impacts cannot be avoided, develop measures to minimize the impacts and restore and preserve the floodplain, as appropriate.
6) Reevaluate alternatives.

MAILING ADDRESS:
4218 Mail Service Center
Raleigh NC 27699-4218
www.ncem.org

An Equal Opportunity Employer

GTM OFFICE LOCATION:
4105 Reedy Creek Road
Raleigh, NC 27607
Telephone: (919) 825-2341
Fax: (919) 825-0408

7) Present the findings and a public explanation.
8) Implement the action.

Thank you for your cooperation and consideration. If you have any questions concerning the above comments, please contact me at (919) 825-2300, by email at dan.brubaker@ncdps.gov or at the address shown on the footer of this document.

Sincerely,

John D Brubaker

John D. Brubaker, P.E., CFM
NFIP Engineer
Risk Management

cc: Tom Langan, Engineering Supervisor
John Gerber, NFIP State Coordinator

File

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Raleigh ES Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

August 30, 2016

Elden J. Gatwood
Chief, Planning and Environmental Branch
U.S. Army Corps of Engineers, Wilmington District
69 Darlington Avenue
Wilmington, NC 28402

Re: Draft Environmental Assessment (DEA) Eagle Island Improvements Dike Raise to Elevation 50 Feet

Dear Mr. Gatwood:

The U.S. Fish and Wildlife Service (Service) has reviewed your July 29, 2016 letter and copy of the Draft Environmental Assessment (DEA) for Eagle Island Improvements Dike Raise to Elevation 50 Feet. The proposed project is to be constructed on Eagle Island in the Cape Fear River, New Hanover and Brunswick Counties, North Carolina. The proposed project will raise the elevation of the dike to 50 feet and require the construction of a supportive outer toe berm. This will provide a spoil disposal area until 2032. The toe berm is projected to impact 39 acres of Phragmites-dominated coastal marsh. The Corps proposes to mitigate the loss of 39 acres of marsh by purchasing 3.04 acres of coastal marsh credits from the Wilson Bay (Sturgeon City) Phase 1 bank which is located in a different hydrologic unit (HUC). The Service does not believe the proposed mitigation will offset the wetland impacts.

In Section 5.7 of the report the Corps states that Eagle Island is fringed by marsh/wetlands suited to brackish water. *Phragmites australis* predominates, while cat tails (*Typha latifolia*, *T. angustifolia*, and *T. domingensis*) are interspersed with *Spartina alterniflora* and *patens*, *Typha latifolia*, *Scirpus* spp, *Juncus roermerianus* and various other species of reeds, rushes, and sedges. The DEA goes on to state that areas dominated by Phragmites are of lower quality and provide less habitat for native species; however they are still useful for flood protection, erosion control and improving water quality. The waters surrounding Eagle Island are designated Primary Nursery Area (PNA). The wetlands on Eagle Island play an important part in the aquatic ecosystem making this a PNA. Although the large amount of Phragmites in the wetland areas does reduce the habitat value to terrestrial species it does provide some habitat and thus appropriate mitigation should be provided.

To mitigate for the 39 acres of wetland impacts the Corps has proposed purchasing 3.04 acres of coastal marsh credits from the Wilson Bay (Sturgeon City) Phase 1 bank. The Service does not believe the proposed mitigation will offset the impacts of the project. The Wilson Bay bank is not in the same hydrologic unit as Eagle Island so any benefits provided by that bank will not be provided to the Cape Fear or Brunswick Rivers. Furthermore the proposed acreage is well below a 1:1 ratio which would lead to a net loss of wetland acreage not just the functions and values. The Service is very concerned about the precedence this may set for mitigation of wetland impacts for other public or private projects.

The Corps should mitigate for these impacts at a ratio of at least 1:1. If mitigation credits are to be purchased, the bank should be in the same HUC. You may wish to contact the Eagles Island Coalition to see if their efforts could be furthered in a way that also mitigates for project impacts. Their Conservation Management Plan can be viewed at http://eaglesisland.org/eaglesislandconservation.pdf. In March 2016, Dial Cordy and Associates, Inc prepared a "Prospective Resiliency Project List for the Cape Fear River Basin" for the National Fish and Wildlife Foundation. This document identifies habitat restoration projects in the Cape Fear Basin including some in close proximity to Eagle Island. Consulting the

document and Dial Cordy may provide potential projects which may be undertaken for mitigation. During the scoping meetings for this project, the Corps mentioned seeking to offset the impacts utilizing its dredge spoil islands in the lower Cape Fear. The Service encourages you to revisit those investigations. Lastly, the Corps could investigate a long term Phragmites control on the remaining wetlands as that may be acceptable to the resource agencies. In summary, the Service believes that there are many options available to the Corps to offset the 39 acres of wetland impacts within the HUC.

In accordance with the Endangered Species Act of 1973, as amended, (ESA) and based on the information provided, and other available information, it appears the action is not likely to adversely affect federally listed species or their critical habitat as defined by the ESA. We believe that the requirements of section 7 (a)(2) of the ESA have been satisfied for this project. Please remember that obligations under the ESA must be reconsidered if: (1) new information identifies impacts of this action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

The Service appreciates the opportunity to review and provide comments on the proposed action. We look forward to continuing to work with the Corps to develop appropriate mitigation for the wetland impacts of this important project. Should you have any questions regarding the project, please contact John Ellis at (919) 856-4520, extension 26.

Sincerely,

John Ellis for

Pete Benjamin,
Field Supervisor

cc: NMFS, Beaufort, NC
EPA, Atlanta, GA
WRC, Raleigh

From: Burdette, Jennifer a
To: Hughes, Emily B CIV USARMY CESAW (US)
Cc: Higgins, Karen; Coburn, Chad
Subject: [EXTERNAL] RE: Eagle Island Revised Mitigation Proposal
Date: Monday, November 14, 2016 3:49:21 PM

Emily,

As we discussed via telephone today, the Division believes that the revised mitigation proposal complies with the mitigation requirement of the 401 water quality certification. Please provide a statement of availability from the mitigation provider to restart the certification process.

Thanks,
Jennifer

Jennifer Burdette
401/Buffer Coordinator
Division of Water Resources - 401 & Buffer Permitting Branch
Department of Environmental Quality
919 807 6364 office
jennifer.burdette@ncdenr.gov

1617 Mail Service Center
Raleigh, NC 27699-1617
(Physical Address: 512 N. Salisbury St, Raleigh, NC 27604 - 9th Flr Archdale Bldg - Room 942F)

-----Original Message-----
From: Hughes, Emily B SAW [mailto:Emily.B.Hughes@usace.army.mil]
Sent: Thursday, October 27, 2016 8:22 AM
To: Burdette, Jennifer a <Jennifer.Burdette@ncdenr.gov>
Cc: Higgins, Karen <karen.higgins@ncdenr.gov>; Coburn, Chad <chad.coburn@ncdenr.gov>
Subject: Eagle Island Revised Mitigation Proposal

Jennifer,

Please see attached letter requesting approval for the revised mitigation proposal to offset impacts associated with the Eagle Island toe berm construction. Deadline for your response is November 10, 2016. I will also be soon providing you with an updated Pre-construction Notification Form to reflect these changes and the additional information requested from the State on our Draft EA.

If you have any questions please let me know.

Thanks,
Emily

From:	Ken Riley - NOAA Federal
To:	Hughes, Emily B CIV USARMY CESAW (US)
Cc:	Burdette, Jennifer a; Pete_Benjamin@fws.gov; Pace Wilber - NOAA Federal; Coburn, Chad; Ellis, John
Subject:	[EXTERNAL] Re: Eagle Island Dike Raise Revised Mitigation Plan
Date:	Monday, November 14, 2016 8:57:56 AM

Dear Emily,

The NMFS has no objection to the compensatory mitigation proposed for the Eagle Island Improvements Dike Raise to 50 Feet. Please let us know if you have questions or comments.

Sincerely,

-Ken Riley

Kenneth Riley, Ph.D.
Habitat Conservation Division

National Marine Fisheries Service Southeast Region

101 Pivers Island Road, Beaufort, NC 28516
Office: 252-728-8750 <tel:252-728-8750> | Cell: 252-864-6193 <tel:252-864-6193> | Email: ken.riley@noaa.gov <mailto:ken.riley@noaa.gov>

On Thu, Nov 10, 2016 at 4:45 PM, Hughes, Emily B CIV USARMY CESAW (US) <Emily.B.Hughes@usace.army.mil <mailto:Emily.B.Hughes@usace.army.mil> > wrote:

> Good Day All,
>
> Just a reminder that we are soliciting a response from everybody on this. I meant to send out the reminder yesterday, as today is the deadline. Since tomorrow is a holiday, we will not be here, so if I find your response in my inbox Monday morning it will be accepted. If not, I'll assume you are in favor of the revised plan. :)
>
> Thank you and have a good weekend!
>
> Emily
>
> Environmental Resources Section, Wilmington District
> US Army Corps of Engineers
> 69 Darlington Ave.
> Wilmington, NC 28403
>
> (910) 251-4635 <tel:%28910%29%20251-4635>
> Emily.b.hughes@usace.army.mil <mailto:Emily.b.hughes@usace.army.mil>

From: Holliman, Daniel
To: Gatwood, Elden SAW; Hughes, Emily B SAW
Cc: Militscher, Chris; Bowers, Todd
Subject: [EXTERNAL] Eagle Island Improvement Dike Project
Date: Tuesday, November 08, 2016 11:58:15 AM

Mr. Gatwood,

EPA appreciates the response provided by Wilmington District (letter dated October 26, 2016) regarding the proposed mitigation for the Eagle Island Improvement Dike project. We appreciate the District conducting an additional site assessment to verify wetland quality and the additional proposed wetland credits which will be purchased from a mitigation bank located within watershed. EPA staff from our Water Protection Division has also reviewed this revised mitigation proposal and concurs with the District's new conclusions. If you have any additional questions, please give me a call.

Thanks,
Dan

Dan Holliman

USEPA Region 4 | NEPA Program Office

61 Forsyth Street SW | Atlanta, GA 30303

tel 404.562.9531 | holliman.daniel@epa.gov

Region 4 NEPA: Blockedhttp://www.epa.gov/region4/opm/nepa/index.html <Blockedhttp://www.epa.gov/region4/opm/nepa/index.html>

From:	Ellis, John
To:	Hughes, Emily B CIV USARMY CESAW (US)
Cc:	Burdette, Jennifer a; Pete_Benjamin@fws.gov; Pace Wilber - NOAA Federal; Coburn, Chad; Ken Riley - NOAA Federal
Subject:	[EXTERNAL] Re: Eagle Island Dike Raise Revised Mitigation Plan
Date:	Monday, November 14, 2016 7:36:00 AM

The Service is ok with the revised plan.

John

On Thu, Nov 10, 2016 at 4:45 PM, Hughes, Emily B CIV USARMY CESAW (US) <Emily.B.Hughes@usace.army.mil <mailto:Emily.B.Hughes@usace.army.mil> > wrote:

Good Day All,

Just a reminder that we are soliciting a response from everybody on this. I meant to send out the reminder yesterday, as today is the deadline. Since tomorrow is a holiday, we will not be here, so if I find your response in my inbox Monday morning it will be accepted. If not, I'll assume you are in favor of the revised plan. :)

Thank you and have a good weekend!

Emily

Environmental Resources Section, Wilmington District
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APPENDIX D

CORPS RESPONSES TO DRAFT EA COMMENTS

Item #	Comment Source	Comment	Response
1	Eagle Island Coalition, August 29, 2016 Letter, Rob Moul, Chair	"more can be done to offset and mitigate the damage to 39 acres of tidal freshwater wetlands."	Concur, the original mitigation plan has been discarded. After reevaluating, toe berm impacts resulted in 35.5 acres of tidal freshwater wetlands, of which 2.85 acres are considered Primary Nursery Area (PNA). The remainder is coastal marsh dominated by *Phragmites astralis*. The Corps is proposing to mitigate for the 35.5 acres by purchasing credits from the Lower Cape Fear Umbrella Mitigation Bank (Sneeden Tract). The Sneeden Tract is within the project's Hydrologic Unit Code, located directly adjacent to the Cape Fear River, 5 miles upstream of Eagle Island. This site has tidal freshwater marsh (both restoration and preservation) incorporated into its credits; as such, it is considered in-kind to the toe berm wetland impacts on Eagle Island. For this reason we are proposing to mitigate for impacts at a ratio of 1:1 (purchase of 35.5 mitigation credits) and strongly believe this would result in no net loss of wetlands (**REFERENCE APPENDIX E, MITIGATION PLAN).**
2	Eagle Island Coalition, August 29, 2016 Letter, Rob Moul, Chair	Request that we "continue the rotational use of the 3 dikes in such a way that continues the availability and supply of the varied bird habitats… Also desired that "Chinese tallow, a known exotic invasive tree, be controlled within and along the dike edges…"	The intention is to continue disposal rotation in the cells every two years with one cell being disposed into, one cell drying, and one cell being used for borrow. The management of the cells from a navigation process will take precedence over rotation of the cells on a set schedule. The Corps maintains vegetation on the existing dikes as part of a separate contract; vegetation is mowed frequently to allow for regular safety inspections of the dikes. Control of non-native invasive vegetation is not included in the budget of the project and future mowing contracts will not include areas beyond the toe of the toe berm.
3	Eagle Island Coalition, August 29, 2016 Letter, Rob Moul, Chair	Suggest that the Corps "plant bald cypress trees along the outer edge of [proposed] toe berm."	To avoid any threats to the structural integrity of the toe berm and dike, no trees may be planted on or near the berm or dike structure; therefore planting of bald cyprus trees on the outer edge of the toe would not be allowed. Although the berms/dikes on Eagle Island do not act as flood control structures, they are designed to encapture millions of gallons of water that slowly discharge to the river through spillways once material has settled out. Woody stems and root systems can compromise the reliability of the structure and threaten overall water quality of the river. To avoid this, requirements for vegetation-free zones (with the exception of grasses) surrounding the berms/dikes exist. Reference: EM 1110-2-301 Guidelines for Landscape and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtement Structures.
4	EPA Region IV, August 30, 2016 Email, Daniel Holliman, NEPA Program Office	"EPA recommends coordination with the State of NC to ensure compliance with WQS during construction activities."	The project has been coordinated with the NC Division of Water Resources. A 401 Water Quality Certification will be received prior to start of construction. All conditions of the certification will be met. See response below (to comment #5) for information regarding sedimentation and erosion control.
5	EPA Region IV, August 30, 2016 Email, Daniel Holliman, NEPA Program Office	"The construction [BMPs] plan should include implementable measures to prevent erosion and sediment runoff from the project."	Approved erosion and sediment control measures will be included in the specifications and shown on the project drawings. The Contractor shall comply with all plan requirements, and is reminded that he is responsible for providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. Non erosion and sediment control structures shall be constructed in waters or wetlands without prior approval from the Contracting Officer or his/her designated representative. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs) as indicated on the drawings or as directed by the Contracting Officer or his/her designated representative. BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. Any temporary measures shall be removed after the area has been stabilized.
6	EPA Region IV, August 30, 2016 Email, Daniel Holliman, NEPA Program Office	All projects that disturb an acre or more of land require permit coverage and an S&EC plan; see info on NC stormwater permit NCG01…	See response above (to comment #5).
7	EPA Region IV, August 30, 2016 Email, Daniel Holliman, NEPA Program Office	"EPA is concerned that the proposed mitigation for impacts to wetlands is not adequate; unclear how it is consistent with the 2008 Mitigation Rile; request the Corps provide copies of the NC Wetland Assessment Method forms...for both the impact site and the mitigation site."	See response to comment #1. NC WAM forms have been inlcuded as part of Appendix E. By email dated 8 Nov 2016, EPA concurred with the revised mitigation plan.
8	EPA Region IV, August 30, 2016 Email, Daniel Holliman, NEPA Program Office	"…language regarding cost of the alternatives is very vague and non-informative; costs should be more clearly described in this section." (Alternatives Considered But Eliminated)	Noted. Estimated costs for transporting dredged material from the Anchorage Basin to the ODMDS are approximately $11.90 per cubic yard (unescalated). Estimated costs for transporting dredged material from the Anchorage Basin to Eagle Island are approximately $3.25 per cubic yard. This information has been added to Section 4.1 of the Final EA.

Item #	Comment Source	Comment	Response
9	Cape Fear River Watch, Letter emailed August 31, 2016, Kemp Burdette	"There is no geo-technical appendix providing details for the proposed dike raise."	No formal Geotechnical Appendix was prepared for the EA, although a design documentation report with a geotechnical section was prepared as part of the design and review process. A detailed geotechnical design of the dike was performed that shows that a toe berm is required for the dike raise to elevation 50 NAVD88 to meet USACE engineering stability guidance. The toe berm width was reduced as much as possible while still meeting stability requirements. Adequate information (i.e. cross-section figure showing toe berm and step-ins) was included in the main text.
10	Cape Fear River Watch, Letter emailed August 31, 2016, Kemp Burdette	"The cost analysis for [disposal to the ODMDS] should be included in the EA."	Noted. Estimated costs for transporting dredged material from the Anchorage Basin to the ODMDS are approximately $11.90 per cubic yard (unescalated). Estimated costs for transporting dredged material from the Anchorage Basin to Eagle Island are approximately $3.25 per cubic yard. This information has been added to Section 4.1 of the Final EA.
11	Cape Fear River Watch, Letter emailed August 31, 2016, Kemp Burdette	"Figs 5&6 should have a legend..."	A legend has been added to Figures 5 and 6.
12	Cape Fear River Watch, Letter emailed August 31, 2016, Kemp Burdette	"The EA states Phrag is of lower quality and has less habitat for native species; however, no reference is provided for that conclusion."	Ozbay et al, Journal of Ecosystems & Ecography, 2014. Land Use Impacts: The Effects of Non-Native Grasses on Marsh and Aquatic Ecosystems. Able et al, Estuaries (vol 6, no 1), 2003. Impact of Common Reed, Phragmites australis, on Essential Fish Habitat: Influence on Reproduction, Embryological Development, and Larval Abundance of Mummichog (Fundulus heteroclitus). Weinstein et al, Estuaries (vol 22, no 3B), 1999. Does the Common Reed, Phragmites Australis, Affect Essential Fish Habitat? See Appendix E, Revised Mitigation Plan
13	Cape Fear River Watch, Letter emailed August 31, 2016, Kemp Burdette	"...how was 3.04 acres of mitigation needs determined?"	See response to comment #1.
14	Cape Fear River Watch, Letter emailed August 31, 2016, Kemp Burdette	Mitigation should be performed or credits received in the Cape Fear River Watershed.	Concur. See response to comment #1.
15	Cape Fear River Watch, Letter emailed August 31, 2016, Kemp Burdette	Suggestions for mitigation alternatives include: "setting aside cells 4&5 for conservation; improving L&D 1; restore Alligator Creek.	Other mitigation alternatives were ruled out based on cost and possible future need. See response to comment #1.
16	Division of Coastal Management, August 31 letter, Daniel Govoni, Policy Analyst	"Clarify wether the project would result in any Coastal Wetland impacts, and if it would, that it quantify the area of Coastal Wetlands to be impacted by the project. Additionally, the location of mean (or normal) high water line should be identified, and any proposed impacts to Public Trust Areas or Estuarine Waters also quantified."	A vegetation map showing impacts to the toe berm areas is included in the Final EA as Figure 7 (verified during a site visit with NCDCM 9/16/2016). The map also identifies the Mean High Water Line (2ft elevation contour).
17	Division of Coastal Management, August 31 letter, Daniel Govoni, Policy Analyst	Recommend submittal of a federal consistency determination.	A Federal Consistency Determination was completed and submitted to Doug Huggett on 29 July 2016. NCDCM Consistency Concurrence was received February 24, 2017.
18	Department of Natural and Cultural Resources, August 29 letter, Renee Gledhill-Early, SHPO	"We believe the Draft EA adequately addresses our concerns for historic resources."	Noted.
19	U.S. Fish and Wildlife Service, August 30 letter, John Ellis	"The Service does not believe the proposed mitigation will offset the wetland impacts...areas dominated by Phragmites are ...still useful for flood protection, erosion control and improving water quality. The waters surrounding Eagle Island are designated PNA. The wetlands play an important part in the aquatic ecosystem making this a PNA. Although the amount of Phrag in the wetland areas does reduce the habitat value to terrestrial species it does provide some habitat and thus appropriate mitigation should be provided."	Concur. See response to comment #1.
20	U.S. Fish and Wildlife Service, August 30 letter, John Ellis	"The Wilson Bay bank is not in the same HUC as Eagle Island so any benefits provided by the bank would not be provided to the CFR...the bank should be in the same HUC."	Concur. See response to comment #1.
21	U.S. Fish and Wildlife Service, August 30 letter, John Ellis	"...the proposed acreage is well below 1:1 which would lead to a net loss of wetland acreage, not just the function and values. The Service is very concerned about the precedence this may set for mitigation of wetland impacts for other public and private projects."	Concur. See response to comment #1.
22	U.S. Fish and Wildlife Service, August 30 letter, John Ellis	"During the scoping meetings for the project, the Corps mentioned seeking to offset the impacts utilizing its dredge spoil islands in the lower Cape Fear. The Service encourages you to revisit those investigations. Lastly, the Corps could investigate a long term Phrag control on the remianing wetlands as that may be acceptable to the resource agencies."	The Corps has eliminated the option to utilize alternate disposal areas (CDFs) in the Cape Fear River because the cost to create the capacity needed would not be practicable, and the environmental impacts would be just as much or greater than the 50ft Dike Raise. Long term Phragmites control is not being considered due to need for additional time and funding to manage and monitor this activity (see response to comment #1).

Item #	Comment Source	Comment	Response
23	NOAA National Marine Fisheries Service. September 6, 2016 Letter, Pace Wilbur, for the Southeast Regional Office	Recommends "the mitigation include projects identified for Eagle Island (e.g. *Eagle Island Conservation Management Plan 2015-2025*) or purchase of mitigation bank credits within the Cape Fear watershed... The amount of mitigation should yield a no net loss of coastal wetland function"	Concur. See response to comment #1.
24	NOAA National Marine Fisheries Service. September 6, 2016 Letter, Pace Wilbur, for the Southeast Regional Office	"NMFS believes the proposed project would eliminate some nursery habitats used by diadromous fishes... including American eel, American shad, Atlantic sturgeon, blueback herring, shortnose sturgeon, and striped bass."	Concur. The construction of toe berms would impact approximately 2.85 acres of tidal area waterward of MHW surrounding Eagle Island, the majority being adjacent to the Brunswick River. Impacts will be mitigated for through purchase of mitigation bank credits (see response to comment #1). To avoid impacts to fisheries within the PNA areas during construction, every effort will be made to construct the toe berms within the environmental window of April 1 - July 31. If construction within these areas cannot be limited to this timeframe, coordination with environmental agencies will occur prior to impacts.
25	NOAA National Marine Fisheries Service. September 6, 2016 Letter, Pace Wilbur, for the Southeast Regional Office	"NMFS believes the draft EA minimally addresses EFH and HAPCs and the topic receives no focused discussion. Substantial review of these considerations should be included in the final EA. The EFH and HAPC characterizations should include a summary of designations for each federally managed species in the project area, including habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages) and time of year of occurrence."	Additional information was added to Section 5.41 Nekton and Section 5.5 Fisheries and Essential Fish Habitat. Table 1 "Essential Fish Habitat Species in the Eagle Island Improvements Project Area" lists, by life stages, fish and crustacean species which may occur in the vacinity of Wilmington Harbor. Table 3 lists Federally listed endangered and threatened species potentially impacted by the project; and Section 5.9 discusses the known occurence of listed sturgeon and habitats they utilize during their life stages, and a determination of effect.
26	NOAA National Marine Fisheries Service. September 6, 2016 Letter, Pace Wilbur, for the Southeast Regional Office	"Phrag-dominated marsh provides many ecological services and functions as a nursery area for larval and juvenile finfish, crustaceans, and mollluscs, and as a habitat for adult fishes... Phrag-dominated marsh can provide many of the same ecological functions as salt marshes, including flood protection, erosion control, water quality, and detrital exchange, and have similar levels of nekton abundance, biomass and diversity."	Noted. Evidence of this is not yet found in published research. Literature from 2014 states that “increased levels of biomass [Phragmites] result in an altered soil chemistry, a shift in the availability of primary production, and elevated marsh surface, smoothed topography (i.e. the loss of rivulets), restricted flow to the marsh interior, an increase in shade and litter cover, and lowered or altered pathways for nutrient availability, especially nitrogen, for marsh nekton” (Ozbay, 2014). Regardless, mitigation to offset impacts has been revised (see response to comment #1).
27	NOAA National Marine Fisheries Service. September 6, 2016 Letter, Pace Wilbur, for the Southeast Regional Office	Section 1.1 should include reference to the *Draft Integrated Feasibilty Report and Environmental Assessment, Wilmington Harbor Navigation Improvements*, dated June 2014.	The subject reference was added to Section 1.1.
28	NOAA National Marine Fisheries Service. September 6, 2016 Letter, Pace Wilbur, for the Southeast Regional Office	Section 5.5, Table 2 incorrectly states that no HAPCs are located in the vicinity of Wilmington Harbor.	Corrections have been made to Table 2.
29	NOAA National Marine Fisheries Service. September 6, 2016 Letter, Pace Wilbur, for the Southeast Regional Office	Section 5.7 and Section 5.18.4 should demonstrate quantitatively that the 39-42 acres of Phrag-dominated coastal marsh is low quality. Section 5.16 should substantiate that Phrag-dominated coastal marsh provides little habitat and food source for native species.	Section 5.7 was revised to state "considered to be" of lower quality and makes reference to the Revised Mitigation Plan. "Low quality" was removed from the description of toe berm impacts in Section 5.18.4.
30	NOAA National Marine Fisheries Service. September 6, 2016 Letter, Pace Wilbur, for the Southeast Regional Office	SAW should employ BMPs to prevent discharge of pollutants and to control turbidity throughout construction.	BMPs to avoid turbidity will be exercised by the Contractor (and enforced by USACE) during construction.
31	NOAA National Marine Fisheries Service. September 6, 2016 Letter, Pace Wilbur, for the Southeast Regional Office	SAW should use vegetation to stabilize the toe berm and prevent its erosion.	Only grasses are considered safe vegetation to plant on berms/dikes (see comment response to #3 above), therefore potted vegetation will not be planted. Dikes and toe berms will be layered with erosion control matting and seeded with a native seed mix for stabilization.
32	NOAA National Marine Fisheries Service. September 6, 2016 Letter, Pace Wilbur, for the Southeast Regional Office	....The mitigation plan should identify the specific wetland functions and values the compensatory mitigation is intended to restore or replace. Compensation for interim losses of ecological functions and values should be included if the compensatory mitigation project requires several years to complete."	Noted. See response to comment #1. Purchase of 35.5 credits of riverine/tidal freshwater marsh will occur prior to start of construction.
33	NC Division of Coastal Management (Heather Coats), Submitted through NC Review Clearinghouse	DCM is processing this project through their federal consistency program.	Noted. The Federal Consistency Determination was revised and submitted to DCM July 29, 2016. NCDCM Consistency Concurrence was received February 24, 2017.
34	NC Division of Environmental Assistance and Customer Service (Lyn Hardison), Submitted through NC Review Clearinghouse	Several of our agencies have identified permits that may be required.	Noted. All required permits/approvals will be obtained prior to start of work.

Item #	Comment Source	Comment	Response
35	NC Division of Coastal Management (Gregg Bodnar), Submitted through NC Review Clearinghouse	Recommend USACE investigate the potential for coastal wetland planting along the toe of slope and other areas where practical. The draft EA identifies an in-water work environmental window (1 Oct - 31 Jan) and is sufficient and recommended.	Noted. See response to comments #3 and #24. The environmental window for PNAs has been adjusted to April 1 - July 31. This has been approved by the NMFS in an email dated 11/22/2016.
36	NC Department of Environmental Quality - Waste Management, Hazardous Waste Section (Bill Hunneke), Submitted through NC Review Clearinghouse	"The demolition, construction, operation, maintenance, and remediation activities conducted will most likely generate a soild waste, and a determination must be made whether it is a hazardous waste…The proposed project site does not currently have an existing EPA Identification number for the generation of hazardous waste."	No hazardous material will be generated during the proposed construction of the toe berm and dike raise. The contractor will be required to provide a solid waste disposal plan identifying methods and locations for solid waste disposal. The contractor will also be required to provide evidence of the disposal facility's acceptance of the solid waste. Revised language has been inlcuded in Section 5.13.
37	NC Division of Waste Management, Federal Remediation Branch (Doug Rumford), Submitted through NC Review Clearinghouse	"Eight sites were identified within one mile of the project as shown on the attached map and in the table below. The Superfund Section recommends that site files be reviewed to ensure the appropriate precautions are incorporated into any construction activities that encounter potentially contaminated soil or groundwater."	Based on experience working at Eagle Island for the past several decades, no contaminated soil or groundwater is expected to be encountered at Eagle Island. Construction will be limited to Eagle Island and will result in fill beyond the footprint of the current dikes. No excavation in surrounding lands will occur. Also, material used to construct the toe berm will be obtained from the interior of the existing dike. That material has been tested for contaminants in accordance with EPA ocean disposal criteria and is suitable for ocean disposal (no contaminants present).
38	NC Waste Management, Solid Waste Section (Drew Hammonds), Submitted through NC Review Clearinghouse	"See no adverse impact on the surrounding community…The Section strongly recommends that the owner require all contractors to provide proof of proper disposal for all waste generated."	The contractor will be required to provide a solid waste disposal plan identifying methods and locations for solid waste disposal. The contractor will also be required to provide evidence of the disposal facility's acceptance of the solid waste.
39	NCDENR Wilmington Regional Office (WIRO), Submitted through NC Review Clearinghouse	An erosion and sedimentation control plan will be required if one or more acres is to be disturbed. Plan filed with proper Land Quality Section at least 30 days prior to construction. A fee of $65 for the first acres or any part of an acre.	Prior to construction, an erosion and sedimentation control plan will be prepared and submitted for review and approval along with an application fee based on the acreage to be disturbed to the NC Division of Energy, Mineral, and Land Resources Land Quality Section.
40	NCDENR Wilmington Regional Office (WIRO), Submitted through NC Review Clearinghouse	Compliance with 15A NCAC 2H 1000 (Coastal Stormwater Rules) is required.	Noted. An exemption from stormwater management permit regulations will be requested from the NC Division of Energy, Mineral, and Land Resources since the proposed construction activity is not expected to be subject to stormwater requirements as provided for in 15A NCAC 2H.1000.
41	NCDENR Wilmington Regional Office (WIRO), Submitted through NC Review Clearinghouse	This project will require an Individual Permit Certification under Section 401.	Noted. A 401 application has been submitted to NCDEQ. A 401 water quality certification will be obtained prior to start of work. All conditions of the 401 will be met.
42	NCDENR Wilmington Regional Office (WIRO), Submitted through NC Review Clearinghouse	Be advised that there are water lines located under the river in the area to be dredged that are owned by CFPUA -- DWR-PWS	Construction of the toe berm and dike raises will not involve dredging; however, the USACE is aware of the location of water lines below the CFR.
43	NCDENR Wilmington Regional Office (WIRO), Submitted through NC Review Clearinghouse	New construction and earthwork will require Division of Energy, Mineral and Land Resources (DEMLR) permits.	Prior to construction an erosion and sedimentation control plan will be prepared and submitted for review and approval to the NC Division of Energy, Mineral, and Land Resources Land Quality Section. An exemption from stormwater management permit regulations will be requested from the NC Division of Energy, Mineral, and Land Resources since the proposed construction activity is not expected to be subject to stormwater requirements as provided for in 15A NCAC 2H.1000.
44	NC State Historic Preservation Office, Submitted through NC Review Clearinghouse	No comment.	Noted.
45	NC Department of Transportation (Natasha Earle-Young), Submitted through NC Review Clearinghouse	Project is located near a facility that is going to be widened. To avoid any potential conflicts to TIP Project R-3601, please coordinate with the Division Planning Engineer in Hwy Div 3.	Concur. Email conversation with several NCDOT representatives resulted with no concerns, and concluded with an email message from Ron Van Cleef, NCDOT Division Bridge Maintenance Engineer on February 9, 2017 stating no foreseeable impacts with the project.
46	NC Department of Public Safety - Emergency Mangement (John Brubaker), Submitted through NC Review Clearinghouse	EO 11988 requires an eight-step review process that agencies should carry out as part of their decision-making on projects that have potential impacts to or within the floodplain…It is noted that several of these actions have already taken place with the preparation of the Description of Proposed Action.	Noted. Text has been added to Section 5.18.3 to better address the 8-step review process.

APPENDIX E

REVISED MITIGATION PLAN AND SUPPLEMENTAL DOCUMENTS

Eagle Island Improvements Revised Mitigation Plan

The Draft Environmental Assessment (EA) for the Eagle Island Improvements, Dike Raise to 50ft project was released for 30-day public review on July 28, 2016. The majority of comments received from the resource agencies and interest groups were related to the project's mitigation proposal. The overall consensus was that the proposed purchase of 3.04 acres of coastal wetland credits would not sufficiently mitigate for the toe berm impacts within the tidal freshwater marsh surrounding Eagle Island.

Based on a detailed vegetation analysis completed in 2015, jurisdictional impacts have been decreased from 39 acres to 35.5 acres. The vegetation mapping effort conducted in 2015 categorized the areas within the toe berm impacts into five classes: "Native", "Majority Phrag", "Mix - Native/Phrag", "Tree/Shrub", and "Water" (Figure 1). As shown on the attached figure, the majority of impacts are to *Phragmites*-dominated wetlands (34.79 ac). Areas identified in green as tree/shrub were ground-truthed and determined to be uplands (non-jurisdictional). Native, mixed and open water impacts were combined to equal 0.66 ac., and together, jurisdictional impacts total 35.5 acres.

A site visit with the NC Division of Coastal Management (DCM) on September 16, 2016 confirmed the mapping. Two open water areas were identified as being isolated and of little or no importance to fisheries habitat. The Mean High Water (MHW) line (2-feet elevation contour) was added to Figure 1 to identify impact areas affected by daily tides during normal water levels (2.85 acres total).

Comments on the Draft EA from federal and state agencies regarding the quality of wetlands in the impact area requested additional information to support the basis for considering *Phragmites australis* of "low" quality. Consequently, the North Carolina Wetland Assessment Method (NC WAM) was conducted in two locations where toe berm impacts would occur: Site 1 on the north end of Cell 3, and Site 2 on the southwest side of Cell 1, adjacent to the Brunswick River (Figure 2). A third location adjacent to the Cape Fear River was identified; however, dense *Phragmites* prevented access to natural ground, which is required to accurately apply the NC WAM.

The NC WAM assesses wetlands by their identified wetland type and applies 22 metrics that rate the quality of the site's Hydrology, Water Quality, and Habitat. Field Assessment Forms and Wetland Rating Sheets have been included as Figure 3, attached. Observations at Site 1 conclude that the assessment area is saturated; however, it is not subject to tidal influence. Dense stands of *Phragmites* approximately 10-12 feet tall crowd out other native vegetation. Results from NC WAM based on Hydrology, Water Quality, and Habitat were achieved and the overall rating for Site 1 is "MEDIUM". Observations at Site 2 conclude that the area is saturated; however, it is undetermined if infrequent flooding from tides occurs. Again, the *Phragmites* made it difficult to observe beyond 4-5 feet within the assessment area, and lower areas closer to the river could not be accessed. Despite the monoculture of *Phragmites*, the overall result from NC WAM based on Hydrology, Water Quality, and Habitat is "HIGH" (Hydrology and Water Quality rate "HIGH", whereas Habitat rates "LOW").

Research on *Phragmites australis* revealed that *Phragmites* could have an impact on hydrology as well, and negatively affect fisheries habitat. According to Ozbay (2014),

“increased levels of biomass result in an altered soil chemistry, a shift in the availability of primary production, and elevated marsh surface, smoothed topography (i.e. the loss of rivulets), restricted flow to the marsh interior, an increase in shade and litter cover, and lowered or altered pathways for nutrient availability, especially nitrogen, for marsh nekton.” Weinstein (1999) noted that *Phragmites* “influences hydrology and hydroperiod through its effects on drainage density, and other geomorphic features”, “demonstrated generally greater tidal attenuation”, and results in “reduction in biodiversity of macrophytes with concomitant reduction in animal diversity.” In a 2000 study, Able and Hagan found “that the larvae and small juveniles use the *Spartina*-dominated marsh surface frequently and in large numbers, while they are seldom found in *Phragmites*-dominated marshes.”

The USACE is proposing to mitigate for the 35.5 acres of toe berm impacts by purchasing credits from the Lower Cape Fear Umbrella Mitigation Bank (LCFUMB), Sneeden Tract. The Sneeden Tract is within the project’s Hydrologic Unit Code (HUC), located directly adjacent to the Cape Fear River, 5 miles upstream of Eagle Island (Figure 4). This site has tidal freshwater marsh incorporated into its credits; as such, it is considered in-kind to the toe berm wetland impacts on Eagle Island. For this reason and reasons stated above, the USACE plans to mitigate for impacts at a ratio of 1:1 (purchase of 35.5 mitigation credits from the Sneeden Tract) and strongly believes this mitigation would result in a no net loss of wetlands. Mitigation will be paid in-full prior to impacting jurisdictional areas.

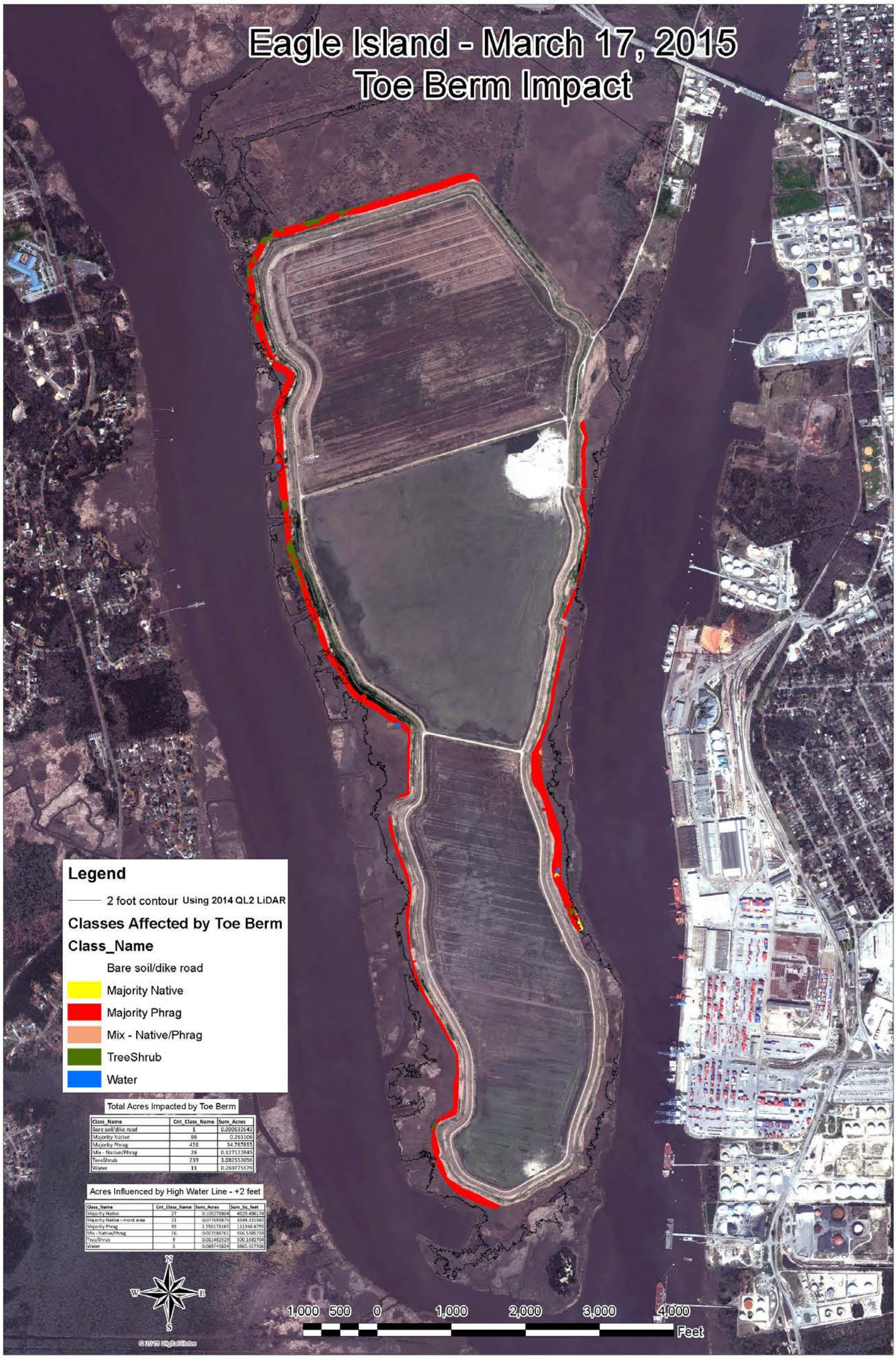
The revised mitigation plan was proposed to the resource agencies in a letter dated October 26, 2016. Based on responses received, agencies agree with the USACE plan to purchase 35.5 credits from the LCFUMB. An acceptance letter from the Bank is attached (Figure 5).

References:

Ozbay et al, Journal of Ecosystems & Ecography, 2014. Land Use Impacts: The Effects of Non-Native Grasses on Marsh and Aquatic Ecosystems.

Able et al, Estuaries (vol 6, no 1), 2003. Impact of Common Reed, *Phragmites australis*, on Essential Fish Habitat: Influence on Reproduction, Embryological Development, and Larval Abundance of Mummichog (*Fundulus heteroclitus*).

Weinstein et al, Estuaries (vol 22, no 3B), 1999. Does the Common Reed, *Phragmites australis*, Affect Essential Fish Habitat?



Appendix E, Figure 1: Toe Berm impacts on Vegetation and Areas Below Mean High Water

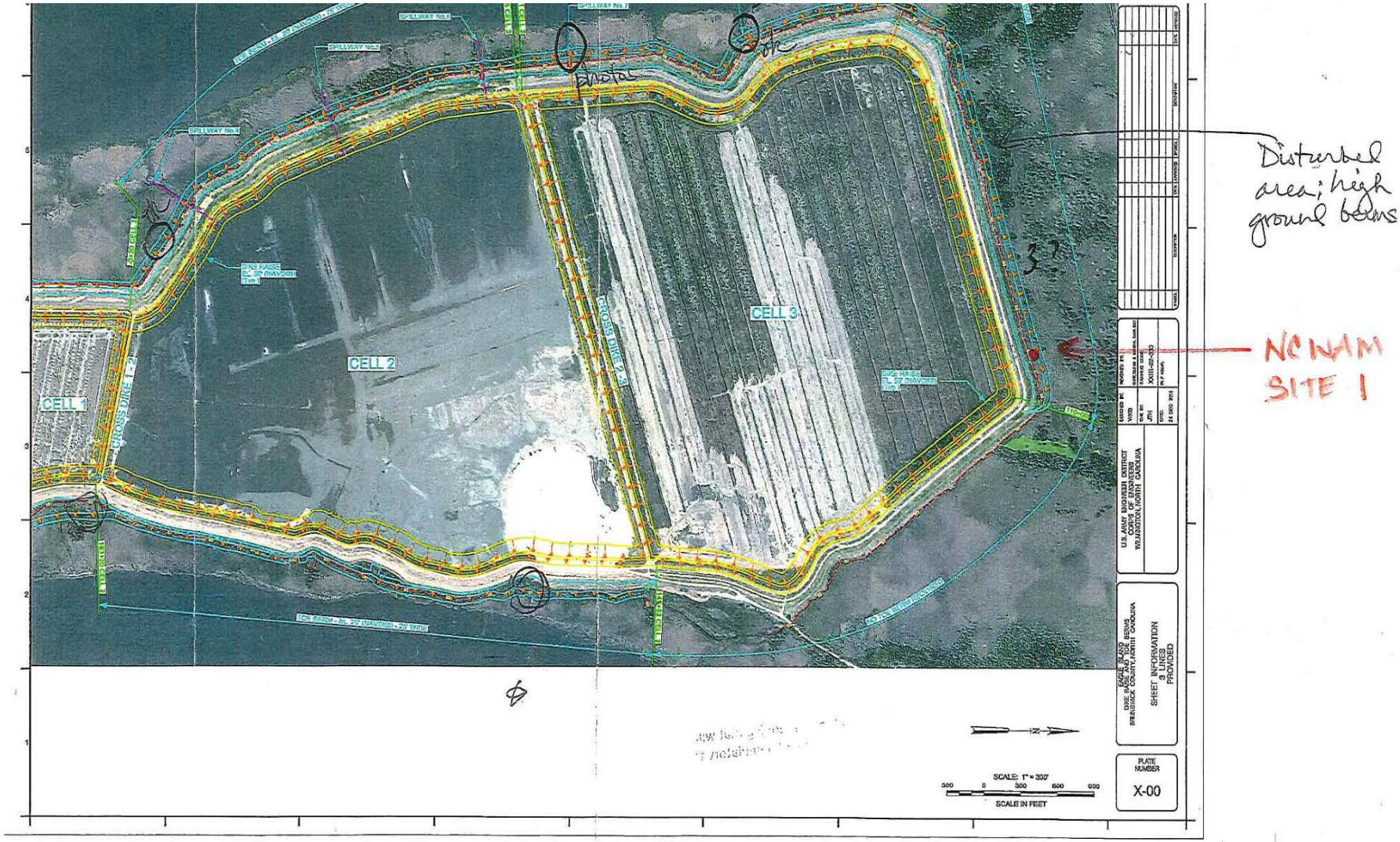


Figure 6. Footprint of the 50' Toe Berms for Cells 2 & 3

Appendix E, Figure 2a: Map of NCWAM Locations (Cells 2 & 3)

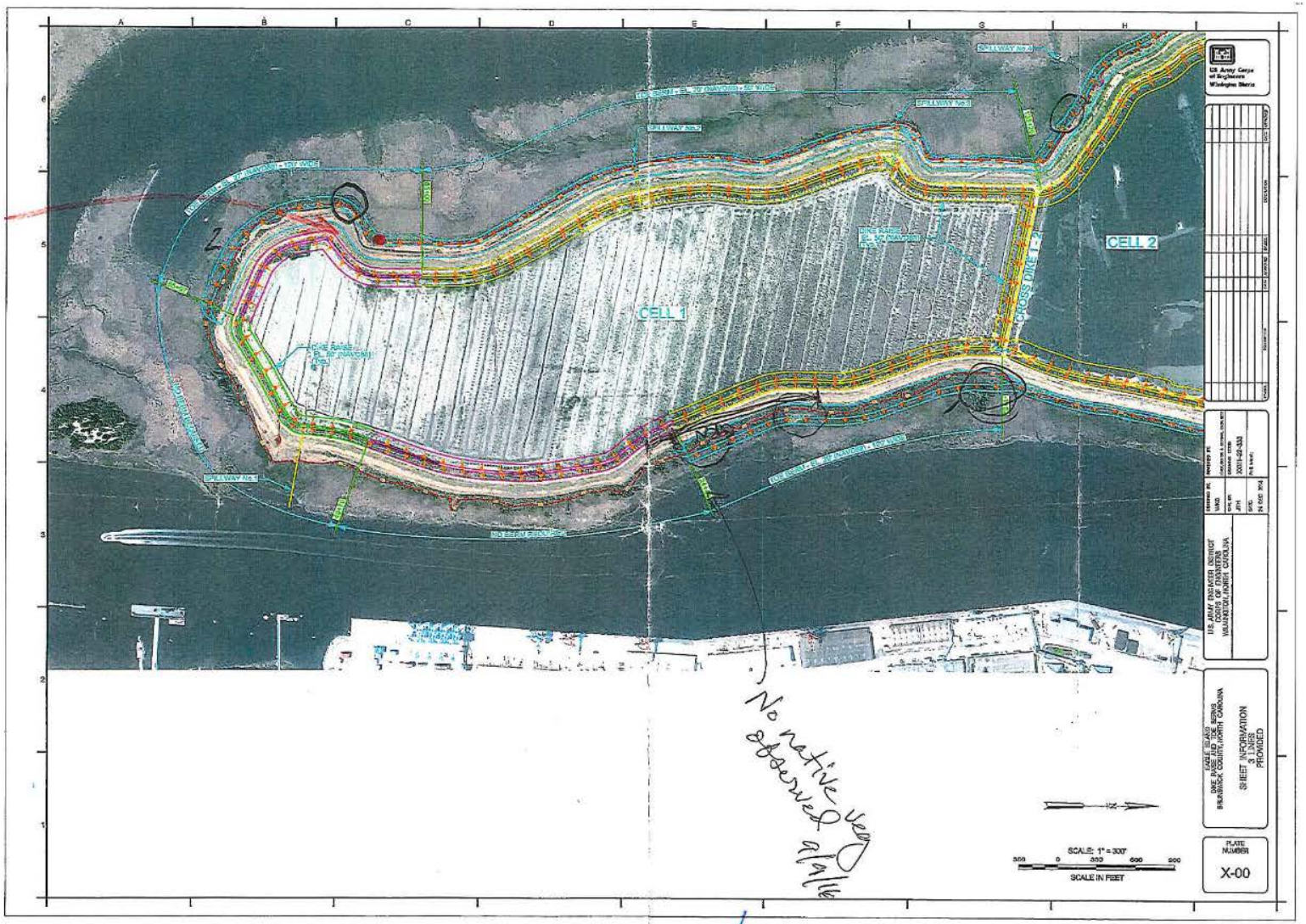


Figure 5. Footprint of the 50' Toe Berm for Cell 1

Appendix E, Figure 2b: Map of NCWAM Locations (Cell 1)

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 4.1

Wetland Site Name	Eagle Is Cell 3	Date	9/9/16
Wetland Type	Non-Tidal Freshwater Marsh	Assessor Name/Organization	T. Hughes / USACE
Level III Ecoregion		Nearest Named Water Body	Cape Fear River
River Basin	Lower Cape Fear	USGS 8-Digit Catalogue Unit	03030001
☐ Yes ☒ No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	34.224226 -77.965327

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☐ Yes ☒ No

Regulatory Considerations (select all that apply to the assessment area)

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☒ Blackwater
☐ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

No!

Historic impacts to Alligator Creek have resulted in a cut off from tidal influence. SRH

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☒ No

1. **Ground Surface Condition/Vegetation Condition – assessment area condition metric**

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒A	☐A	Not severely altered
☐B	☒B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, reduced diversity [if appropriate], hydrologic alteration)

2. **Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☒A	☒A	Water storage capacity and duration are not altered.
☐B	☐B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐C	☐C	Water storage capacity or duration is substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. **Water Storage/Surface Relief – assessment area/wetland type condition metric (evaluate for non-marsh wetlands only)**

Check a box in each column for each group below. Select for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐A	☐A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐B	☐B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐C	☐C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☐D	☐D	Depressions able to pond water < 3 inches deep

skip

3b.	☐A	Evidence that maximum depth of inundation is greater than 2 feet
	☐B	Evidence that maximum depth of inundation is between 1 and 2 feet
	☐C	Evidence that maximum depth of inundation is less than 1 foot

Appendix E, Figure 3: NCWAM Forms ix

4. **Soil Texture/Structure – assessment area condition metric**

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent guidance for National Technical Committee for Hydric Soils regional indicators.

4a.
- ☐A Sandy soil
- ☒B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐C Loamy or clayey soils not exhibiting redoximorphic features
- ☐D Loamy or clayey gleyed soil
- ☐E Histosol or histic epipedon

4b.
- ☐A Soil ribbon < 1 inch
- ☒B Soil ribbon ≥ 1 inch

4c.
- ☒A No peat or muck presence
- ☐B A peat or muck presence

5. **Discharge into Wetland – assessment area opportunity metric**

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☒A	☒A	Little or no evidence of pollutants or discharges entering the assessment area
☐B	☐B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐C	☐C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. **Land Use – opportunity metric**

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

WS	5M	2M	
☒A	☒A	☒A	≥ 10% impervious surfaces
☐B	☐B	☐B	< 10% impervious surfaces
☐C	☐C	☐C	Confined animal operations (or other local, concentrated source of pollutants)
☐D	☐D	☐D	≥ 20% coverage of pasture
☐E	☐E	☐E	≥ 20% coverage of agricultural land (regularly plowed land)
☐F	☐F	☐F	≥ 20% coverage of maintained grass/herb
☐G	☐G	☐G	≥ 20% coverage of clear-cut land
☐H	☐H	☐H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. **Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?
☐Yes ☒No If Yes, continue to 7b. If No, skip to Metric 8.
Wetland buffer need only be present on one side of the open water. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is wetland?
- ☐A ≥ 50 feet
- ☐B From 30 to < 50 feet
- ☐C From 15 to < 30 feet
- ☐D From 5 to < 15 feet
- ☐E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
☐≤ 15-feet wide ☐> 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
☐Yes ☐No

7e. Is the tributary or other open water sheltered or exposed?
- ☐Sheltered – open water width < 2500 feet and no regular boat traffic.
- ☐Exposed – open water width ≥ 2500 feet or regular boat traffic.

8. **Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate for riparian wetlands only)**

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

WT	WC	
☒A	☒A	≥ 100 feet
☐B	☐B	From 80 to < 100 feet
☐C	☐C	From 50 to < 80 feet
☐D	☐D	From 40 to < 50 feet
☐E	☐E	From 30 to < 40 feet
☐F	☐F	From 15 to < 30 feet
☐G	☐G	From 5 to < 15 feet
☐H	☐H	< 5 feet

x

9. **Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- ☐A Evidence of short-duration inundation (< 7 consecutive days)
- ☐B Evidence of saturation, without evidence of inundation
- ☒C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. **Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- ☒A Sediment deposition is not excessive, but at approximately natural levels.
- ☐B Sediment deposition is excessive, but not overwhelming the wetland.
- ☐C Sediment deposition is excessive and is overwhelming the wetland.

11. **Wetland Size – wetland type/wetland complex condition metric**

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
☐A	☐A	☐A	≥ 500 acres
☒B	☒B	☐B	From 100 to < 500 acres
☐C	☐C	☐C	From 50 to < 100 acres
☐D	☐D	☐D	From 25 to < 50 acres
☐E	☐E	☐E	From 10 to < 25 acres
☐F	☐F	☐F	From 5 to < 10 acres
☐G	☐G	☐G	From 1 to < 5 acres
☐H	☐H	☐H	From 0.5 to < 1 acre
☐I	☐I	☐I	From 0.1 to < 0.5 acre
☐J	☐J	☐J	From 0.01 to < 0.1 acre
☐K	☐K	☐K	< 0.01 acre or assessment area is clear-cut

12. **Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- ☐A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ☐B Pocosin is < 90% of the full extent of its natural landscape size.

skip

13. **Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

Well	Loosely	
☐A	☐A	≥ 500 acres
☒B	☐B	From 100 to < 500 acres
☐C	☐C	From 50 to < 100 acres
☐D	☐D	From 10 to < 50 acres
☐E	☐E	< 10 acres
☐F	☐F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only.**

☒Yes ☐No Wetland type has a surface hydrology connection to open waters/tributary or tidal wetlands.

14. **Edge Effect – wetland type condition metric (skip for all marshes)**

skip

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass.

- ☐A No artificial edge within 150 feet in all directions
- ☐B No artificial edge within 150 feet in four (4) to seven (7) directions
- ☐C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. **Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

skip

- ☐A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ☐B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- ☐C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. **Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- ☐A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
- ☐B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ☒C Vegetation is dominated by exotic species (> 50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒Yes ☐No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to17c for non-marsh wetlands.

☒A ≥ 25% coverage of vegetation
☐B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	☐A	☐A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	☐B	☐B	Canopy present, but opened more than natural gaps
	☐C	☐C	Canopy sparse or absent
Mid-Story	☐A	☐A	Dense mid-story/sapling layer
	☐B	☐B	Moderate density mid-story/sapling layer
	☐C	☐C	Mid-story/sapling layer sparse or absent
Shrub	☐A	☐A	Dense shrub layer
	☐B	☐B	Moderate density shrub layer
	☐C	☐C	Shrub layer sparse or absent
Herb	☐A	☐A	Dense herb layer
	☐B	☐B	Moderate density herb layer
	☐C	☐C	Herb layer sparse or absent

18. Snags – wetland type condition metric

☐A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
☒B Not A

19. Diameter Class Distribution – wetland type condition metric

☐A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
☒C Majority of canopy trees are < 6 inches DBH or no trees.

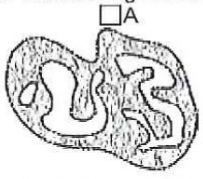
20. Large Woody Debris – wetland type condition metric

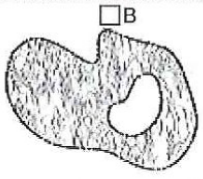
Include both natural debris and man-placed natural debris.

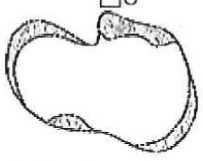
☐A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒B Not A

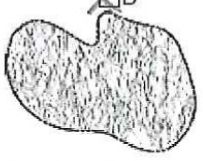
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐A 

☐B 

☐C 

☒D 

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☒A Overbank and overland flow are not severely altered in the assessment area.
☐B Overbank flow is severely altered in the assessment area.
☐C Overland flow is severely altered in the assessment area.
☐D Both overbank and overland flow are severely altered in the assessment area.

Notes

Dense phrag 10-12 ft high

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name	Site 1	Date	9/9/16
Wetland Type	Non-Tidal Freshwater Marsh	Assessor Name/Organization	Hughes/USACE

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	YES
Wetland is intensively managed (Y/N)	NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	NO
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	YES
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**HIGH**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**MEDIUM**
Water Quality	Condition	**MEDIUM**
	Condition/Opportunity	**MEDIUM**
	Opportunity Presence? (Y/N)	**NO**
Habitat	Condition	**LOW**

Overall Wetland Rating **MEDIUM**

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 4.1

Wetland Site Name	Eagle Is. Cell 1	Date	9/9/16
Wetland Type	Tidal Freshwater Marsh	Assessor Name/Organization	Hughes / USACE
Level III Ecoregion		Nearest Named Water Body	Brunswick River
River Basin	Lower Cape Fear	USGS 8-Digit Catalogue Unit	03030001
☐ Yes ☒ No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	34.189709 -77.965751

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☐ Yes ☐ No

Regulatory Considerations (select all that apply to the assessment area)

- ☒ Anadromous fish
- ☒ Federally protected species or State endangered or threatened species
- ☐ NCDWQ riparian buffer rule in effect
- ☒ Abuts a Primary Nursery Area (PNA)
- ☐ Publicly owned property
- ☒ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- ☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- ☐ Designated NCNHP reference community
- ☒ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- ☒ Blackwater
- ☐ Brownwater
- ☒ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☒ Both

crabs present

Is the assessment area on a coastal island? ☐ Yes ☐ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☐ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☐ No

1. **Ground Surface Condition/Vegetation Condition – assessment area condition metric**

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒A	☐A	Not severely altered
☐B	☒B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, reduced diversity [if appropriate], hydrologic alteration)

2. **Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☒A	☒A	Water storage capacity and duration are not altered.
☐B	☐B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐C	☐C	Water storage capacity or duration is substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. **Water Storage/Surface Relief – assessment area/wetland type condition metric (evaluate for non-marsh wetlands only)**

Check a box in each column for each group below. Select for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐A	☐A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐B	☐B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐C	☐C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☐D	☐D	Depressions able to pond water < 3 inches deep

Surf

3b.	☐A	Evidence that maximum depth of inundation is greater than 2 feet
	☐B	Evidence that maximum depth of inundation is between 1 and 2 feet
	☐C	Evidence that maximum depth of inundation is less than 1 foot

4. **Soil Texture/Structure – assessment area condition metric**

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent guidance for National Technical Committee for Hydric Soils regional indicators.

4a.
- ☒A Sandy soil
- ☐B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐C Loamy or clayey soils not exhibiting redoximorphic features
- ☐D Loamy or clayey gleyed soil
- ☐E Histosol or histic epipedon

4b.
- ☒A Soil ribbon < 1 inch
- ☐B Soil ribbon ≥ 1 inch

4c.
- ☒A No peat or muck presence
- ☐B A peat or muck presence

5. **Discharge into Wetland – assessment area opportunity metric**

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☒A	☒A	Little or no evidence of pollutants or discharges entering the assessment area
☐B	☐B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐C	☐C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. **Land Use – opportunity metric**

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

WS	5M	2M	
☒A	☒A	☒A	≥ 10% impervious surfaces
☐B	☐B	☐B	< 10% impervious surfaces
☐C	☐C	☐C	Confined animal operations (or other local, concentrated source of pollutants)
☐D	☐D	☐D	≥ 20% coverage of pasture
☐E	☐E	☐E	≥ 20% coverage of agricultural land (regularly plowed land)
☐F	☐F	☐F	≥ 20% coverage of maintained grass/herb
☐G	☐G	☐G	≥ 20% coverage of clear-cut land
☐H	☐H	☐H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. **Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?
☐Yes ☒No If Yes, continue to 7b. If No, skip to Metric 8.
Wetland buffer need only be present on one side of the open water. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is wetland?
- ☐A ≥ 50 feet
- ☐B From 30 to < 50 feet
- ☐C From 15 to < 30 feet
- ☐D From 5 to < 15 feet
- ☐E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
☐≤ 15-feet wide ☐> 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
☐Yes ☐No

7e. Is the tributary or other open water sheltered or exposed?
- ☐Sheltered – open water width < 2500 feet and no regular boat traffic.
- ☐Exposed – open water width ≥ 2500 feet or regular boat traffic.

8. **Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate for riparian wetlands only)**

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

WT	WC	
☒A	☒A	≥ 100 feet
☐B	☐B	From 80 to < 100 feet
☐C	☐C	From 50 to < 80 feet
☐D	☐D	From 40 to < 50 feet
☐E	☐E	From 30 to < 40 feet
☐F	☐F	From 15 to < 30 feet
☐G	☐G	From 5 to < 15 feet
☐H	☐H	< 5 feet

x

9. **Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- [x] A Evidence of short-duration inundation (< 7 consecutive days)
- [ ] B Evidence of saturation, without evidence of inundation
- [ ] C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. **Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- [x] A Sediment deposition is not excessive, but at approximately natural levels.
- [ ] B Sediment deposition is excessive, but not overwhelming the wetland.
- [ ] C Sediment deposition is excessive and is overwhelming the wetland.

11. **Wetland Size – wetland type/wetland complex condition metric**

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
☐A	☐A	☐A	≥ 500 acres
☒B	☒B	☐B	From 100 to < 500 acres
☐C	☐C	☐C	From 50 to < 100 acres
☐D	☐D	☐D	From 25 to < 50 acres
☐E	☐E	☐E	From 10 to < 25 acres
☐F	☐F	☐F	From 5 to < 10 acres
☐G	☐G	☐G	From 1 to < 5 acres
☐H	☐H	☐H	From 0.5 to < 1 acre
☐I	☐I	☐I	From 0.1 to < 0.5 acre
☐J	☐J	☐J	From 0.01 to < 0.1 acre
☐K	☐K	☐K	< 0.01 acre or assessment area is clear-cut

12. **Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

skip

- [ ] A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- [ ] B Pocosin is < 90% of the full extent of its natural landscape size.

13. **Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

Well	Loosely	
☐A	☐A	≥ 500 acres
☐B	☒B	From 100 to < 500 acres
☐C	☐C	From 50 to < 100 acres
☒D	☐D	From 10 to < 50 acres
☐E	☐E	< 10 acres
☐F	☐F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only.**

- [ ] Yes [ ] No Wetland type has a surface hydrology connection to open waters/tributary or tidal wetlands.

14. **Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass.

skip

- [ ] A No artificial edge within 150 feet in all directions
- [ ] B No artificial edge within 150 feet in four (4) to seven (7) directions
- [ ] C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. **Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

skip

- [ ] A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- [ ] B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- [ ] C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. **Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- [ ] A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
- [ ] B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- [x] C Vegetation is dominated by exotic species (> 50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒Yes ☐No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to17c for non-marsh wetlands.

☒A ≥ 25% coverage of vegetation
☐B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	☐A	☐A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	☐B	☐B	Canopy present, but opened more than natural gaps
	☐C	☐C	Canopy sparse or absent
Mid-Story	☐A	☐A	Dense mid-story/sapling layer
	☐B	☐B	Moderate density mid-story/sapling layer
	☐C	☐C	Mid-story/sapling layer sparse or absent
Shrub	☐A	☐A	Dense shrub layer
	☐B	☐B	Moderate density shrub layer
	☐C	☐C	Shrub layer sparse or absent
Herb	☐A	☐A	Dense herb layer
	☐B	☐B	Moderate density herb layer
	☐C	☐C	Herb layer sparse or absent

skip

18. Snags – wetland type condition metric

☐A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
☒B Not A

19. Diameter Class Distribution – wetland type condition metric

☐A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
☒C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

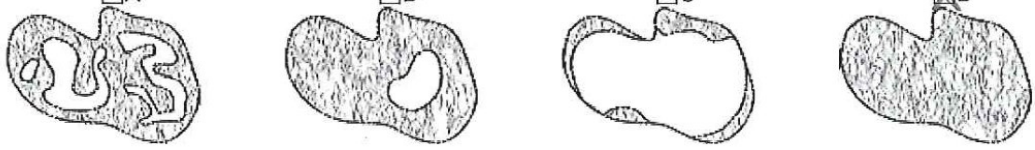
Include both natural debris and man-placed natural debris.

☐A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐A ☐B ☐C ☒D



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☒A Overbank and overland flow are not severely altered in the assessment area.
☐B Overbank flow is severely altered in the assessment area.
☐C Overland flow is severely altered in the assessment area.
☐D Both overbank and overland flow are severely altered in the assessment area.

Notes

AA is beyond toe of berm where lots of seepage is occuring however, standing water not evident as expected.

Avian warning sounds were heard from 20-50 ft away possibly indicating a birds nest in the phragmites?

Very dense phrag 12-14 ft high

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name	Site 2	Date	9/9/16
Wetland Type	Tidal Freshwater Marsh	Assessor Name/Organization	Hughes/USACE

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	YES
Wetland is intensively managed (Y/N)	NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	NO
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	YES
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	NA
	Landscape Patch Structure	Condition	NA
	Vegetation Composition	Condition	NA

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**HIGH**
Water Quality	Condition	**HIGH**
	Condition/Opportunity	**HIGH**
	Opportunity Presence? (Y/N)	**YES**
Habitat	Condition	**LOW**

Overall Wetland Rating **HIGH**

L:\WETLANDS\2013WETLANDSFILES\01-13-038A---LCUMB, Monitoring,JonVincent\SiteCompositeLocationMap\Map

*Boundaries are approximate and are not meant to be absolute.

Map Source: 2012 NC ONE Map

Eagle Island Dike Improvement & Sneeden Tracts Brunswick County, NC September 2016 LMG # 01-13-038	LMG Land Management Group Inc. Environmental Consultants www.lmgroup.net 3805 Wrightsville Avenue Wilmington, NC 28403 Phone: 910.452.0001 Fax: 910.452.0060	**Figure 1** **Vicinity Map**

Appendix E, Figure 4: Lower Cape Fear Umbrella Mitigation Bank (LCFUMB), Sneeden Tract Map

LOWER CAPE FEAR UMBRELLA MITIGATION BANK
STATEMENT OF CREDIT AVAILIBILITY

March 3, 2017
(update of reservation letter dated November 16, 2016)

TO: Emily Hughes
USACE – Wilmington District
Environmental Resources Section
69 Darlington Ave.
Wilmington, NC 28403

FROM: Lower Cape Fear Umbrella Mitigation Bank
c/o Land Management Group, Inc.
3805 Wrightsville Avenue, Suite 15
Wilmington, NC 28403

Project: Eagle Island Dike Raise Project (Brunswick County, NC)

Dear Ms. Hughes:

Pursuant to your recent credit request, the Lower Cape Fear Umbrella Mitigation Bank (LCFUMB) is providing confirmation of acceptance to supply riverine wetland credits for proposed impacts associated with the Corps of Engineer's Eagle Island Dike Raise Project in Brunswick County, NC. This acceptance is conditional upon receipt of payment as outlined below. Please refer to the table below depicting the type and quantity of credits requested and reserved for your project.

Mitigation Type	Credits Reserved	Fee Per Unit	Fee
Stream	0	$390.00	$0.00
Non- Riparian Wetland	0.0	$51,370.00	$0.00
Riparian (Riverine) Wetland	35.5	$71,273.00	$2,530,191.50
		Total Fee	**$2,530,191.50**

Based upon receipt of your credit request transmitted by email on November 14, 2016 and your recent request to extend the reservation, LCFUMB will reserve 35.5 riparian (riverine) wetland credits until December 31, 2017.

Upon request for receipt of credit transfer, LCFUMB will issue an invoice in the amount of $2,530,191.50. Upon receipt of payment, LCFUMB will provide an executed Transfer of Credit Certificate.

If you have any questions or need additional information, please contact me by phone at (910) 452-0001 or by email at cpreziosi@lmgroup.net.

Sincerely,

Land Management Group, Inc. (agent for LCFUMB)

Christian Preziosi

Digitally signed by Christian Preziosi
DN: cn=Christian Preziosi, o=Land Management Group, Inc., ou, email=cpreziosi@lmgroup.net, c=US
Date: 2017.03.03 16:00:06 -05'00'

Christian Preziosi
Section Manager

Appendix E, Figure 5: LCFUMB Signed Acceptance/Reservation Letter

APPENDIX F

N.C. DIVISION OF COASTAL MANAGEMENT CONSISTENCY CONCURRENCE

Coastal Management
ENVIRONMENTAL QUALITY

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
BRAXTON C. DAVIS
Director

February 24, 2017

Ms. Jennifer L. Owens
Chief, Environmental Resources Section
Wilmington District, US Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403-1343

SUBJECT: **CD17-0010** Consistency Concurrence concerning the proposed construction of dike raises on Eagle Island, Cape Fear River, New Hanover and Brunswick Counties, North Carolina (DCM#20170010)

Dear Ms. Owens:

We received your revised consistency submission on January 27, 2017, concerning the proposed construction of dike raises on Eagle Island, Cape Fear River, New Hanover and Brunswick Counties, North Carolina.

North Carolina's coastal zone management program consists of, but is not limited to, the Coastal Area Management Act, the State's Dredge and Fill Law, Chapter 7 of Title 15A of North Carolina's Administrative Code, and the land use plan of the County and/or local municipality in which the proposed project is located. It is the objective of the Division of Coastal Management (DCM) to manage the State's coastal resources to ensure that proposed Federal activities would be compatible with safeguarding and perpetuating the biological, social, economic, and aesthetic values of the State's coastal waters.

DCM has reviewed the submitted information pursuant to the management objectives and enforceable policies of Subchapters 7H and 7M of Chapter 7 in Title 15A of the North Carolina Administrative Code and concurs that the proposed Federal activity by

the U.S. Army Corps of Engineers is consistent, to the maximum extent practicable, with North Carolina's certified coastal management program.

Prior to the initiation of the activities described, the applicant should obtain any required State approvals or authorizations. In accordance with commitments made by USACE, and in order to protect anadromous finfish resources, no construction of the toe berms below MHW is authorized between April 1-July 31 of any year without coordination with DCM. Additionally, in order to compensate for the impacts associated with the proposed project, mitigation shall be provided in accordance with the plan outlined in the submitted revised consistency determination. Should the proposed action be modified, a revised consistency determination could be necessary. This might take the form of either a supplemental consistency determination pursuant to 15 CFR 930.46, or a new consistency determination pursuant to 15 CFR 930.36. Likewise, if further project assessments reveal environmental effects not previously considered by the proposed development, a supplemental consistency certification may be required. If you have any questions, please contact me at 252-808-2808 x215. Thank you for your consideration of the North Carolina Coastal Management Program.

Sincerely,

Daniel Govoni
Policy Analyst

State of North Carolina | Environmental Quality | Coastal Management
Morehead City Office | 400 Commerce Avenue | Morehead City, NC 28557
252 808 2808