AH Environmental Consultants, Inc.

FINAL

WETLAND DELINEATION REPORT

Road Shoulder Widening Bodie Island Entrance/ North Carolina State Route 12

Cape Hatteras National Seashore
Dare County North Carolina

Prepared for the

FEDERAL HIGHWAY ADMINISTRATION
and the
NATIONAL PARK SERVICE

May 2010

APPENDICES

ACRONYMS

AEC	Area of Environmental Concern
CAMA	Coastal Area Management Act
CRC	Coastal Resources Commission
CZMA	Federal Coastal Zone Management Act
DO	Director's Order
FHWA	Federal Highway Administration
NC	North Carolina
NPS	National Park Service
NWI	National Wetlands Inventory
PRS	Park Roads Standards
Sq ft	Square Feet
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

1 INTRODUCTION

The National Park Service (NPS), in cooperation with the Federal Highway Administration (FHWA) proposes to improve North Carolina State Route 12 (NC-12) from Whalebone Junction south for approximately 5.28 miles. The proposed roadway improvements would include shoulder widening, culvert replacement, and the construction of drainage swales, in addition to milling and paving the existing roadway. Areas with a potential for wetland presence were determined by NPS and are the focus of this delineation. A wetland delineation verification and a jurisdictional determination will be sought from the US Army Corps of Engineers (USACE), Wilmington District. A wetlands functional assessment of the aquatic resources located within the project study area will also be conducted.

2 PROJECT DESCRIPTION

The study area consists of a portion of the Bodie Island Entrance Road (NPS Route 10) which is a portion of NC-12, and is the main access route for park visitors to the three main islands at Cape Hatteras National Seashore in Dare County, North Carolina. The road is classified as a Principal Park Road as described in the Park Roads Standards (PRS). The posted speed limit along NC-12 is 55 miles per hour and the terrain is relatively flat. The section of road in the study area is two-lane with 11-foot paved lanes and 2-foot paved shoulders plus an additional 12-foot or greater turf shoulder.

As part of the proposed improvements, the 2-foot paved shoulders would be widened by 3 feet to provide 5-foot paved shoulders on each side of the roadway The existing roadway pavement would be milled, and new asphalt would be placed. Associated storm water treatment features would be re-constructed to treat storm water resulting from the additional impervious surface. Three culverts within the study area would be extended and/or replaced where necessary.

The area identified by the NPS with a potential for wetland presence and impacts (study area) includes the roadway shoulders approximately 30 feet from the edge of pavement on each side of NC 12 from Station 261+00 to Station 291+70 which is equivalent to 3,070 linear feet on each side of the road. Station numbers refer to the linear distance in

feet, stated in surveying/engineering terms, starting at the intersection of NC-12 and NC-158 at Whalebone junction. The station numbers increase correspondingly as one moves south along NC-12. Three culvert locations at approximately Station 97+20, 80', 140+25, 70' and 164+20, 55' are included in the study area (Appendix A). An area of about 4,000 square feet was identified for delineation at each culvert location.

3 FEDERAL AND STATE REQUIREMENTS

The USACE administers the Clean Water Act Section 404 program in North Carolina and prior authorization from the USACE is required for any projects that may impact jurisdictional areas. If the USACE determines that a Section 404 permit is required, then a Section 401 Water Quality Certification is also required. The North Carolina Department of Water Quality has responsibility for this certification program. Issuance of a 401 Certification certifies that a given project will not degrade Waters of the State or otherwise violate water quality standards. The project is located within the Cape Hatteras National Seashore, a National Park Unit; therefore, conforming to the NPS Director's Order (DO) #77-1 (NPS 2002) was also the intent of this study.

3.1 Waters of the United States

"Waters of the United States" are within the jurisdiction of the USACE pursuant to the Clean Water Act (1969). Jurisdictional Waters of the United States is a broad term which includes waters that have been historically used, or are currently used or could be used, for interstate commerce. They include certain vegetated and non-vegetated wetlands, ponds, lakes, territorial seas, rivers, and tributary streams that include any definable intermittent waterway and some ditches below the ordinary high water mark (OHWM). Water bodies which are no longer being actively mined or constructed, such as quarries, lakes and ponds, may also be included, depending on their proximity and/or connection to other waters of the United States. Wetlands are considered special aquatic sites and typically involve more rigorous regulatory permitting requirements than open waters.

3.2 Executive Order 11990

Executive Order (EO) 11990, *Protection of Wetlands*, requires that government agencies provide leadership and take actions to:

- Minimize the destruction, loss, or degradation of wetlands, and
- Preserve and enhance the natural and beneficial values of wetlands.

The intent of EO 11990 is to avoid, to the extent possible, long and short-term adverse impacts by destroying or modifying wetlands, and to avoid direct or indirect support of new construction in wetlands if a practical alternative exists. Compliance with EO 11990 is required for all activities that are funded, sanctioned, supported, or regulated by the federal government.

3.3 Executive Order 11988

EO 11988, *Floodplain Management*, requires the following of all federal agencies:

- Provide leadership and take actions to reduce the risk of flood loss
- Minimize the impacts of floods on human safety, health and welfare, and
- Restore and preserve the natural and beneficial values of floodplains in acquisition, management, and disposal of federal lands.

This EO designates floodplains as the lowland and flat areas adjoining inland and coastal waters, including flood-prone areas on offshore islands that have a one percent or greater chance of flooding in any given year (otherwise known as the 100-year floodplain).

3.4 North Carolina Coastal Area Management Act

North Carolina's Coastal Area Management Act (CAMA) requires permits for development in Areas of Environmental Concern (AEC). AECs were established by the Coastal Resources Commission (CRC). An AEC is an area of national importance—it may be easily destroyed by erosion or flooding, or it may have environmental, social, economic or aesthetic values that make it valuable to the State of North Carolina. The CRC classifies areas as AECs to protect them from uncontrolled development, which may cause irreversible damage to property, public health or the environment. The proposed project is located in Dare County which is covered by CAMA regulations. Impacts to vegetated wetlands, navigable waters or areas with 75 feet of the mean high water line along an estuarine shoreline, among other criteria, are designated AECs.

Section 103(5)(b) of CAMA exempts road maintenance within a public right-of-way for projects that are State or locally funded. However, because North Carolina's Coastal Management Program is a federally approved program, the State is still required to comply and the exemption no longer applies. Since this project is funded by a federal agency, the requirement to demonstrate federal consistency exists under the Federal Coastal Zone Management Act (CZMA). A federal Coastal Zone Consistency Determination will be required prior to project implementation.

3.5 National Park Service Procedural Manual #77-1: Wetland Protection

For the purpose of implementing EO 11990 (see 3.2 above), the NPS is required through DO #77-1, to protect any area that is classified as a wetland according to the US Fish and Wildlife Service's *Classification of Wetlands and Deepwater Habitats of the United States*(Cowardin et al. 1979). All wetlands falling under the Cowardin classification are subject to the procedures included in NPS *Procedural Manual #77-1: Wetland Protection* (NPS 2008).

Under the Cowardin definition, a wetland must have one or more of the following three attributes (NPS 2008).

- At least periodically, the land supports predominantly hydrophytes (wetland vegetation).
- The substrate is predominately undrained hydric soil.
- The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

These three attributes encompass wetland areas that fall into five categories (NPS 2008).

- Areas with hydrophytes and hydric soils, such as those commonly known as marshes, swamps, and bogs.
- Areas without hydrophytes but with hydric soils - for example, flats where drastic fluctuations in water level, wave action, turbidity, or high concentration of salts may prevent the growth of hydrophytes.
- Areas with hydrophytes but non-hydric soils, such as margins of impoundments or excavations where hydrophytes have become established but
- hydric soils have not yet developed.
- Areas without soils but with hydrophytes such as the seaweed-covered
- portion of rocky shores.
- Wetlands without soil and without hydrophytes, such as gravel beaches or rocky shores without vegetation.

The Cowardin wetland definition encompasses more aquatic habitat types than the definition (33 CFR 328.3) and the 1987 delineation manual used by the USACE for

wetlands subject to Section 404 of the Clean Water Act (see section 4 below). The USACE 1987 delineation manual requires that all three wetland parameters (hydrophytic vegetation, hydric soil, wetland hydrology) be present in order for an area to be considered a wetland (with some exceptions for "atypical situations" and "problem areas"). The Cowardin wetland definition includes such wetlands, but also adds some areas that, though lacking vegetation and/or soils due to natural physical or chemical factors such as wave action or high salinity, are still saturated or shallow inundated environments that support aquatic life (e.g., unvegetated stream shallows, mudflats, rocky shores). Most of these additional shallow aquatic environments, as well as most deepwater habitats, are still regulated as Waters of the US under the 404 permit program although they may not be classed as wetlands by the USACE.

The study area contained both vegetation and soils, therefore in accordance with NPS Procedural Manual #77-1, the USACE 1987 wetland delineation manual, including "problem area" and "atypical situation" procedures, was used (see section 4 below).

The study area also contains unvegetated areas such as stream channels, therefore the limits of these systems were determined as described in Cowardin et al. (1979), and in accordance with NPS Procedural Manual #77-1.

4 WETLAND DELINEATION

Wetland boundaries are delineated in the field using the three technical parameters – hydric soils, wetland hydrology and hydrophytic vegetation – and in accordance with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). Beginning 3 January 2009, the USACE requires the use of the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* (the 2009 Supplement) (USACE 2008) for delineations conducted using the 1987 Manual. The 2009 Supplement includes revised wetland delineation data forms and additional field indicators for the three technical parameters. Although the 2009 Supplement is in a one year trial period, its use is mandatory.

4.1 Hydric Soils

Hydric soils are defined in the 1987 Manual as soils that are saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part

(within 12 inches) of the soil profile. The anaerobic conditions created by repeated or prolonged saturation, or flooding result in permanent changes in soil color and chemistry, which are used to differentiate hydric soils from non-hydric soils.

The use of *Field Indicators of Hydric Soils in the United States* (USDA 1988b) has been incorporated into the 2009 Supplement. A regionally modified and revised edition of that publication, *Field Indicators of Hydric Soils in the Mid-Atlantic United States*, version 6.0, developed by EPA's Mid-Atlantic Hydric Soils Committee (undated) was used for this delineation.

4.2 Wetland Hydrology

Wetland hydrology is defined as the presence of water for a significant period of time at or near the surface (within the root zone) during the growing season. Wetland hydrology may be present only seasonally, and is often inferred by indirect evidence (field indicators). Hydrology is controlled by such factors as seasonal and long-term rainfall patterns, local geology and topography, landscape position, soil type, local water table conditions, and drainage. Primary indicators of hydrology include inundation, high water table, soil saturation in the upper 12 inches of the soil, watermarks, drainage patterns, sediment deposits, water stained leaves, and oxidized rhizospheres. Secondary indictors, such drainage patterns, crayfish burrows, soil surface cracks, or passing the FAC-neutral test.

4.3 Hydrophytic Vegetation

Plant species in the United States are assigned an indicator status based on the affinity to tolerate anaerobic conditions or periods of extended ponding, flooding or soil saturation. The indicator status of each plant is expressed in terms of estimated probabilities of that species occurring in wetland conditions within a given region. The indicator categories, as defined by the 1987 Manual are as follows.

- Obligate Wetland (OBL): Occurs almost always in wetlands (estimated probability >99%) under natural conditions
- Facultative Wetland (FACW): Usually occurs in wetlands (estimated probability
- 67-99%) but occasionally found in non-wetlands
- Facultative FAC): Equally likely to occur in wetlands or non-wetlands (estimated probability 34-66%)

Facultative Upland (FACU): Usually occurs in non-wetlands but occasionally found in wetlands (estimated probability 1-33%)

- Obligate Upland (UPL): Occurs almost always in non-wetlands (estimated probability >99%) in uplands.

Plants that are listed as OBL, FACW and FAC are considered hydrophytic (wetland) species. The percentage of the dominant wetland plant species in each vegetation strata in a sample area determines the hydrophytic or wetland status of the plant community. The Southeast region of the *National Plant of Vascular Plant Species That Occur in Wetlands: 1996 National Summary* (USFWS 1997) was utilized for this delineation.

4.4 Wetland Habitats Classification

The publication, *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979) (commonly referred to as the Cowardin classification system) provides a hierarchical classification system for identifying and classifying all wetland and deepwater systems in the United States. The NPS wetland procedures require the Cowardin classification system be used for all wetland delineation and assessment projects. The system was applied to this project.

5 SITE INVESTIGATION

There are two types of wetland delineation methods: the comprehensive and routine. Comprehensive determinations include establishing transect lines and making observations at predetermined fixed intervals along the transect lines. Routine determinations use representative wetland and upland locations for data collection. The routine determination methodology for wetland delineation was used for this project.

The delineation of jurisdictional waters of the US, including wetlands, was based on the 1987 Manual and the 2009 Supplement. The habitat classification followed the Cowardin classification system.

Prior to conducting the site investigation, several sources of information were obtained and reviewed to identify various resources within the project study area and to establish the probability and approximate location of wetlands.

- National Wetland Inventory (NWI) Maps are reasonable predictors for locating wetlands in the field. The NWI overlay of the Roanoke Island NE Quadrangle

map was obtained and reviewed prior to conducting field investigations. A portion of the NWI map which includes the study area is provided at Appendix B.

- Using the on-line Web Soil Survey, a customized soil resources report was produced for the project on 24 July 2009 (see Appendix C, *Soil Resources Report for Dare County, North Carolina, NPS Cape Hatteras NC-12 Improvement Project*). Because of the minimum mapping polygon size used to produce the online report, roughly 5 acres, many inclusions and/or small man induced disturbances, such as excavation or fill, may not be included in the Web Soil Survey, thus limiting accuracy and utility on such small sites. As a consequence, the characteristics of the soil series listed on the wetland delineation data forms, may not correspond to actual field data recorded at the individual observation points.
- Aerial photographs were obtained online and reviewed. The images were captured using either high altitude and/or satellite platforms. As such, small area resolution is generally somewhat problematic for delineation purposes, but is useful for obtaining ecosystem configurations, landscape position, surface hydrologic inputs and outputs (Appendix A).

5.1 Field Survey

The field work was conducted by R. Harold Jones, Professional Wetland Scientist, of AH during the period 16 to 19 June 2009. Field work started on the west side of NC-12 beginning at Station 261+00 and headed south to the delineation terminus at Station 291+70. Delineation pin-flags were installed along the wetland/non-wetland interface and were identified by an alpha-numeric recording system. Pin-flags were installed approximately every 45-50 feet, unless a shorter spacing was dictated by the configuration of the wetland boundary. Pin-flags numbered A-1 through A-64 were set along the west line of NC-12. The east side of NC-12 was delineated in the reverse direction, starting at Station 291+70 and heading north to Station 261+00. Pin-flags numbered B-1 through B-50 were set along the east line of NC-12. Station numbers refer to the linear distance along the roadway starting at station 0+00 at Whalebone Junction and heading south to study are terminus at Station 291+70.

Three culvert locations (C, D and E) at approximately Station 97+20,80', Station 140+25,70' and Station 164+20,55' were also included in the study area. An area of approximately 200 by 208 feet (41,600 square feet) was delineated and flagged at each culvert location. Each culvert was divided into four separate sections and identified alpha-numerically.

Culvert C was located at Station 97+20. Pin-flags identified as CA-1 through CA-13, CB-1 through CB-5, CC-1 through CC-3, and CD-1 through CD-9 were set. Culvert D was located at Station 140+25. Pin-flags identified as DA-1 through DA-3, DB-1 through DB-7, DC-1 through DC-4 and DD-1 through DD-7 were set. Culvert E was located at Station 164+20. Pin-flags identified as EA-1 through EA-4, EB-1 through EB-3, EC-1 through EC-4 and ED-1 through ED-4 were set.

5.2 Wetland Delineation Data Forms

The field data forms used were those established in the regional 2009 Supplement. These forms document how a representative sample station met or did not meet each of the three wetland parameters (wetland hydrology, wetland soil, hydrophytic vegetation). Paired data forms were completed at five (5) separate observation points. At each observation point, a data form was completed in both the wetland and non-wetland area adjacent to the set delineation pin-flag. At least one individual site data form was completed at selected observation points that represented a different wetland Cowardin classification notation for vegetated wetlands. The completed data forms are attached as Appendix D.

5.3 Wetland Boundary Survey

Following completion of the field wetland delineation, the wetland boundaries and waters of the U.S. as marked in the field, were surveyed by a professional land surveyor licensed to work in the State of North Carolina. The survey of the wetland boundary is included as Appendix E.

5.4 Photographs

Photographs of the project wetlands and non-wetlands are included in Appendix F. These photographs provide a visual representation of the different wetland and non-wetland features encountered during the delineation field work.

6 FINDINGS

The total area included in the field investigation encompassed 8.15 acres (355,174 sq. ft.) and comprised 2.80 acres (122,091 sq. ft.) of jurisdictional wetlands and 5.35 acres (233,083 sq. ft.) of non-wetland area. Those figures include upland and aquatic resources

within an expanded area of field investigation located outside of the 30 foot study area at the three culvert locations. Although the wetland delineation was surveyed by a licensed surveyor, exact figures of potentially impacted wetlands cannot be determined until the Wilmington District Regulatory office has reviewed and approved the wetland delineation and/or makes any adjustments to the alignment. Additionally, the acreage of potential impacts will not be known until after the approved alignment has been overlain on the project plans.

6.1 Community Description and Classification

The project study area is located on the leeward side of a coastal barrier island within the Pamlico Sound estuary complex. According the NWI mapping, three tidal wetland community types have been designated within the study area: E2EM1N, E2SS3EM1PD and E2SS3P (Appendix B). These mapping designations apply to the larger wetland system that adjoins the study area. Since most of the 30-foot wide study area along the roadway occupies a transition zone between the mowed shoulder and the larger estuarine wetland system, most of the vegetated wetlands located in the narrow study area would be classified as scrub-shrub rather than emergent. As a consequence, the NWI classifications noted on the project data forms may differ from the classification given on the Roanoke Island NE NWI map.

Approximately 95 percent of the wetlands located within the study area may be classified as Estuarine intertidal scrub-shrub broad-leaved deciduous (E2SS1). Dominant scrub-shrub species include bayberry (*Morella cerifera*), groundsel tree (*Baccharis halimilifolia*), saltbush (*Iva frutescens*), black willow (*Salix nigra*), red bay (*Persea borbonia*), and swamp rose (*Rosa palustris*). Dominant herbaceous species include narrow-leaved cattail (*Typha angustifolia*), common reed (*Phragmites australis*), salt meadow hay (*Spartina patens*), salt grass (*Spartina alterniflora*), marsh shield fern (*Thelypteris palustris*), royal fern (*Osmunda regalis*), false nettle (*Boehmeria cylindrica*), seaside goldenrod (*Solidago sempervirens*), and climbing hempweed (*Mikania scandens*). Dominant woody vines include poison ivy (*Toxicondendron radicans*), common greenbrier (*Smilax rotundifolia*), bullbrier (*Smilax bona-nox*), and Virginia creeper (*Parthenocissus quinquefolia*).

A very small area located on the west side of culvert D (Station 140+25) may be classified as Estuarine intertidal emergent persistent (E2EM1). This area is dominated by herbaceous species that includes black nettle rush (*Juncus roemerianus*), salt grass (*Spartina alterniflora*) and salt meadow hay (*Spartina patens*).

The remaining jurisdictional area consists of non-vegetated stream/ditch channels and bottoms located at the three culvert sites. These are classified as Estuarine intertidal streambed sand/mud/organic (E2SB2/3/4).

6.2 Jurisdictional Waters and Wetlands

Over 6,000 linear feet of vegetated wetlands were delineated and field located by the placement of 114 alpha-numeric pin-flags within the 30-foot wide study area established parallel to NC-12. The area included in the field investigation encompassed 218,374 square feet and comprised 42,388 square feet of jurisdictional vegetated wetlands and 175,986 square feet of non-wetland area.

In addition, an area of about 45,600 square feet was investigated at each of the three culverts. The following table indicates results of the delineation at each culvert site.

Table 11. Culvert Study Areas

Location	Study Area (square feet)	Jurisdictional Area (square feet)	Non-Wetland Area (square feet)
Culvert C Station 97+20	45,600	21,128	24,472
Culvert D Station 140+25	45,600	24,923	20,677
Culvert E Station 164+20	45,600	33,652	11,948

Non-vegetated open water areas (includes ditch and stream channels) were identified and delineated at each of the three culvert locations in accordance with regulations established in the USACE implementing regulations at 33 CFR 328.1 et seq. and with the NPS Procedural Manual #77-1. Although the delineation efforts at each culvert encompassed an area over an order of magnitude larger than required in the scope of

work, the following table indicates the quantity of the non-vegetated open water areas located within the study area beginning from the edge of the pavement along NC-12 outward to the end of the 30 foot study limit (Table 2).

Table 2. Non-Vegetated Open Water Area at Culvert Study Areas

Location	Non-vegetated open water area (square feet)
Culvert C Station 97+20	420
Culvert D Station 140+25	336
Culvert E Station 164+20	434

All vegetated and non-vegetated wetlands identified within the project study area would be considered Waters of the United States and are jurisdictional pursuant provisions of the Clean Water Act. The following table provides a quantification of each Corwardin wetland community type identified within the 30 foot project study limits.

Table 3. Corwardin Classification Wetland Community Types.

Location Study Sections	Cowardin Classification	Area (square feet)
A & B	E2SS1	42,388
C	E2EM1 E2SB2/3/4	207 420
D	E2SS1 E2EM1 E2SB2/3/4	1603 142 336
E	E2SS1 E2SB2/3/4	5798 434

No deep water aquatic habitats, as defined by the Cowardin classification system, were identified or located within the study area.

7 RECOMMENDATIONS

In conclusion, this report represents the best professional judgment of the project team based on knowledge and experience. However the Wilmington District Corps of Engineers has final regulatory authority over all wetland delineations and jurisdictional determinations. Verification of this report from the Wilmington District Corps regulatory office is required to confirm the findings and determination contained in this report. No land disturbing activities associated with the proposed widening of the Bodie Island entrance, should occur without verification of the jurisdictional boundaries or without prior authorization from the USACE. Once reviewed and approved by FHWA and NPS, AH will request a wetland delineation confirmation and a jurisdiction determination from the Wilmington District regulatory office.

8 NOTIFICATION OF JURISDICTIONAL DETERMINATION

The US Army Corps of Engineers, Wilmington District, Washington Field Office provided a Wetland Delineation Confirmation and Notification of Jurisdictional Determination on May 3, 2010. The jurisdictional determination will remain valid for the period not to exceed five from the date of issuance. The notification and the certified plat are attached at Appendix F.

Should the need arise that requires the NPS and/or the FHWA to extend the duration of the confirmed wetland delineation and jurisdictional determination beyond the 5-year period, the NPS should request in a writing, within 60 days of the expiration date (May 3, 2015), that USACE provide a re-verification of the Notification of Jurisdictional Determination.

9 REFERENCES

Beal, Ernest O. 1977. *A Manual of Marsh and Aquatic Vascular Plants of North Carolina with Habitat Data*. Technical Bulletin No. 247. The North Carolina Agricultural Experiment Station.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. US Army Engineer Waterways Experiment Station, Vicksburg, MS.

Executive Order No. 11988. *Floodplain Management.* 24 May 1977. 42 F.R. 26951

Executive Order 11990. Protection of Wetlands. 24 May 1977. 42 F.R. 26951

Mid-Atlantic Hydric Soils Committee. *Field Indicators of Hydric Soils in the Mid-Atlantic United States*, version 6.0. EPA Region III, Philadelphia, PA.

[NPS] National Park Service. 2008. *National Park Service Procedural Manual #77-1: Wetland Protection.*

Radford, A.E., Ahles, H.E., and Bell, C.R.. 1968. *Manual of the Vascular Flora of the Carolinas*. The University of North Carolina Press. Chapel Hill, NC.

Schoeneberger, P.J., Wysocki, D.A., Benham, E.C., and Broderson, W.D. 1968. *Field book for describing and sampling soils.* Natural Resources Conservation Service, USDA National Soil Survey Center, Lincoln, NE.

[USACE] US Army Corps of Engineers. 2008. *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*, ed. J.S. Wakeley, R.W.Lichvar, and C.V. Noble. ERDC/ELTR-08-03. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

[USDA] US Department of Agriculture, National Resources Conservation Service. 1988b. *Field Indicators of Hydric Soils of the United States*, Version 3.2. G.W. Hurt, P.M. Whited, and R.F. Pringle (eds). USDA, NRCS, Fort Worth, Texas.

[USDA] US Department of Agriculture, National Resources Conservation Service, National Cooperative Soil Survey. *Custom Soil Resource Report for Dare County, North Carolina, NPS Cape Hatteras NC-12 Improvement Project.* Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm. Accessed: 24 July 2009.

[USFWS] US Fish and Wildlife Service. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. L.M. Cowardin, V. Carter, F. C. Golet and E.T. LaRoe. Washington, D.C.

[USFWS] US Fish and Wildlife Service. 1997. *National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary.* March 3, 1997. National Wetlands Inventory, Ecology Section. Washington, DC

APPENDIX A

ROANOKE ISLAND NE QUAD AND NWI OVERLAY

ROANOKE ISLAND NE QUAD AND NWI OVERLAY
NC-12 ENTRANCE ROAD WIDENING
SCALE: 1:41,879

APPENDIX B

CUSTOM SOIL REPORT

United States Department of Agriculture

NRCS

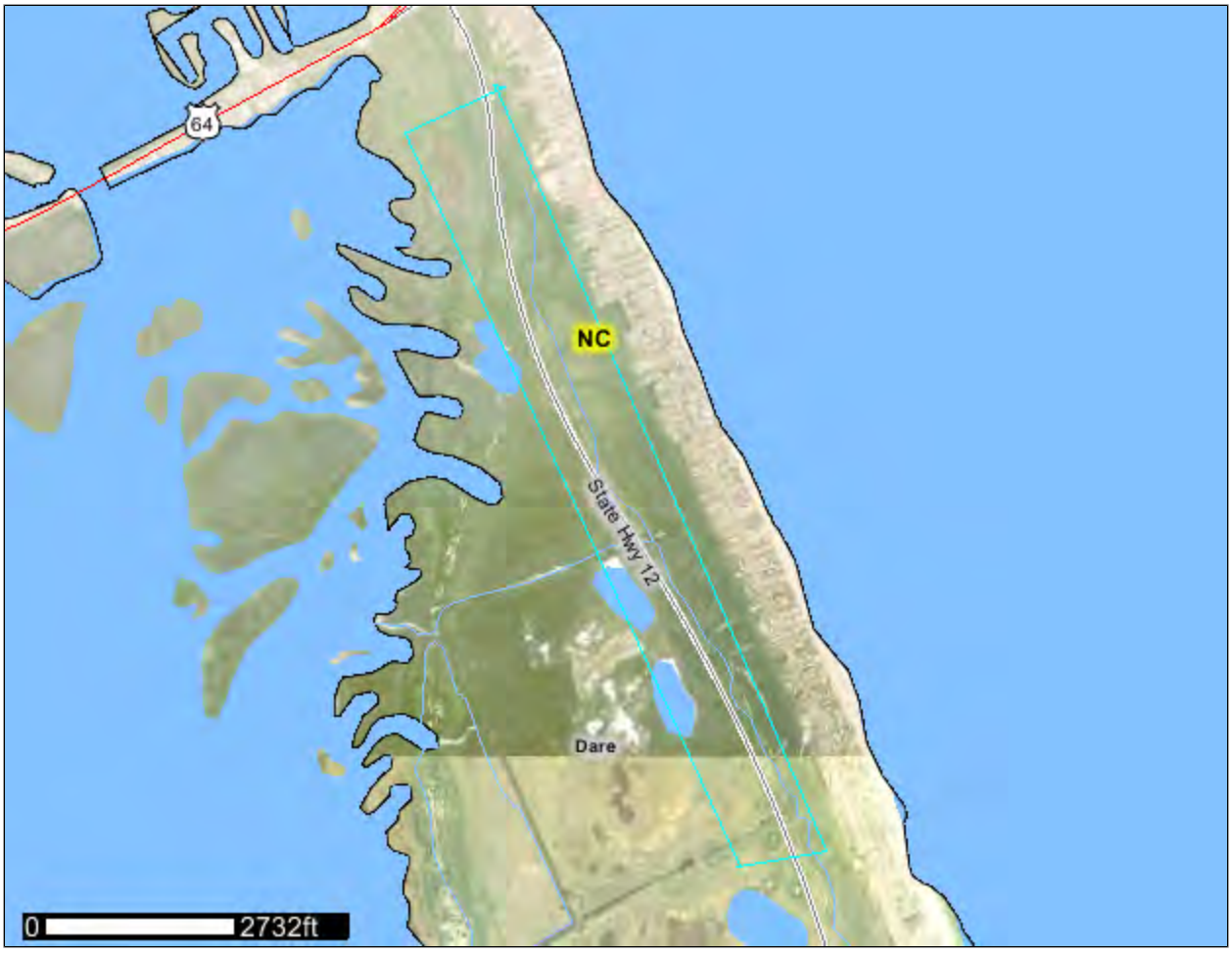
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Dare County, North Carolina

NPS -FHWA NC12 Wet Del



May 28, 2009

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

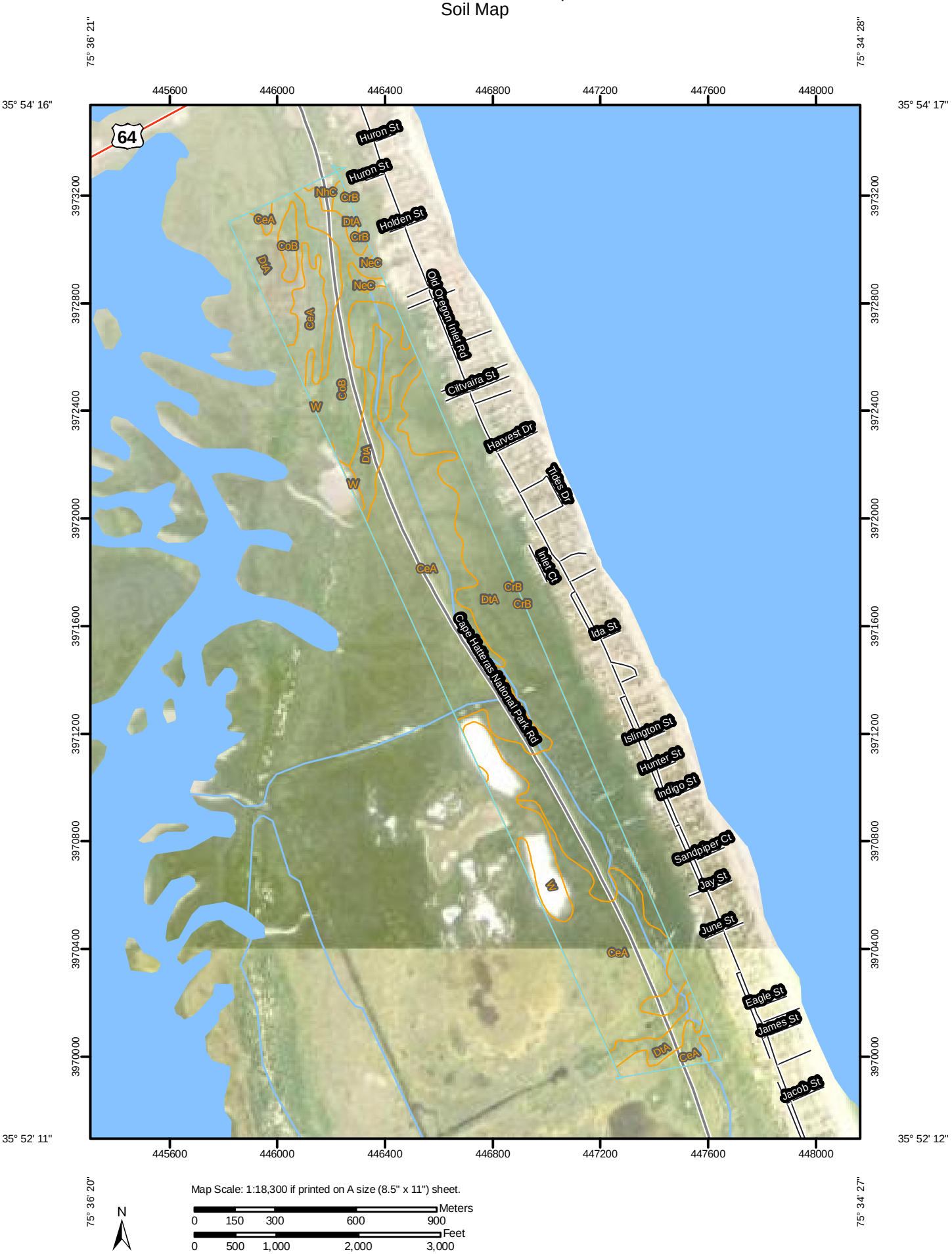
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:18,300 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Dare County, North Carolina
Survey Area Data: Version 11, Mar 27, 2009

Date(s) aerial images were photographed: 8/26/2006; 1/4/1998

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Dare County, North Carolina (NC055)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
CeA	Carteret sand, 0 to 2 percent slopes, frequently flooded	149.2	42.0%
CoB	Corolla fine sand, 0 to 6 percent slopes, rarely flooded	32.6	9.2%
CrB	Corolla-Duckston complex, 0 to 6 percent slopes, rarely flooded	0.4	0.1%
DtA	Duckston fine sand, 0 to 2 percent slopes, occasionally flooded	148.1	41.6%
NeC	Newhan fine sand, 0 to 10 percent slopes	1.8	0.5%
NhC	Newhan-Corolla complex, 0 to 10 percent slopes	2.2	0.6%
W	Water	21.2	6.0%
Totals for Area of Interest		**355.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially

where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dare County, North Carolina

CeA—Carteret sand, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

Elevation: 0 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days

Map Unit Composition

Carteret, tidal, and similar soils: 90 percent

Description of Carteret, Tidal

Setting

Landform: Tidal marshes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy fluviomarine deposits and/or eolian sands

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Maximum salinity: Moderately saline to strongly saline (16.0 to 80.0 mmhos/cm)
Sodium adsorption ratio, maximum: 60.0
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability (nonirrigated): 8w

Typical profile

0 to 10 inches: Sand
10 to 80 inches: Sand

CoB—Corolla fine sand, 0 to 6 percent slopes, rarely flooded

Map Unit Setting

Elevation: 0 to 10 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days

Map Unit Composition

Corolla and similar soils: 85 percent

Minor components: 7 percent

Description of Corolla

Setting

Landform: Troughs on barrier islands
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Eolian sands and/or beach sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 39.96 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Very slightly saline to moderately saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Very low (about 1.2 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 3 inches: Fine sand
3 to 26 inches: Fine sand
26 to 32 inches: Sand
32 to 80 inches: Sand

Minor Components

Duckston

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave

Carteret, high

Percent of map unit: 2 percent
Landform: Tidal marshes
Down-slope shape: Linear
Across-slope shape: Linear

CrB—Corolla-Duckston complex, 0 to 6 percent slopes, rarely flooded

Map Unit Setting

Elevation: 0 to 10 feet

Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days

Map Unit Composition
Corolla and similar soils: 50 percent
Duckston and similar soils: 30 percent

Description of Corolla

Setting
Landform: Troughs on barrier islands
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Eolian sands and/or beach sand

Properties and qualities
Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 39.96 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Very slightly saline to moderately saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Very low (about 1.2 inches)

Interpretive groups
Land capability (nonirrigated): 7s

Typical profile
0 to 3 inches: Fine sand
3 to 26 inches: Fine sand
26 to 32 inches: Sand
32 to 60 inches: Sand

Description of Duckston

Setting
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Eolian sands and/or beach sand

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 39.96 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: None

Maximum salinity: Slightly saline to moderately saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Very low (about 3.0 inches)

Interpretive groups
Land capability (nonirrigated): 7w

Typical profile
0 to 8 inches: Fine sand
8 to 13 inches: Sand
13 to 17 inches: Sand
17 to 80 inches: Sand

DtA—Duckston fine sand, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting
Elevation: 0 to 10 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days

Map Unit Composition
Duckston and similar soils: 90 percent

Description of Duckston

Setting
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Eolian sands and/or beach sand

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 39.96 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Slightly saline to moderately saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Very low (about 3.0 inches)

Interpretive groups
Land capability (nonirrigated): 7w

Typical profile
0 to 8 inches: Fine sand
8 to 13 inches: Sand
13 to 17 inches: Sand

17 to 80 inches: Sand

NeC—Newhan fine sand, 0 to 10 percent slopes

Map Unit Setting

Elevation: 0 to 20 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days

Map Unit Composition

Newhan and similar soils: 80 percent
Minor components: 10 percent

Description of Newhan

Setting

Landform: Dunes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian sands and/or beach sand

Properties and qualities

Slope: 0 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 39.96 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Very slightly saline to moderately saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Very low (about 1.8 inches)

Interpretive groups

Land capability (nonirrigated): 8s

Typical profile

0 to 2 inches: Fine sand
2 to 50 inches: Fine sand
50 to 80 inches: Sand

Minor Components

Beaches

Percent of map unit: 5 percent
Landform: Barrier beaches, barrier flats

Duckston

Percent of map unit: 5 percent

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave

NhC—Newhan-Corolla complex, 0 to 10 percent slopes

Map Unit Setting

Elevation: 0 to 20 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days

Map Unit Composition

Newhan and similar soils: 50 percent
Corolla and similar soils: 40 percent
Minor components: 5 percent

Description of Newhan

Setting

Landform: Dunes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian sands and/or beach sand

Properties and qualities

Slope: 0 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 39.96 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Very slightly saline to moderately saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Very low (about 1.8 inches)

Interpretive groups

Land capability (nonirrigated): 8s

Typical profile

0 to 2 inches: Fine sand
2 to 50 inches: Fine sand
50 to 80 inches: Sand

Description of Corolla

Setting

Landform: Troughs on barrier islands
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Eolian sands and/or beach sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Very slightly saline to moderately saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Very low (about 1.2 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 3 inches: Fine sand
3 to 26 inches: Fine sand
26 to 32 inches: Sand
32 to 60 inches: Sand

Minor Components

Duckston

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave

W—Water

Map Unit Composition

Water: 100 percent

Description of Water

Interpretive groups

Land capability (nonirrigated): 8w

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://soils.usda.gov/

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://soils.usda.gov/

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://soils.usda.gov/

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://soils.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.glti.nrcs.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://soils.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://soils.usda.gov/

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210.

APPENDIX C

AERIAL PHOTOGRAPH


Whalebone Junction
NC-12
Study Area
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2009 TerraMetrics
Image USDA Farm Service Agency
Image © 2009 DigitalGlobe
©2009 Google
Imagery Dates: Aug 7, 2004 - Jul 2006
35°52'03.18" N 75°37'07.07" W
Eye alt 44935 ft

APPENDIX D

FIELD DATA SHEETS

Print Form

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: CapeHatteras NS, NC-12 Entrance Road City/County: Dare County Sampling Date: 2009-07-17

Applicant/Owner: USDI, National Park Service State: NC Sampling Point: A-3-1

Investigator(s): R. Harold Jones, PWS Section, Township, Range:

Landform (hillslope, terrace, etc.): Lower Coastal Plain Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): (LRR) T Lat: 3017457.793100 Long: 779695.921400 Datum: NAD 83

Soil Map Unit Name: Carteret sand NWI classification: E3SS1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks:

Lat and Long coordinates listed above locate wetland delineation flag number A-3.
Observation data point located 35' west of wetland delineation flag number A-3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☒	No ☐	Depth (inches): 3"
Water Table Present?	Yes ☒	No ☐	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches):

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: A-3-1

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Sapling Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Shrub Stratum (Plot size: 30 ft. Dia.)			
1. Myrica cerifera	80	☒	FAC+
2. Persea borbonia	5	☐	FACW
3. Baccaharis halimfolia	5	☐	FAC
4. Rosa palustris	1	☐	OBL
5.		☐	
6.		☐	
7.		☐	
	91 = Total Cover		
Herb Stratum (Plot size: 30 ft. Dia.)			
1. Thelypteris palustris	10	☒	OBL
2. Osmunda regalis	20	☒	OBL
3. Boehmeria cylindrica	10	☒	FACW+
4. Phragmites australis	15	☒	FACW
5. Polygonum spp.	5	☐	--
6. Typha angustifolia	2	☐	OBL
7. Mikania scandans	2	☐	FACW+
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.		☐	
	64 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. Toxicondendron radican	5	☒	FAC
2. Parthenocissus quinquefolia	1	☐	FAC
3. Lonicera japonica	2	☐	FAC-
4.		☐	
5.		☐	
	8 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	33	x 1 =	33
FACW species	32	x 2 =	64
FAC species	93	x 3 =	279
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	158 (A)		376 (B)

Prevalence Index = B/A = 2.37

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: A-3-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1						M/P/L	Mucky-Peaty loam
6-12	10YR3/2	90	10YR 5/2	10			Sand	
12-18	10YR5/2	95	10YR2/2	5			Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☒ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☒ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Organic Streaking 12-18 inches below surface.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: CapeHatteras NS, NC-12 Entrance Road City/County: Dare County Sampling Date: 2009-07-17

Applicant/Owner: USDI, National Park Service State: NC Sampling Point: A-3-2

Investigator(s): R. Harold Jones, PWS Section, Township, Range:

Landform (hillslope, terrace, etc.): Lower Coastal Plain Local relief (concave, convex, none): Convex Slope (%): 3-5%

Subregion (LRR or MLRA): (LRR) T Lat: 3017457.793100 Long: 779695.921400 Datum: NAD 83

Soil Map Unit Name: Carteret sand NWI classification: Non-wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

Lat and Long coordinates listed above locate wetland delineation pin-flag number A-3.
Observation data point located approximately 10 feet east of wetland delineation pin-flag number A-3 in the shoulder of NC-12.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: A-3-2

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Sapling Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. Paspalum laeve	25	☒	FACW
2. Muhlenbergia schreberi	25	☒	FAC
3. Arthraxon hispidus	40	☒	UPL/NI
4. Trifolium repens	5	☐	FACU
5. Phyla lanceolta	2	☐	FACW
6. Hydrocotyle bonariensis	2	☐	FACW
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.		☐	
	99 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	29	x 2 =	58
FAC species	25	x 3 =	75
FACU species	5	x 4 =	20
UPL species	40	x 5 =	200
Column Totals:	99 (A)		382 (B)

Prevalence Index = B/A = 3.85

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: A-3-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-4	10YR2/1	90					loam	
4-5	10YR6/2	85	10YR 4/6	15	C	M	Clay	
5-8	10YR2/2	80	10YR5/2	15			C/L	Clayey loam shell fragments
8-16	10YR5/3	95					Sand	pebbles, uncoated sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Soil pit located in the shoulder of NC-12 approximately 10 feet from edge of pavement. Material consists of an assortment of various fill materials used for road construction. Appears the existing fill material were form, in part, under hydric soil conditions.

Print Form

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: CapeHatteras NS, NC-12 Entrance Road City/County: Dare County Sampling Date: 2009-07-17

Applicant/Owner: USDI, National Park Service State: NC Sampling Point: A-21-1

Investigator(s): R. Harold Jones, PWS Section, Township, Range:

Landform (hillslope, terrace, etc.): Lower Coastal Plain Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): (LRR) T Lat: 3017926.812300 Long: 779200.335400 Datum: NAD 83

Soil Map Unit Name: Carteret sand NWI classification: E2SS1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks:

Lat and Long coordinates listed above locate wetland delineation pin-flag A-21.
Observation data point located approximately 35 feet west of wetland delineation pin-flag A-21.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☒ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☒	No ☐	Depth (inches): 0.5
Water Table Present?	Yes ☒	No ☐	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches):

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: A-21-1

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Sapling Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Shrub Stratum (Plot size: 30 ft. Dia.)			
1. Salix Nigra	25	☒	OBL
2. Hibiscus moscheutos	5	☐	OBL
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	30 = Total Cover		
Herb Stratum (Plot size: 30 ft. Dia.)			
1. Phragmites australis	40	☒	FACW
2. Thelypteris palustris	10	☒	OBL
3. Boehmeria cylindrica	10	☒	FACW+
4. Solidago semipervens	15	☒	FACW
5. Polygonum arifolium	5	☐	OBL
6. Hydrocotyle bonariensis	5	☐	FACW
7. Mikania scandens	10	☒	FACW+
8. Cyperus spp.	2	☐	---
9. Lonicera japonica	2	☐	FAC
10.		☐	
11.		☐	
12.		☐	
	99 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45
FACW species	80	x 2 =	160
FAC species	2	x 3 =	6
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	127 (A)		211 (B)

Prevalence Index = B/A = 1.66

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (If observed, list morphological adaptations below).

SOIL Sampling Point: A-21-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4.5	10YR 2/1	100					M/P	Mucky Peat
4.5-8	10YR 3/2	95					Sand	Silty Sand
8-18	2.5YR 5/2	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☒ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☒ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Print Form

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: CapeHatteras NS, NC-12 Entrance Road City/County: Dare County Sampling Date: 2009-07-17

Applicant/Owner: USDI, National Park Service State: NC Sampling Point: A-21-2

Investigator(s): R. Harold Jones, PWS Section, Township, Range:

Landform (hillslope, terrace, etc.): Lower Coastal Plain Local relief (concave, convex, none): Convex Slope (%): 3-5%

Subregion (LRR or MLRA): (LRR) T Lat: 3017926.812300 Long: 779200.335400 Datum: NAD 83

Soil Map Unit Name: Carteret sand NWI classification: Non-wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

Lat and Long coordinates listed above locate wetland delineation pin-flag number A-21.
Observation area located approximately 15 feet west of wetland delineation pin-flag A-21

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: A-21-2

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Sapling Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Shrub Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Herb Stratum (Plot size: 10 ft. Dia.)			
1. Paspalum laeve	10	☒	FACW
2. Arthraxon hispidus	25	☒	UPL/NI
3. Lespedeza cuneata	25	☒	UPL/NI
4. Trifolium repens	20	☒	FACU
5. Muhlenbergia schreberi	20	☐	FAC
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.	100	☐	
	= Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	20	x 3 =	60
FACU species	20	x 4 =	80
UPL species	50	x 5 =	250
Column Totals:	100 (A)		410 (B)

Prevalence Index = B/A = 0.82

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: A-21-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR2/2	85					Loam	
2-5	10YR3/2	95	10YR4/4	5	C	M	Loam	Faint redox features
5-8	10YR3/2	95					Loam	Mixed pebbles, uncoated sand
8-16	10YR6/2	60	10YR3/2	40	CS		Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Soil pit located in the shoulder of NC-12 approximately 15 feet from edge of pavement. Material consists of an assortment of various fill materials used for road construction. Surface fill previously formed under hydric conditions.

Print Form

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Cape Hatteras NS, NC-12 Entrance Road City/County: Dare County Sampling Date: 2009-07-17

Applicant/Owner: USDI, National Park Service State: NC Sampling Point: CA-6-1

Investigator(s): R. Harold Jones, PWS Section, Township, Range:

Landform (hillslope, terrace, etc.): Coastal Plain Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): (LRR) T Lat: 3010113.422900 Long: 794306.946200 Datum: NAD 83

Soil Map Unit Name: Carteret sand NWI classification: E2EM1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

Lat and Long coordinates listed above locate wetland delineation pin-flag CA-6.
Observation area located approximately 30 feet southwest of pin-flag CA-6.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☒ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☒	No ☐	Depth (inches): 3.5"
Water Table Present?	Yes ☒	No ☐	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches):

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: CA-6-1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Sapling Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Herb Stratum (Plot size: 30 ft. Dia)			
1. Spartina alterniflora	45	☒	OBL
2. Phragmites australis	45	☒	FACW
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.		☐	
	90 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45
FACW species	45	x 2 =	90
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	90 (A)		135 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: CA-6-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	5Y3/2	100					M/P	Mucky Peat

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [x] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Organic Bodies (A6) **(LRR P, T, U)**
- [ ] 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- [ ] Muck Presence (A8) **(LRR U)**
- [ ] 1 cm Muck (A9) **(LRR P, T)**
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Coast Prairie Redox (A16) **(MLRA 150A)**
- [ ] Sandy Mucky Mineral (S1) **(LRR O, S)**
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR P, S, T, U)**
- [ ] Polyvalue Below Surface (S8) **(LRR S, T, U)**
- [ ] Thin Dark Surface (S9) **(LRR S, T, U)**
- [ ] Loamy Mucky Mineral (F1) **(LRR O)**
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Marl (F10) **(LRR U)**
- [ ] Depleted Ochric (F11) **(MLRA 151)**
- [ ] Iron-Manganese Masses (F12) **(LRR O, P, T)**
- [ ] Umbric Surface (F13) **(LRR P, T, U)**
- [ ] Delta Ochric (F17) **(MLRA 151)**
- [ ] Reduced Vertic (F18) **(MLRA 150A, 150B)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- [ ] 1 cm Muck (A9) **(LRR O)**
- [ ] 2 cm Muck (A10) **(LRR S)**
- [ ] Reduced Vertic (F18) **(outside MLRA 150A,B)**
- [ ] Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12) **(LRR T, U)**
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes [x] No [ ]

Remarks:

Print Form

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Cape Hatteras NS, NC-12 Entrance Road City/County: Dare County Sampling Date: 2009-07-17

Applicant/Owner: USDI, National Park Service State: NC Sampling Point: CA-6-2

Investigator(s): R. Harold Jones, PWS Section, Township, Range:

Landform (hillslope, terrace, etc.): Coastal Plain Local relief (concave, convex, none): Convex Slope (%): 25%

Subregion (LRR or MLRA): (LRR) T Lat: 3010113.422900 Long: 794306.946200 Datum: NAD 83

Soil Map Unit Name: Carteret sand NWI classification: non-wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

Lat and Long coordinates listed above locate wetland delineation pin-flag CA-6.
Observation area located approximately 20 feet east of WD pin-flag CA-6. The observation site is located on a former dredged disposal area approximately 8-9 feet above the surrounding marsh elevation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☐	No ☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: CA-6-2

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Sapling Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Shrub Stratum (Plot size: 20 ft. Dia)			
1. Ilex vomitoria	20	☒	FAC
2. Myrica ceriferia	25	☒	FAC+
3. Prunus serotina	20	☒	FACU
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	65 = Total Cover		
Herb Stratum (Plot size: 20 ft. Dia)			
1. Toxicodendron radicans	15	☒	FAC
2. Parthenocissus quinquefolia	15	☒	FAC
3. Ilex vomitoria	20	☒	FAC
4. Opuntia drummondii	2	☐	UPL
5. Poa spp.	5	☐	--
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.		☐	
	57 = Total Cover		
Woody Vine Stratum (Plot size: 20 ft. Dia)			
1. Smilax bona-nox	5	☒	FAC
2. Toxicodendron radicans	10	☒	FAC
3. Parthenocissus quinquefolia	15	☒	FAC
4.		☐	
5.		☐	
	30 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 11 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 81% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	125	x 3 =	375
FACU species	20	x 4 =	80
UPL species	2	x 5 =	10
Column Totals:	147 (A)		465 (B)

Prevalence Index = B/A = 3.16

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: CA-6-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3								Oi, Roots, leaf litter
3-18	7.5YR 5/3	100					M. Sand	Many uncoated sand grains

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

Print Form

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Cape Hatteras NS, NC-12 Entrance Road City/County: Dare County Sampling Date: 2009-07-17

Applicant/Owner: USDI, National Park Service State: NC Sampling Point: CD-5-1

Investigator(s): R. Harold Jones, PWS Section, Township, Range:

Landform (hillslope, terrace, etc.): Lower Coastal Plain Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): (LRR) T Lat: 3010353.689900 Long: 794416.484300 Datum: NAD 83

Soil Map Unit Name: Carteret sand NWI classification: E2SS1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

Observation located approximately 25 feet north of wetland Delineation Data Point CD-5.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☒ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☒ No ☐ Depth (inches): 5 "

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 0"

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: CD-5-1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Sapling Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Shrub Stratum (Plot size: 30 ft. Dia.)			
1. Iva frutescens	30	☒	FACW
2. Myrica ceriferia	15	☒	FAC+
3. Baccaharis halimfolia	10	☒	FAC
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	55 = Total Cover		
Herb Stratum (Plot size: 30 ft. Dia.)			
1. Spartina patens	45	☒	FACW
2. Solilidago semipervins	25	☒	FACW
3. Borrochia frutescens	5	☐	OBL
4. Toxicondendron radicans	20	☒	FAC
5.		☐	
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.		☐	
	95 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft. Dia.)			
1. Toxicondendron radicans	25	☒	FAC
2. Smiliax bona-nox	2	☐	FAC
3.		☐	
4.		☐	
5.		☐	
	27 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	100	x 2 =	200
FAC species	72	x 3 =	216
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	177 (A)		421 (B)

Prevalence Index = B/A = 2.37

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: CD-5-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR2/2	100					M/P	Mucky Peat
4-9	10YR4/1	90	5Y4/1	8-10	C		Sand	
9-18	5Y4/1	100					Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☒ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☒ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☒ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Print Form

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: CapeHatteras NS, NC-12 Entrance Road City/County: Dare County Sampling Date: 2009-07-17

Applicant/Owner: USDI, National Park Service State: NC Sampling Point: CD-5-2

Investigator(s): R. Harold Jones, PWS Section, Township, Range:

Landform (hillslope, terrace, etc.): Lower Coastal Plain Local relief (concave, convex, none): Convex Slope (%): 20%

Subregion (LRR or MLRA): (LRR) T Lat: 3010353.689900 Long: 794416.484300 Datum: NAD 83

Soil Map Unit Name: Carteret sand NWI classification: non-wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

Lat and Long coordinates listed above locate wetland delineation pin-flag number CD-5.
Observation site located on top of an approximately 8 foot dredged spoil berm approximately 15 feet from pin-flag number CD-5.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☐	No ☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: CD-5-2

Tree Stratum (Plot size: 30 ft. Dia.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus virginiana	25	☒	UPL
2. Prunus serotina	30	☒	FACU
3. Persea borbonia	5	☐	FACW
4. Ilex vomitoria	2	☐	FAC
5. Myrica cerifera	5	☐	FAC+
6.		☐	
7.		☐	
	67	= Total Cover	
Sapling Stratum (Plot size: 30 ft. Dia.)			
1. Quercus virginiana	20	☒	UPL
2. Ilex vomitoria	10	☒	FAC
3. Prunus serotina	5	☐	FACU
4. Juniperus virginiana	1	☐	FACU-
5.		☐	
6.		☐	
7.	36	☐	
		= Total Cover	
Shrub Stratum (Plot size: 30 ft. Dia.)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
		= Total Cover	
Herb Stratum (Plot size: 30 ft. Dia.)			
1. Toxicondendron radicans	10	☒	FAC
2. Smilax bona-nox	10	☒	FAC
3. Sassafras albidum	5	☐	FACU
4. Lonicera japonica	3-5	☐	FAC-
5. Prunus serotina	3-5	☐	FACU
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.	33	☐	
		= Total Cover	
Woody Vine Stratum (Plot size: 30 ft. Dia.)			
1. Smilax bona-nox	15	☒	FAC
2. Smilax glauca	10	☒	FAC
3. Toxicondendron radicans	15	☒	FAC
4.		☐	
5.		☐	
	40	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	81	x 3 =	243
FACU species	45	x 4 =	180
UPL species	45	x 5 =	225
Column Totals:	186 (A)		658 (B)

Prevalence Index = B/A = 3.53

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: CD-5-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 5/3		10 YR7/1				Sand	No O horizon

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

Print Form

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: CapeHatteras NS, NC-12 Entrance Road City/County: Dare County Sampling Date: 2009-07-17

Applicant/Owner: USDI, National Park Service State: NC Sampling Point: EA-3-1

Investigator(s): R. Harold Jones, PWS Section, Township, Range:

Landform (hillslope, terrace, etc.): Lower Coastal Plain Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): (LRR) T Lat: 3013183.866100 Long: 788388.802900 Datum: NAD 83

Soil Map Unit Name: Carteret sand NWI classification: E2SS1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

Lat and Long coordinates listed above locate wetland delineation pin-flag EA-3.
Observation area located approximately 35' west of wetland delineation pin-flag EA-3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☒ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☒	No ☐	Depth (inches): 3"
Water Table Present?	Yes ☒	No ☐	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches):

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: EA-3-1

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Sapling Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Shrub Stratum (Plot size: 30 ft. Dia.)			
1. Kosteletzkya virginica	15	☒	OBL
2. Baccaharis halimfolia	10	☒	FAC
3. Myrica cerifera	10	☒	FAC+
4. Iva frutescens	5	☐	FACW+
5.		☐	
6.		☐	
7.		☐	
	40 = Total Cover		
Herb Stratum (Plot size: 30 ft. Dia.)			
1. Typha angustifolia	20	☒	OBL
2. Spartina patens	55	☒	FACW
3. Distichlis spicata	10	☒	FACW+
4. Mikania scandens	5	☐	FACW+
5. Toxicondendron radicans	1	☐	FAC
6. Thelypteris palustris	1	☐	OBL
7. Boehmeria cylindrica	1	☐	FACW+
8. Typha latifolia	3	☐	OBL
9. Scirpus americanus	3	☐	OBL
10.		☐	
11.		☐	
12.		☐	
	99 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	139 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	42	x 1 =	42
FACW species	76	x 2 =	152
FAC species	21	x 3 =	126
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	139 (A)		320 (B)

Prevalence Index = B/A = 1.33

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: EA-3-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					Muck	
4-18	10YR 2/2	100					M/Sand	Mucky Sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☒ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Print Form

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: CapeHatteras NS, NC-12 Entrance Road City/County: Dare County Sampling Date: 2009-07-16

Applicant/Owner: USDI, National Park Service State: NC Sampling Point: EA-3-2

Investigator(s): R. Harold Jones, PWS Section, Township, Range:

Landform (hillslope, terrace, etc.): Lower Coastal Plain Local relief (concave, convex, none): Convex Slope (%): 3-5

Subregion (LRR or MLRA): (LRR) T Lat: 3013183.866100 Long: 788388.802900 Datum: NAD 83

Soil Map Unit Name: Carteret sand NWI classification: non-wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

Lat and Long coordinates listed above locate wetland delineation pin-flag number EA-3.
Observation data point is located approximately 15 feet east of wetland delineation pin-flag EA-3 in the shoulder of NC-12.

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HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☐	No ☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches): > 18"

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: EA-3-2

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Sapling Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Shrub Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
	= Total Cover		
Herb Stratum (Plot size: _____)			
1. Fescue rubra	70	☒	FACU
2. Arthraxon hispidus	10	☒	NL
3. Hydrocotyle bonariensis	3	☐	FACW
4. Trifolium repens	8	☒	FACU
5. Phyla lanceolata	3	☐	FACW
6. Cyperus tenuifolius	2	☐	NL
7. Plantago laneolata	2	☐	FAC
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.		☐	
	98 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	6	x 2 =	12
FAC species	2	x 3 =	6
FACU species	78	x 4 =	312
UPL species	0	x 5 =	0
Column Totals:	86 (A)		330 (B)

Prevalence Index = B/A = 3.83

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (If observed, list morphological adaptations below).

Observation area located on the mowed shoulder of NC-12.

SOIL

Sampling Point: EA-3-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/3	100					loam	loam, shell, clay, stone
8-9	10YR 5/1	85	10YR 5/4	15			clay	Ox Rhiz -10YR 4/4
9-18	10YR 4/2	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Soil pit located in the shoulder of NC-12 approximately 10 feet from edge of pavement. Material consists of an assortment of various fill materials used for road construction.

APPENDIX E

SITE PHOTOGRAPHS

PHOTO 1. **OBSERVATION DATA POINT A-3-1** **LOOKING WEST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 2. **OBSERVATION DATA POINT A-3-2** **LOOKING NORTHEAST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 3. **OBSERVATION DATA POINT A-21-1** **LOOKING SOUTHWEST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 4. **OBSERVATION DATA POINT A-21-2** **LOOKING NORTHEAST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 5. **OBSERVATION DATA POINT CD-5-1** **LOOKING EAST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 6. **OBSERVATION DATA POINT CD-5-2** **LOOKING SOUTH**
NC-12 ENTRANCE ROAD **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 7. **OBSERVATION DATA POINT EA-3-1** **LOOKING WEST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 8. **OBSERVATION DATA POINT EA-3-2** **LOOKING NORTHEAST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 9. **CULVERT "E"** **LOOKING EAST NORTH EAST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 10. **CULVERT "E"** **LOOKING WEST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 11. **CULVERT "D"** **LOOKING NORTHEAST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 12. **CULVERT "D"** **LOOKING WEST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

PHOTO 13. **CULVERT "E"** **LOOKING EAST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AN ENV.**

PHOTO 14. **CULVERT "E"** **LOOKING WEST**
NC-12 ENTRANCE ROAD WIDENING **JUNE 19, 2009** **R.H.JONES AH ENV.**

APPENDIX F

NOTIFICATION OF JURISDICTIONAL DETERMINATION
&
CERTIFIED WETLAND DELINEATION SURVEY

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW 2010-00372** County: **Dare** U.S.G.S. Quad: **Bodie Island**

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner/Agent: **National Park Service**
Address: **Attn: Megan Carfioli**
1401 National Park Drive
Manteo, North Carolina 27954
Telephone No.: **252-473-2111**

Property description:
Size (acres) **8.15** Nearest Town **Nags Head**
Nearest Waterway **Roanoke Sound** River Basin **Pasquotank**
USGS HUC **03020105** Coordinates N **35.872420** W **-75.582027**
Location description **The project area is located from Whalebone Junction south approximately 5.28 miles along NC-12, south of Nags Head, in Dare County, North Carolina.**

Indicate Which of the Following Apply:

A. Preliminary Determination

_ Based on preliminary information, there may be wetlands on the above described property. We strongly suggest you have this property inspected to determine the extent of Department of the Army (DA) jurisdiction. To be considered final, a jurisdictional determination must be verified by the Corps. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331).

B. Approved Determination

_ There are Navigable Waters of the United States within the above described property subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are wetlands on the above described property subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ We strongly suggest you have the wetlands on your property delineated. Due to the size of your property and/or our present workload, the Corps may not be able to accomplish this wetland delineation in a timely manner. For a more timely delineation, you may wish to obtain a consultant. To be considered final, any delineation must be verified by the Corps.

_ The wetland on your property have been delineated and the delineation has been verified by the Corps. We strongly suggest you have this delineation surveyed. Upon completion, this survey should be reviewed and verified by the Corps. Once verified, this survey will provide an accurate depiction of all areas subject to CWA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

X **The wetlands have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on May 3, 2010. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.**

_ There are no waters of the U.S., to include wetlands, present on the above described property which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

X **The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Elizabeth City, NC, at (252) 264-3901 to determine their requirements.**

Placement of dredged or fill material within waters of the US and/or wetlands without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). If you have any questions regarding this determination and/or the Corps regulatory program, please contact **Josh Pelletier** at **910-251-4605**.

C. Basis For Determination

The wetlands on this site were identified using the Atlantic and Gulf Coastal Plain Regional Supplement and are a broad continuum of wetlands associated with the Roanoke and Pamlico Sounds.

D. Remarks

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

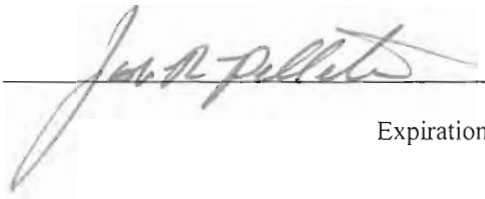
F. Appeals Information (This information applies only to approved jurisdictional determinations as indicated in B. above)

This correspondence constitutes an approved jurisdictional determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

District Engineer, Wilmington Regulatory Division
Attn: Josh Pelletier, Project Manager,
Washington Regulatory Field Office
PO Box 1000
Washington, North Carolina 27889

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the District Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by **July 3, 2010**.

It is not necessary to submit an RFA form to the District Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: 

Date **May 3, 2010** Expiration Date **May 3, 2015**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at our website at http://regulatory.usacesurvey.com/ to complete the survey online.

Copy furnished:
Harold Jones, AH Environmental Consultants

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: National Park Service/ Attn: Meghan Carfiolo	File Number: SAW 2010-00372	Date: May 3, 2010
Attached is:		See Section below
☐ INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)		A
☐ PROFFERED PERMIT (Standard Permit or Letter of permission)		B
☐ PERMIT DENIAL		C
☒ APPROVED JURISDICTIONAL DETERMINATION		D
☐ PRELIMINARY JURISDICTIONAL DETERMINATION		E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the district engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact: Mr. Mike Bell, Administrative Appeal Review Officer CESAD-ET-CO-R U.S. Army Corps of Engineers, South Atlantic Division 60 Forsyth Street, Room 9M15 Atlanta, Georgia 30303-8801

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

	Date:	Telephone number:
_____ Signature of appellant or agent.		

For appeals on Initial Proffered Permits and approved Jurisdictional Determinations send this form to:

District Engineer, Wilmington Regulatory Division, Attn: Josh, Project Manager, Washington Regulatory Field Office, PO Box 1000, Washington, North Carolina 27889

For Permit denials and Proffered Permits send this form to:

Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Mike Bell, Administrative Appeal Officer, CESAD-ET-CO-R, 60 Forsyth Street, Room 9M15, Atlanta, Georgia 30303-8801