STATEMENT OF FINDINGS
EXECUTIVE ORDER 11988: **Floodplain Management**
PRA-CAHA 10(2) NC 12 Improvements
Dare County, NC

*Recommended:*

for Superintendent, Cape Hatteras National Seashore — 4/04/10 Date

*Certified for Technical Adequacy and Servicewide Consistency:*

Chief, WASO Water Resources Division — 4/16/10 Date

*Approved:*

Acting Director, Southeast Region — 5/13/10 Date

## INTRODUCTION

Executive Order 11988 (Floodplain Management) requires the National Park Service (NPS), the Federal Highway Administration (FHWA), and other federal agencies to evaluate the likely impacts of actions in floodplains. The objective of E.O. 11988 is to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. NPS Director's Order #77-2 Floodplain Management and Procedural Manual #77-2 provide NPS policies and procedures for complying with E.O. 11988. United States Department of Transportation (DOT) Order 5650.2, Floodplain Management and Protection, contains DOT policies and procedures for implementing E.O. 11988. This Statement of Findings (SOF) documents compliance with these floodplain management procedures.

The purpose of this SOF is to present the rationale for the proposed improvements to NC 12 in the floodplain area and to document the anticipated effects on these resources. The project area begins at Whalebone Junction (the intersection with US-64/US-264) and follows NC 12 south to mile 5.28 (Figure 1). The site includes two 11-foot wide paved shoulders and two two-foot wide paved shoulders. Also included is the mowed-grass clear zone on each side of the roadway that extends for approximately 15 to 20 feet. The roadway crosses several culverts, four of which (at three locations) are included in the project area. The roadway is comprised of approximately seven inches of asphalt pavement. The surrounding soils are primarily sand.

The project area is located in a Class I Action, per DO #77-2. Avoidance of impacts to floodplains is not possible because NC 12 is currently located in the 100-year floodplain of Bodie Island; therefore, any improvements made to the existing road would be located in the floodplain (Figure 2). NC 12 is the only evacuation route for Outer Banks villages south of South Nags Head in the event of an impending storm. Improvements to NC 12 are necessary in order to avoid risk of life during storm events.

Improvements are proposed for NC 12 with the intent of meeting the following objectives:

- Maintenance of NC 12 as safe public access;
- Reduction of potential conflicts between vehicles, pedestrians, and bicyclists using NC 12;
- Improvement of visitor access along Bodie Island; and
- Minimization of impacts to natural, cultural, and scenic and aesthetic resources.

### Proposed Action

The proposed action is Alternative C as described in the *NC 12 Improvements Environmental Assessment* (EA). Under the Alternative C, the existing deteriorated road pavement would be resurfaced. Several options regarding the resurfacing of NC 12 are under consideration, and would be refined during final design of the proposed action. Resurfacing would most likely include milling of the existing pavement and recycling this material into a new asphalt wearing surface and/or or overlaying asphalt over the existing road surface. The resurfacing strategy chosen would be based on factors such as cost, life-expectancy, and durability.

Five parking areas located along the project area would be milled and paved. The Whalebone

Information Station parking area would be repaved within the existing pavement limits. A small gravel and grassed section within the parking area would be paved. Four existing paved pull-offs along the road would be repaved to match their existing dimensions. Three of the pull-offs include an additional gravel area extending beyond the paved area. The gravel was placed due to vehicles parking in the grass beyond the paved pull-off. In order to discourage vehicles from parking beyond the paved area, the gravel will be removed, and bollards would be placed adjacent to the pull-off. Gravel will be left in placed where needed to create a trail to the wildlife overlook and hunting blind trails.

Wooden bollards would be replaced where necessary, and regulatory and warning signs would be replaced to ensure that there is adequate retroreflectivity. Retroreflectivity is the reflection of light, typically in the form of vehicle headlights, at night-time.

Along NC 12, three culvert locations contain culverts that have deteriorated and are beyond their useful life. These locations are approximately 1.86, 2.67, and 3.13 miles south of Whalebone Junction. At mile 1.86, there are two culverts placed parallel to each other. Both of these culverts would be replaced with the same capacity and length culverts. Mile 2.67 has a single culvert. This culvert would be replaced with the same capacity and length culvert. The culvert at mile 3.13 is currently too short. The ends of the culvert are within the vegetated shoulder and recovery zone, and are indicated as a potential hazard to motorists with plastic delineators. This culvert would be replaced with the same capacity culvert, though it would be longer.

The paved shoulders would also be expanded. At the edge of the existing pavement the vegetation and soils would be removed to create an area to place five inches of aggregate base. The edge of the base would match the base created through milling and pulverizing the travel lanes. After this is completed, seven inches of asphalt pavement would be placed on the southbound and northbound lanes to create two 11-foot travel lanes with five-foot shoulders. The five-foot-wide shoulders would be in accordance with the Guide for the Development of Bicycle Facilities, published by the American Association of State Highway and Transportation Officials. This guide recommends that paved shoulders be at least four feet wide to accommodate bicycle travel.

Staging would take place in previously disturbed paved areas. Locations that may be used for staging include the paved area which previously served as an access road and parking for the U.S. Coast Guard Station or the Bodie Island Maintenance Facility, located just south of the southern terminus of South Old Oregon Inlet Road. Construction vehicles would be parking at the staging location when not in use, and materials (such as aggregate and topsoil) would be stockpiled.

The access roads, parking areas, and concrete walkways associated with the U.S. Coast Guard Station, U.S. Lifesaving Station, and boathouse may be removed as mitigation for floodplain impacts and/or stormwater impacts. The need for and amount of impervious surface removal would be determined through coordination with the North Carolina Division of Water Quality and Division of Coastal Management.

Alternative C was identified as the Preferred Alternative because it best meets the objectives for the project. Alternative C would maintain NC 12 as safe public access by repairing and/or replacing components of the road that have deteriorated, including the pavement, bollards, signs, and culverts. Potential conflicts between vehicles, pedestrians, and bicyclists using NC 12 would

be reduced by the construction of widened paved shoulders. Visitor access along Bodie Island would be improved by the repaired road and widening shoulders which support multi-modal use of the transportation facility. Impacts to natural, cultural, and scenic and aesthetic resources would be minimized by constructing the shoulders adjacent to the existing roadway, limiting the addition of fill material and recycling materials such as topsoil and fill material as possible. Additional analysis regarding the determination of the Preferred Alternative and discussion of the Alternatives considered are available in the EA, Chapter 2.

## Floodplain Impacts

Implementation of Alternative C, the Preferred Alternative, would result in temporary impacts to the floodplain from the dewatering in order to replace the culverts. Approximately 148 cubic yards would be dewatered; however after construction is completed, the cofferdams and dewatering would be removed. The culverts would be replaced with a similar size and capacity culvert, so there would be no rise in water surface elevation or backwater. Construction materials may be stockpiled in the project area to be ready for use during construction.

Implementation of Alternative C would result in permanent impacts to the floodplain. New material would be placed in the project area in the form of riprap (large sized rock). The riprap would be used to protect the culverts from scour from tidal movement through the channels. Approximately 70 cubic yards of riprap would be placed at the culverts. The displacement of floodwaters as a result of the riprap placement would not be noticeable. Approximately 2,700 cubic yards of soil adjacent to the road would be excavated and approximately 3,150 cubic yards of new material would be added to the project area in order to construct the widened shoulders. This material would consist of aggregate base, asphalt, and aggregate topsoil. The net total of new material added to the project area as a result of the implementation of Alternative C would be 520 cubic yards. The excavated soils would be primarily fine sand. Sand has a lower ability to store water in comparison to other soils, such as silt and clay soils. The new material would be compacted and impervious, and therefore would have no ability to store water; however, this material would be located along the highest elevations in the project area. The additional material would be visibly noticeable. However, a change in the function of the floodplain such as the frequency, duration, or extent of flooding, would not be noticeably different.

Table 1. Impact Summary

| Activity/Material | Alternative C – Preferred Alternative |
|---|---|
| Dewatering at culverts (temporary) | 148 cubic yards |
| Excavation of material | -2700 cubic yards |
| Placement of Riprap | 70 cubic yards |
| Placement of Road Base, Pavement, and Aggregate Topsoil | 3150 cubic yards |
| **Total** | **668 cubic yards of displacement (148 cubic yards of this is temporary)** |

## Site Description and Flood Risk

Federal Emergency Management Agency (FEMA) Flood Insurance Rate maps show that the project area is within a Zone AE 100-year-flood floodplain (Figure 1). Zone AE is defined as an areas inundated by 100-year flooding for which base flood elevations have been determined.

Elevations in the project area range from sea level to 4.5 feet above sea level. NC 12 is generally 3 to 3.5 feet above sea level and approximately 1.5 to 2 feet above the surrounding area. It was constructed on fill dirt obtained from the surrounding area. Fill dirt was obtained to construct the raised roadbed by creating ponds along NC 12 (NCDENR 1987). The base flood elevations in the project area range between 10 and 11 feet. No portion of the project area is located within the velocity zone. Velocity zones (Zone VE) are coastal high hazard areas where wave actions and/or high velocity water can cause structural damage during the base flood (FEMA 2009). As depicted in the North Carolina Division of Coastal Management Ocean Shoreline and Setback Mapping of "Storm Surge – Slow Moving" (Figures 3 and 4), the project area mostly shows a surge elevation of 12 feet and a small area in the northern portion of the project area shows a surge elevation of three feet (NCDCM 2010). Flooding of NC 12 has only been observed in the project area by Park staff during strong nor'easters or hurricanes.

## JUSTIFICATION FOR USE OF THE FLOODPLAIN

The project proposes improvements to an existing transportation facility, which is located within the 100-year floodplain. The improvements are needed in order to address the deterioration of the roadway facility, including the pavement, signs, and culverts. Continued deterioration poses a potential safety hazard to park visitors and staff. The majority of Bodie Island is located within the 100-year floodplain; therefore, use of a site outside of the 100-year floodplain is not possible.

The improvements are also needed to provide a multi-modal facility that better accommodates bicyclists and pedestrians. Alternate sites were investigated for the bicycle element of the project; however, construction of a multi-modal facility on these sites would have a greater impact on the floodplain than the Preferred Alternative. The construction of a multi-use trail separate from NC 12 on either one or both sides of the road was analyzed. Fill material would be necessary to construct a multi-use trail in a new alignment. Also, it would be necessary to construct new crossings of the channels which would cause additional impacts to the floodplain.

### Other Alternatives Considered

Additional alternatives were considered in order to meet the purpose and need, as described in the EA in Chapter 1: Purpose and Need. These alternatives include: Alternative A – No Action Alternative, Alternative B – Road Improvements, Alternative D – Multi-use Trail Separate from NC 12 – Both Sides, and Alternative E – Multi-Use Trail Separate from NC 12 – One Side.

Under Alternative A, no substantial improvements other than routine maintenance operations would be performed. Routine road maintenance operations include pavement repairs, such as crack sealing and pothole patching. The culverts would be maintained, but not replaced. There would be no change in the width of the paved shoulder. Additional gravel may be placed at the pull-offs to repair the rutting and vegetation loss caused by motorists driving beyond the paved areas of the pull-offs. Emergency repairs and replacements of the road surface or culverts may be necessary. Alternative A would not meet any of the objectives of the project. Therefore, Alternative A was not identified as the Preferred Alternative (see EA Chapter 2, Preferred Alternative).

Under Alternative B, improvements to NC 12 would be performed. The deteriorated road pavement would be resurfaced, but the road shoulders would not be widened. Five parking areas

in the project area would also be resurfaced. The Whalebone Junction Information Station parking area would be repaved within the existing pavement limits, and a small gravel and grass section would also be paved. Four existing paved pull-offs would be repaved to match their existing dimensions. Excess gravel would be removed at three of the pull-offs. Wooden bollards and signs would be replaced. Four deteriorated culverts located at three locations would also be replaced. Traffic control, staging, and mitigation measures would be similar to Alternative C; however, the duration would be shorter, and mitigation measures would not include removal of pavement or the construction of permanent BMPs. Although Alternative B would meet most of the objectives for the project, Alternative B would not meet the objective to reduce potential conflicts between vehicles, pedestrians, and bicyclists using NC 12. Therefore, this Alternative was not identified as the Preferred Alternative (see EA Chapter 2, Preferred Alternative).

Under Alternative D, a six-foot wide, multiple-use paved trail would be constructed parallel to NC 12 on each side of the road, at a distance of five feet from the edge of the existing road. The construction of a paved trail five feet from the existing road would increase the footprint of the transportation corridor and would require the placement of fill material. Wetlands are located along most of NC 12 at the edge of the vegetated clear zone. Alternative D would permanently fill approximately two acres of wetlands. This would result in an unacceptable amount of wetland impacts. Therefore, Alternative D was dismissed from further consideration.

Under Alternative E, a ten-foot wide, multiple use trail would be constructed parallel to NC 12 on one side of the road. The trail would be located five feet from the edge of the existing road, and would also increase the footprint of the transportation corridor. Alternative E would permanently fill approximately three acres of wetlands. This Alternative would also be difficult to tie into the existing widened paved shoulders north and south of the project area. Users would also have to cross two lanes of NC 12 in order to access the trail, causing a potential conflict with vehicles traveling at high speeds along NC 12. Alternative E would result in an unacceptable amount of wetland impacts, unacceptable design challenges, and an unacceptable potential for conflicts between users of NC 12 and the trail. Therefore, Alternative E was dismissed from further consideration.

## FLOOD MITIGATION PLANS

Flood mitigation includes the protection of human health and safety, protection of investment, and protection of floodplain resources and processes. Flooding in the project area is caused by traceable storm events, such as hurricanes and nor'easters that allow for adequate warning time. NC 12 is the only evacuation route for Outer Banks villages. These villages from the Village of Ocracoke northward, in order, are: Ocracoke, Hatteras, Frisco, Buxton, Avon, Salvo, Waves, Rodanthe, and South Nags Head. Dare County evacuees use NC 12 to US 64 west or US 158 north. The estimated hours needed to evacuate is 18 hours (Dare County 2010).

Harm or risks to human health and safety is minimized through a warning and evacuation plan. Cape Hatteras National Seashore is one of the three parks (also included are the Fort Raleigh National Historic Site and the Wright Brothers National Monument) collectively managed by NPS staff at the Outer Banks Group Office in Manteo, NC. The NPS – Outer Banks Group annually updates its Hurricane Plan (NPS 2009), which describes the Incident Command System (ICS) priorities, procedures, and timeliness for the protection of human safety, property, and park resources and values in the event of a hurricane or other emergency.

The 2009 Hurricane Plan details actions to be taken at the beginning of hurricane season (June 1), at critical intervals from 96 hours prior to storm force winds through landfall of a hurricane, recovery, and re-entry. As early as 96 hours prior to storm force winds, the Superintendent activates the ICS and the following would occur on Bodie Island:

- Visitors would be informed of weather conditions, Seashore status, and recommended actions Hurricane watch notices are posted at all visitor centers, campground kiosks, and on the Seashore's website.

- Visitors are advised to leave the island or be prepared for short notice evacuation. Ocracoke must be evacuated prior to termination of ferry services or prior to onset of gale-force winds.

- Normal Seashore operations and visitor facilities (e.g., visitor centers, campgrounds, swim beaches) close.

- Concessionaires and local businesses are notified of the Seashore status.

- All non-assigned personnel are released by noon to permit daylight evacuations.

- All non-essential vehicles and equipment are secured.

Travel conditions would be posed to the North Carolina Department of Transportation's (NCDOT) Traveler Information Management System and NCDOT's dynamic information sign at Whalebone Junction (NCDOT 2010).

Although the improvements to NC 12 would not construct a new investment, the rehabilitation and widening of NC 12 re-invests in an existing facility. Risk to the investment exists and will continue to exist after the improvements to NC 12 are completed. The proposed NC 12 improvements would not create any additional risk. The NPS would repair or reconstruct the facility if and when damage occurs.

Protection of floodplain resources and processes was achieved to the extent possible. Instead of constructing a new multi-use trail adjacent to NC 12 to accommodate bicyclists and pedestrians, the paved shoulders of NC 12 would be widened to five feet. Widening the shoulders of an existing roadway greatly reduced the fill and materials required. Excess gravel currently present at the pull-offs will be removed, and the area will be re-vegetated. Also, the culverts would be replaced with those of a similar size, reducing the need for additional fill material. This also maintains the hydraulic capacity of the culverts. The amount of riprap proposed to protect the culvert inlets and outlets was minimized to the extent possible.

## SUMMARY

### Compliance

*National Environmental Policy Act:* The *NC 12 Improvements Environmental Assessment* has been prepared for the proposed project pursuant to the National Environmental Policy Act, and a Finding of No Significant Impact is expected to be approved and signed by the NPS's Regional

Director for the Southeast Region and the FHWA's Director of Program Administration for the Eastern Federal Lands Highway Division.

*Coastal Zone Management Act and North Carolina's Coastal Area Management Act:* The Coastal Zone Management Act of 1972 was enacted by Congress to protect the coastal environment from growing demands associated with residential, recreational, commercial, and industrial uses. The provisions of this Act help States develop coastal management programs to manage and balance competing uses of the coastal zone. A request for concurrence with a Federal Consistency Determination has been requested from the State of North Carolina (Appendix B). It is expected that the proposed project will be found to be consistent to the maximum extent possible with the Coastal Zone Management Act and all applicable components of North Carolina's Coastal Area Management Act.

## Conclusion

The NPS concludes that there is no practical alternative for improving NC 12 in its existing location. Mitigation and compliance with regulations and policies to prevent or minimize potential impacts to water quality, floodplain values, and loss of property or human life would be strictly adhered to during and after the construction. Individual permits with other federal and cooperating state and local agencies would be obtained prior to construction activities. Although implementation of the Preferred Alternative would result in a short-term, negligible, adverse impact and a long-term, minor, adverse impact to the floodplain functions and values within the project area, it would contribute an imperceptible adverse increment to the existing and predicted future cumulative impacts to the floodplain functions and values within the project area. Therefore, the NPS finds the Preferred Alternative to be acceptable under E.O. 11988 for the protection of floodplains.

## REFERENCES

Dare County. 2010. Emergency Management, Hurricane Evacuation. Available on the Internet at http://www.co.dare.nc.us/emgymgmt/evacmap.htm

Federal Emergency Management Agency. 2009. Map Viewer. Available on the Internet at https://hazards.fema.gov/femaportal/wps/portal/

National Park Service. 2003 Procedural Manual #77-2: Floodplains Management. Available on the Internet at http://www.nature.nps.gov/rm77/floodplain.cfm

National Park Service. 2009. 2009 Hurricane Plan. NPS - Outer Banks Group, Manteo, NC.

North Carolina Department of Environment and Natural Resources. 1987. North Carolina Registry of Natural Heritage Areas: Letter of Intent and Agreement to Register and Protect a Natural Area.

North Carolina Floodplain Mapping Program. 2009. http://www.ncfloodmaps.com/

North Carolina Department of Transportation. 2010. Traveler Information Management System. Available on the Internet at http://www.ncdot.org/traffictravel/

Figure 1. Project area (NC OneMap 2009)

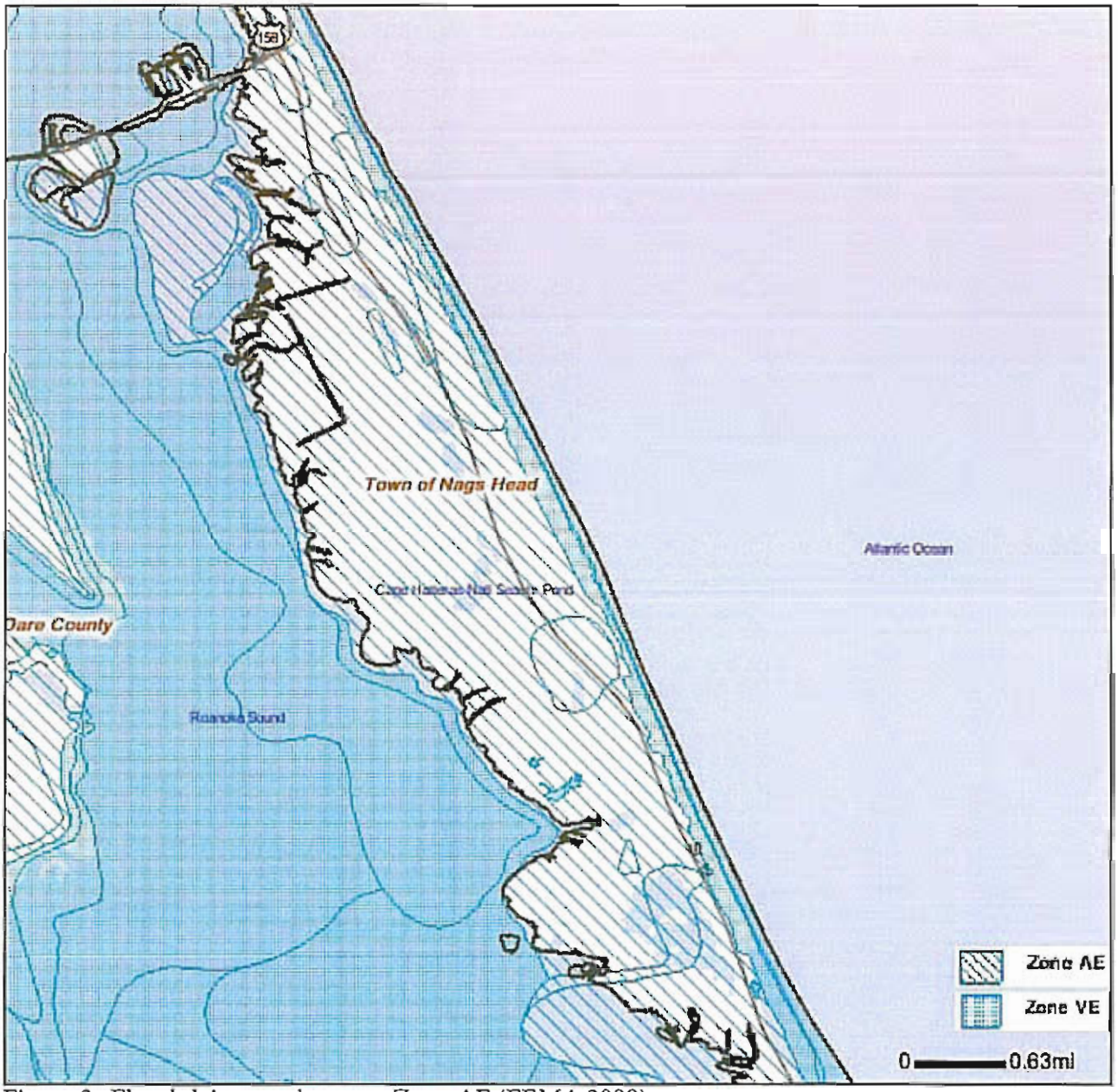

Figure 2. Floodplains are shown as Zone AE (FEMA 2009).

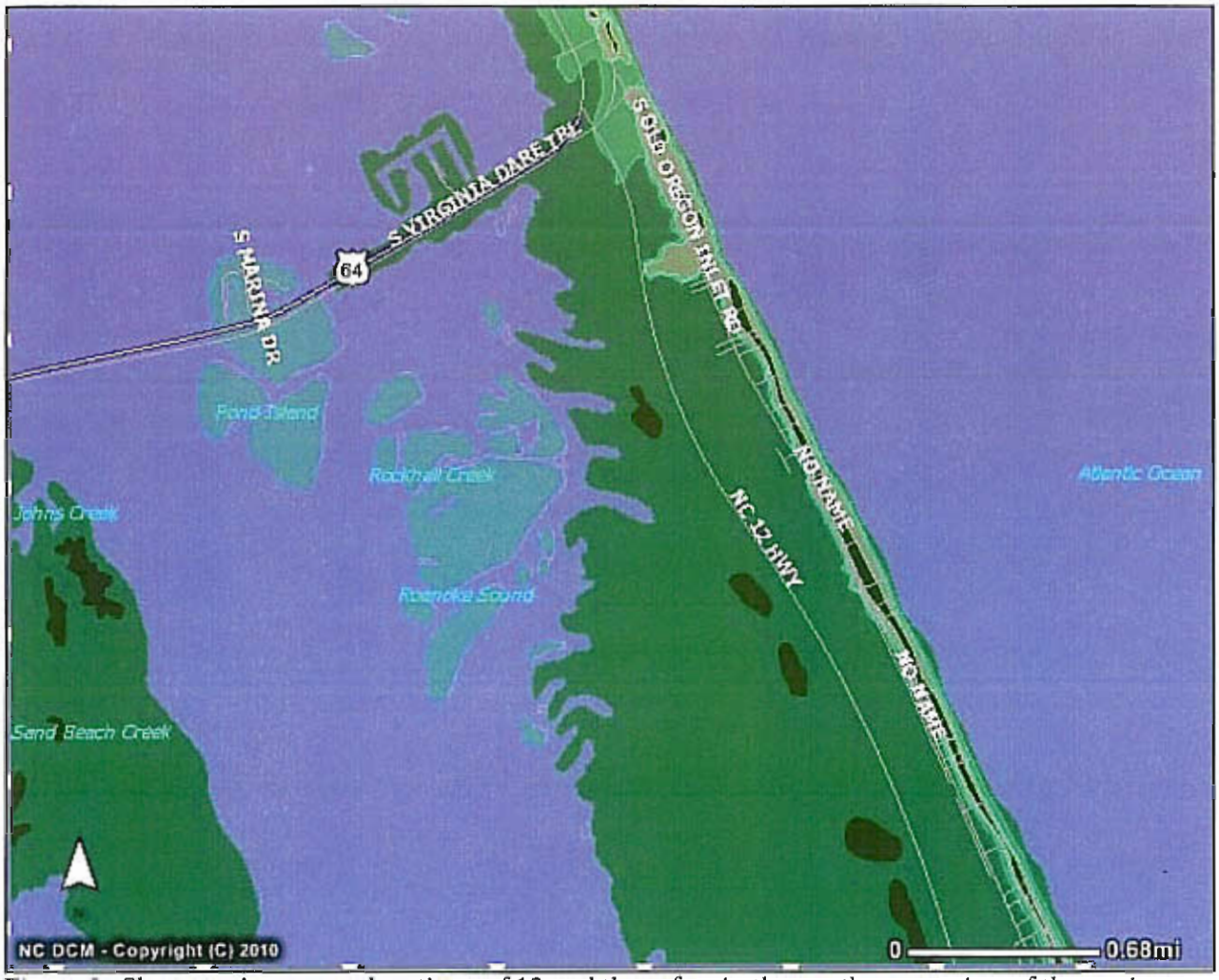

Figure 3. Slow moving surge elevations of 12 and three feet in the northern portion of the project area (NCDCM 2010).

Figure 4. Slow moving storm surge elevations of 12 feet in the southern portion of the study area (NCDCM 2010).