

**National Park Service  
U.S. Department of the Interior**

**Cape Hatteras National Seashore  
North Carolina**



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# **Ocracoke Island Multi-Use Trail Environmental Assessment**

*June 7, 2008*



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## EXECUTIVE SUMMARY

The National Park Service proposes to construct a new multi-use trail at Cape Hatteras National Seashore. The trail would be located along a corridor parallel to North Carolina Highway 12 (NC-12) on Ocracoke Island in Hyde County between the Village of Ocracoke (also referred to as “the Village”) and the NPS Campground. The purpose of constructing the trail would be to:

- Improve safety on NC-12 for pedestrians, bicyclists, and motorists;
- Improve visitor access in the project corridor;
- Increase opportunities for utilization of alternative modes of transportation, such as walking and bicycling; and
- Reduce traffic congestion within the park and near the Village limit.

The need for the proposed multi-use trail includes safety concerns and the desire to promote alternative forms of transportation. The following statements define the need for the proposed action:

- Pedestrian, bicycle, and vehicular congestion on NC-12 creates unsafe conditions for these different user groups;
- Existing facilities for pedestrians and bicyclists do not support accessibility by the greatest number of people; and
- Existing transportation infrastructure does not meet the need to improve opportunities for alternative transportation.

This environmental assessment analyzes the continued current management (Alternative A, the No Action Alternative), two action alternatives (Alternative B and Alternative C, the Preferred Alternative), and their impacts on the environment.

- Under Alternative A, the trail would not be constructed. The current condition of mixed use on NC-12 would continue, including highway-speed vehicle travel, pedestrian use, and bicycle traffic.
- Under Alternative B, a 3¼-mile-long, multi-use trail would be constructed from the NPS Campground to the Village of Ocracoke. Much of the new trail would have a asphalt-paved surface, except where short segments of elevated boardwalks would be constructed to span a wetland and the backdune. The trail would enhance public safety and the visitor experience along the corridor by providing a pedestrian and bicycle facility separate from the vehicular traffic corridor.
- Under Alternative C (the Preferred Alternative), a 3¼-mile-long, multi-use trail would be constructed from the NPS Campground to the Village of Ocracoke. The entire length of the new trail would have a asphalt-paved surface. The trail would enhance public safety and the visitor experience along the corridor by providing a pedestrian and bicycle facility separate from the vehicular traffic corridor.

This environmental assessment has been prepared in accordance with the National Environmental Policy Act of 1969 and implementing regulations; 40 Code of Federal Regulations Parts 1500-1508; and NPS Director’s Order #12 and Handbook, Conservation Planning, Environmental Impact Analysis, and Decision-Making.

None of the three alternatives analyzed in this environmental assessment would result in major environmental impacts or impairment to park resources or values.

## **PUBLIC COMMENT**

If you wish to comment on this environmental assessment, you may mail comments to the name and address below or post comments online at <http://parkplanning.nps.gov/caha>. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

**This document will be on review for 30 days. Please address written comments to:**

Cape Hatteras National Seashore  
Attn: Ocracoke Island Multi-use Trail EA  
1401 National Park Drive  
Manteo, NC 27954

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## **CHAPTER 1: PURPOSE AND NEED**

### **INTRODUCTION**

This environmental assessment presents the No Action Alternative and two action alternatives for the proposed development of a multiple-use trail (hereafter referred to as a “multi-use trail”) on Ocracoke Island within Cape Hatteras National Seashore, North Carolina. The document also identifies the effects of implementing each alternative on the natural, social, and physical environment.

### **PROJECT LOCATION**

Cape Hatteras National Seashore (also referred to as “the Park” or “the Seashore”) is managed by the National Park Service (NPS). The Seashore is located in Dare and Hyde counties, along the Outer Banks of North Carolina and extends for over 70 miles on Bodie, Hatteras and Ocracoke Islands (Figure 1). The islands constitute a narrow barrier island chain that is typically less than one mile wide. The barrier islands are bordered on the west by the Pamlico Sound, which forms the largest estuarine system on the East Coast, and on the east by the Atlantic Ocean. The proposed multi-use trail would be located along a corridor parallel to North Carolina Highway 12 (NC-12) on Ocracoke Island in Hyde County between the Village of Ocracoke (also referred to as “the Village”) and the NPS Campground. The project corridor is bounded to the north by NC-12; east by the NPS Campground; south by the Atlantic Ocean; west by the Village of Ocracoke limit (Figure 2).

The Park’s General Management Plan (GMP; NPS 1984a) identified that improvement of the link between the NPS Campground and the Village by establishing a multi-use trail would be desirable. The Park’s GMP also identified four planning units, based on the islands’ varied landform, to help determine appropriate visitor use and park development. Under Alternatives B and C, long segments of the proposed trail would be located in the vegetated sand flats unit. This unit is characterized by low, flat topography with grasses, scattered shrubs, and shrub thickets in some places. NC-12 and most of the Park’s developed areas are located in this unit. The planning objectives for this unit are to continue its use as a transportation corridor and to allow for development, as necessary to support visitor activities and resource protection, where construction activities have minimal impact on natural systems and processes. Under Alternatives B and C, short segments of the proposed trail would be located in the ocean/beach unit. This unit is characterized by constantly shifting sands, frequent overwash, and limited grass vegetation. The proposed trail would be located on the backdune in the ocean/beach unit, at the interface with the vegetated sand flats unit. The Park’s GMP states that, in this unit, natural processes would be allowed to continue unhampered and that adequate visitor access over the dunes would be permitted provided that the dunes were protected from overuse.

### **PURPOSE AND NEED FOR THE PROPOSED ACTION**

The NPS is proposing to construct a multi-use trail between the Village of Ocracoke and the NPS Campground on Ocracoke Island within Cape Hatteras National Seashore. This multi-use trail is defined as a trail that permits more than one type of user (e.g., pedestrians, bicyclists, mobility-restricted visitors) as the designated users. The NPS must outline a statement of goals and objectives that will be fulfilled to define the purpose of the proposed action. The following statements define the goals of the proposed action:

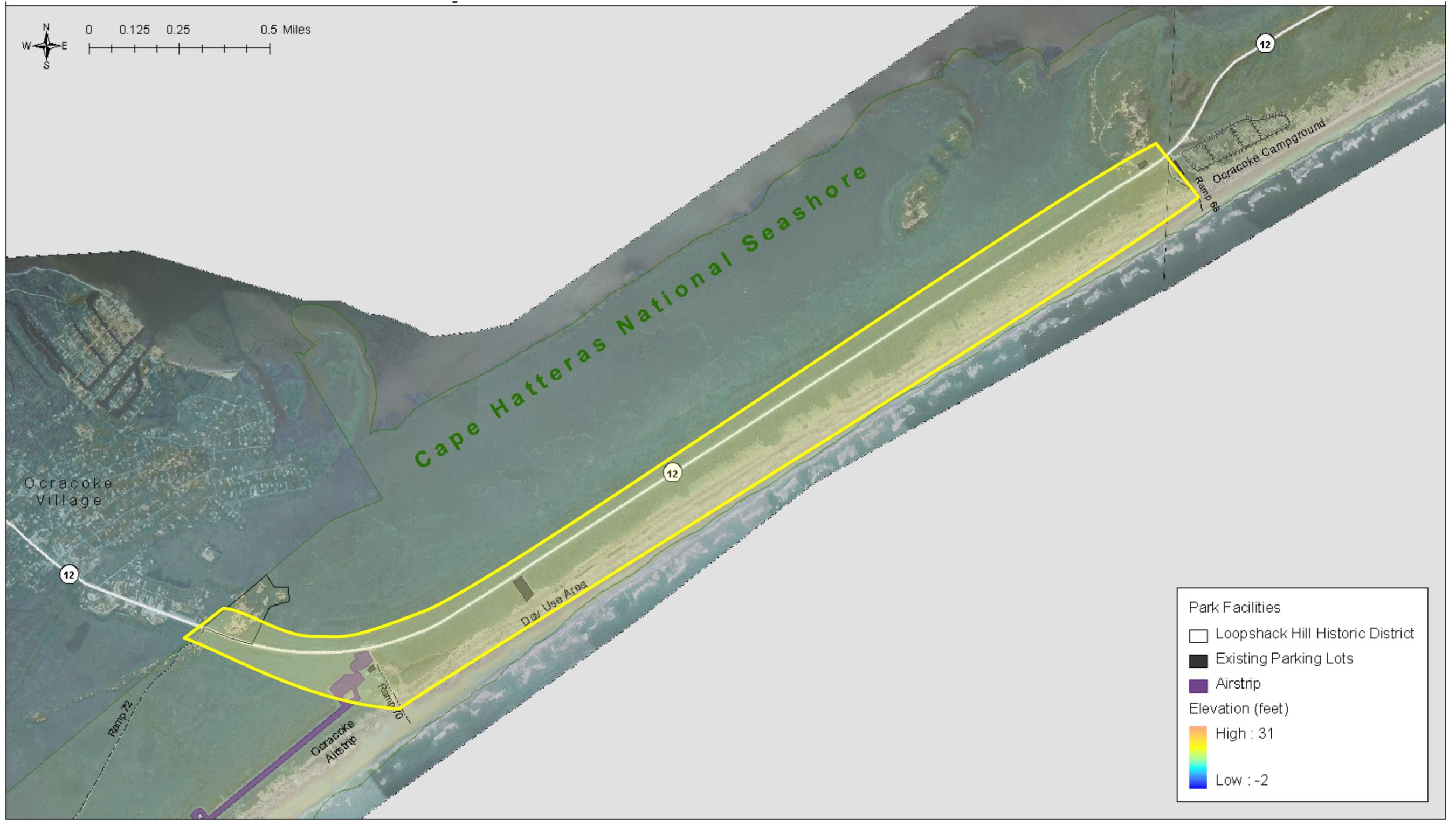
- To improve safety on NC-12 for pedestrians, bicyclists, and motorists;
- To improve visitor access in the project corridor;

- To increase opportunities for utilization of alternative modes of transportation, such as walking and bicycling; and
- To help reduce traffic congestion within the park and near the Village limit.

The NPS determined that the proposed development of this multi-use trail is necessary and appropriate, and that there is no practicable alternative location for its development outside of the Park. Suitable alternatives for trail siting, alignment, and construction materials were developed with integration into the Park's landscape and environs to minimize environmental impact and avoid natural hazards. Therefore, the proposed trail is consistent with NPS Management Policies (2006).



**FIGURE 1. CAPE HATTERAS NATIONAL SEASHORE VICINITY MAP**



Produced by CAHA RM ACZ

7 May 2008

FIGURE 2. PROJECT CORRIDOR ON OCRACOKE ISLAND

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For the proposed action to be considered successful, objectives that are critical must be identified. These objectives can be specific to the proposed action and/or general in terms of overall protection of park resources or complying with all applicable laws, rules, and regulations. For the proposed multi-use trail project to be considered successful, the following objectives must be met:

- Development of a new multi-use trail that would reduce conflicts among user groups on NC-12;
- Provide a satisfying visitor experience along the project corridor for pedestrians, bicyclists, and motorists;
- Allow for a satisfying experience that is consistent with the purposes for which the park was established;
- Protect the park's natural, cultural, scenic, and aesthetic values;
- Develop alternatives that minimize areas of disturbance and the potential for other long-term, adverse impacts to park resources; and
- Work cooperatively with local communities and other government agencies to address mutual concerns.

The need for the proposed action is related to defining existing conditions that need to be changed or problems that need to be remedied, explaining why the park must take action at this time and in this place. The need for the proposed multi-use trail is driven by safety concerns associated with NC-12 and the desire to promote alternative forms of transportation within the Seashore. The following statements define the need for the proposed action:

- Pedestrian, bicycle, and vehicular congestion on NC-12 creates unsafe conditions for these different user groups;
- Existing facilities for pedestrians and bicyclists do not support accessibility by the greatest number of people; and
- Existing transportation infrastructure does not meet the need to improve opportunities for alternative transportation.

This environmental assessment analyzes the proposed action and alternatives and their impacts on the environment. This environmental assessment has been prepared in accordance with the National Environmental Policy Act of 1969 and implementing regulations; 40 Code of Federal Regulations Parts 1500-1508; and NPS Director's Order #12 and Handbook, Conservation Planning, Environmental Impact Analysis, and Decision-Making.

## **PURPOSE AND SIGNIFICANCE OF THE PARK**

Cape Hatteras National Seashore was authorized by Congress on August 17, 1937 (50 Stat. 669), and the Secretary of the Interior issued an order establishing Cape Hatteras National Seashore on January 12, 1953. The authorizing legislation states that the purpose of the Seashore "shall be, and is hereby, established, dedicated and set apart as a national seashore for the benefit and enjoyment of the people." The act continues, "Except for certain portions of the area, deemed to be especially adaptable for recreational uses... the said area shall be permanently reserved as a primitive wilderness and no development of the project or plan for the convenience of visitors shall be undertaken which would be incompatible with the preservation of the unique flora and fauna or the physiographic conditions now prevailing in this area" (NPS 1981, 1984b).

The Seashore is recognized for its natural, historical, and recreational values, including its beaches, excellent fishing, diverse bird life, and historic landmarks. The following significance statements have been formulated for the park (NPS 2007):

- The Seashore was authorized in 1937 and established in 1953 as our nation's first national seashore and preserves publicly accessible barrier islands where audiences should be able to experience unimpaired seashore values such as clean ocean water and beaches, undeveloped island and water resources, natural sounds, solitude, seashore viewsheds, and night skies.
- The Seashore is part of a natural system with a geologic process unique to barrier islands and is characterized by constant change both seasonally and daily, subtle and dramatic.
- The Seashore is characteristic of the ecological habitats normally associated with barrier island systems including beach, dunes, maritime forest, inlets, freshwater wetlands, salt marshes, and tidal flats.
- The Seashore is a permanent and temporary home to a great variety of terrestrial and aquatic life, including several protected species, which depend on the fragile and special island habitats that result from the transition between the northern and southern habitat zones and the dynamic nature of these barrier islands.
- The Seashore, a Globally Important Bird Area, is a critical natural landform along the Atlantic Flyway serving as major resting, feeding, and breeding grounds for migratory birds.
- The Seashore contains archeological and historical resources that provide clues to livelihood and activities of Native American life, self-sufficient and isolated island communities, waterfowl hunting camps, commercial fisheries, lighthouses, U.S. Life Saving stations, U.S. Coast Guard stations, shipwrecks, military structures and sites, a U.S. Weather Station, and sites associated with the Civilian Conservation Corps.
- The Seashore is an outdoor recreational resource offering outstanding opportunities for hiking, camping, boating, sailing, nature study, solitude and reflection, beach combing, fishing, hunting, shellfishing, swimming, birding, biking, picnicking, and many other leisure activities.
- The Seashore is an educational resource offering outstanding opportunities for visitors and educational groups to learn about stewardship, preservation, and the park's unique natural and cultural resources.

## **PROJECT BACKGROUND**

Pedestrian, bicycle, and vehicular congestion on NC-12 along the project corridor creates unsafe conditions for motorists, bicyclists, and pedestrians. Bicyclists and pedestrians currently use the 4-foot-wide road shoulder of NC-12. The posted vehicular speed limit for this area is 55 mph until the final 0.25 miles before the Village, where it is reduced to 25 mph. In addition, a high percentage of visitors using bicycles on the Island are families and children. Although there have been no documented safety incidents between motor vehicles and pedestrians or bicyclists, the potential for an incident is substantial. Establishment of a wider or separate corridor for visitors using non-motorized forms of transportation would have the greatest potential for improving safety within the project corridor.

Standards for the design of bicycle facilities (AASHTO 1994 and 1999, NC DOT 1994) identify that 4 foot wide road shoulders are minimally acceptable for bicycle traffic use. Therefore, the existing 4 foot-wide road shoulder of NC-12 meets the minimally acceptable standards for bicyclists only. However, these guides do recommend additional width when vehicle speeds exceed 50 mph or when the

percentage of trucks, buses, or recreational vehicles is high. A more comfortable operating space of 5 foot-wide paved shoulders for bicyclists is recommended.

In keeping with NPS policy (Director's Order #87B) on developing alternative transportation systems where feasible, the National Park Service proposes to construct a paved, multi-use trail extending from the Village of Ocracoke northward through the NPS Day-Use Area and on to the NPS Campground, a distance of approximately three linear miles. The proposed action would provide a direct connection to pedestrian enhancement projects along NC-12 in the Village of Ocracoke, creating a pedestrian and bicycle system extending from the south end of the Village near the ferry docks and NPS Visitor Center to the NPS Campground (Figure 2). Construction of the proposed multi-use trail would serve as an alternative transportation pathway, encouraging continued development of a bicycle-pedestrian community that is safer and more enjoyable for visitors and residents of all ages. The North Carolina Department of Transportation would provide funding for construction of the trail, and the National Park Service would maintain the trail.

The National Park Service, North Carolina Department of Transportation, and Hyde County are working cooperatively to provide and promote safe and enjoyable experiences of Ocracoke Island by all. As such, the need for an alternate transportation system using trams or trolleys has been proposed to help alleviate congestion between the Village of Ocracoke and the park. Currently, there is inadequate infrastructure and parking to accommodate the peak season vehicular demands on Ocracoke Island. During peak visitation in the summer months, up to 1,200 cars per day visit Ocracoke Island via the North Carolina Department of Transportation ferry service. The National Park Service has investigated several potential locations for construction of a parking area within the park boundary that would provide access to the multi-use trail and serve the dual purpose of supporting potential tram/trolley operations. However, results of wetlands surveys conducted within the project corridor by multiple state and federal agencies have indicated that there is no viable location for constructing a parking area due to the extensive presence of wetlands. The specific locations of each of the areas investigated as well as a rationale for dismissal of the parking area as a component of this environmental assessment are included in Chapter 2.

## **Previous Planning**

The proposed multi-use trail was first identified as a desirable addition to Cape Hatteras National Seashore in its General Management Plan (NPS 1981, 1984a). Since that time, collaborative transportation planning efforts for Ocracoke Island have taken place between multiple stakeholders through various communications and meetings over a period of several years. These stakeholders have included, but are not limited to, the National Park Service, the North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation, the North Carolina Division of Coastal Zone Management, Hyde County, the Ocracoke Scenic Byways Committee, the Ocracoke Transportation Committee, and the Ocracoke Civic Association. The project is listed in Division 1 of the North Carolina Fiscal Year 2007-2013 State Transportation Improvement Program (NCDOT 2007).

The North Carolina Department of Transportation Division of Public Transportation and Hyde County Transit are proposing initiation of a public transportation system on Ocracoke Island consisting of a tram or trolley system. The North Carolina Department of Transportation completed a feasibility study for the project in 2005. In addition, an Ocracoke Transportation Survey was completed by East Carolina University which summarized transportation survey results from visitors, business owners, and residents of Ocracoke Island (East Carolina University 2005). An Ocracoke Island Public Transit and Implementation Study, Draft Ocracoke Implementation Plan was prepared by KFH Group, Inc. (KFH Group, Inc. 2005). The planning effort details the existing demand, service plan designs, and funding sources for a public transportation system on Ocracoke Island. The National Park Service is coordinating with Hyde County Transit, Inc. in order to plan, design, operate, and evaluate public transportation systems on Ocracoke Island including Cape Hatteras National Seashore. This environmental assessment reports the efforts of the National Park Service to locate and evaluate potential parking areas within the

seashore for purposes of supporting a future tram/trolley system. Chapter 2 identifies the locations of parking areas that were considered but dismissed due to resource concerns.

## Scoping

The Council on Environmental Quality (CEQ 1978) guidelines for implementing the National Environmental Policy Act and the NPS National Environmental Policy Act guidelines contained in Director's Order # 12: Conservation Planning, Environmental Impact Analysis and Decision Making Handbook (NPS 2001b) provide the framework for scoping. Scoping is an early and open process completed by the National Park Service to:

- Determine important issues;
- Eliminate issues that are not important or relevant;
- Identify relationships to other planning efforts or documents;
- Define a time schedule of document preparation and decision-making; and
- Define purpose and need, agency objectives and constraints, and the range of alternatives.

A project kickoff meeting and project corridor site visit was conducted in November 2007. The meeting was attended by several key Park staff members (see Chapter 4 for planning team participants) and provided an opportunity for scoping and further refinement of the alternatives. Representatives from the North Carolina Department of Transportation (NC DOT) and the North Carolina Division of Coastal Management were also present for a project corridor site visit. Subsequent to this meeting, a site visit for the purpose of wetlands assessment was conducted by the U.S. Army Corps of Engineers and a NPS Southeast Regional Wetlands Ecologist. A site visit by NPS, US Public Health Service engineer, and NC DOT engineers was held in March 2008. The results of these site visits and assessments provided the information necessary to refine the proposed trail design.

A coordination letter was prepared for the US Fish and Wildlife Service requesting a current list of Federally-listed threatened and endangered species in the project area and to initiate informal consultation pursuant to the requirements of the 1973 Endangered Species Act, as amended and NPS Management Policies. The NPS' letter to US Fish and Wildlife, as well as the US Fish and Wildlife's response are included in Appendix A.

A coordination letter was prepared for the purpose of outlining the proposed action and requesting agency concerns and comments related to the proposed action (see Appendix A). North Carolina Department of Administration's State Environmental Review Clearinghouse on December 13, 2007. The clearinghouse assists state and federal government agencies in meeting their coordination requirements under the National Environmental Policy Act and serves as a means to notify potentially affected state/local agencies and the public of proposed development activities in their jurisdiction. The process is intended to provide decision makers with the information that would enable them to make an informed decision of the environmental consequences of a proposed action. The North Carolina Department of Environment and Natural Resources, Division of Coastal Management responded to the letter request (see Appendix A) with concerns for coastal zone consistency, visitor experience, construction materials, plantings, resource evaluation, and consistency with local land use plan.

Public scoping for the proposed action was facilitated through the NPS Planning, Environment, and Public Comment website. A brief project synopsis, including the purpose and need of the proposed action and alternatives descriptions, were posted on the website along with instructions for providing comments. The comment period extended from October 13, 2007 through November 13, 2007. Seven comments were received through the Planning, Environment, and Public Comment website. Most commenters expressed support of the trail and concerns over safety, which is consistent with park records from other public and agency engagement. Some comments related to parking and need for additional parking.

However, due to wetland resource considerations, a parking lot was considered as part of this project, but eliminated to avoid adverse wetland impacts.

The comment period was also announced via a newspaper article published in the *Coastland Times* on October 14, 2007. Public scoping has also been an informal component of previous planning efforts conducted with project stakeholders. For example, the concept of a multi-use trail was discussed at Ocracoke Civic Association meetings, which are open to the public. For further scoping and public participation information, see Chapter 4.

In summary, potential issues and concerns associated with the proposed multi-use trail were identified by input from park staff; local, state, and federal agencies; local and regional organizations; and the public.

## ISSUES AND IMPACT TOPICS

Potential issues and concerns affecting the proposed action were identified based on the features of the multi-use trail. Issues and concerns affecting this proposal were identified by input from park staff; local, state and federal agencies; local and regional organizations; and the public. The major issues and concerns identified for the proposed action include:

- Improvement of public health and safety;
- Promotion of alternative forms of transportation;
- Wetlands avoidance; and
- Minimization of impacts to coastal processes (dune resources).

Resources of concern that could be affected by the range of alternatives are defined in the NPS National Environmental Policy Act process as impact topics. The impact topics are identified based on the potential environmental effects of the alternatives; scoping concerns; federal laws, regulations, and Executive Orders; and NPS Management Policies 2006. A list of impact topics and a summary of relevant regulations or policies related to each impact topic are provided in Table 1. Some topics were eliminated because the proposed action was judged to have no effect or a negligible effect. The rationale for the elimination of selected impact topics is summarized below.

**TABLE 1. POLICIES AND REGULATIONS PERTAINING TO IMPACT TOPICS**

<b>Impact Topics</b>	<b>Relevant Regulations or Policies</b>
<i>Impact Topics Retained</i>	
Visitor Use and Experience	NPS Organic Act; NPS Management Policies 8.2, 2006
Public Health and Safety	NPS Management Policies 8.2.5, 2006
Transportation	NPS Management Policies 9.2, 2006
Park Operations	NPS Management Policies 9.1, 2006
Coastal Processes	NPS Management Policies 4.8.1.1, 2006; Coastal Zone Management Act (16 U.S.C. 1451 et seq.)
Floodplains	Executive Order 11988 (Floodplain Management); NPS Management Policies 4.6.4, 2006
Wetlands	Rivers and Harbors Act of 1899; Clean Water Act Section 404; Executive Order 11990 (Protection of Wetlands); NPS Director's Order #77-1; NPS Management Policies 4.6.5, 2006

**TABLE 1. POLICIES AND REGULATIONS PERTAINING TO IMPACT TOPICS**

<b>Impact Topics</b>	<b>Relevant Regulations or Policies</b>
Vegetation	NPS Management Policies 4.4.2, 2006; Executive Order 13112
Wildlife	NPS Management Policies 4.4.2, 2006; Migratory Bird Treaty Act
Special Status Species	Endangered Species Act of 1973; NPS Management Policies 4.4.2.3, 2006; 40 Code of Federal Regulations 1500 (regulations for implementing the National Environmental Policy Act)
<i>Impact Topics Dismissed</i>	
Air Quality	Federal Clean Air Act; Clean Air Act Amendments of 1990; Noise Control Act of 1972; NPS Management Policies, 4.7.1, 2006
Geologic Resources	NPS Management Policies 4.8, 2006
Soils	NPS Management Policies 4.8.2.4, 2006
Prime and Unique Farmlands	Council on Environmental Quality 1980 memorandum on prime and unique farmlands; 40 Code of Federal Regulations 1500 (regulations for implementing National Environmental Policy Act, section 1508.27)
Water Quality	Executive Order 12088; Executive Order 11990; NPS Management Policies 4.6.3, 2006; Federal Water Pollution Control Act [The Clean Water Act of 1972 (as amended in 1977)]; Section 404 of Clean Water Act.
Aquatic Resources	NPS Management Policies 4.6, 2006; Federal Water Pollution Control Act [The Clean Water Act of 1972 (as amended in 1977)]; Magnuson-Stevens Fishery Conservation and Management Act
Ecologically Critical Areas, Wilderness, Wild and Scenic Rivers, or Other Unique Natural Resources	36 Code of Federal Regulations 62 (criteria for national natural landmarks); NPS Management Policies 4.3, 2006; Wilderness Act of 1964, NPS Management Policies 6.3, 2006
Soundscape/Noise	NPS Management Policies 4.9, 2006
Cultural Resources	40 Code of Federal Regulations 1500 (regulations for implementing the National Environmental Policy Act); Section 106 of the National Historic Preservation Act; National Environmental Policy Act (NEPA) of 1969; Council on Environmental Quality regulations for Implementing the National Environmental Policy Act (40 CFR Parts 1500-1508); NPS Director's Order (DO) #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making (2001); National Historic Preservation Act of 1966 and its implementing regulations at 36 CFR 800; Executive Order 11593 (Protection and Enhancement of the Cultural Environment); Director's Order #28, Cultural Resource Management (1998); NPS-28, Cultural Resource Management Guideline (1998); NPS Management Policies 2006, especially Chapter 5; The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (1983, 48 FR 44716).
Indian Trust / Sacred Sites	Director's Order #72, Executive Order 13007; NPS Management Policies 5.3.5.3.2, 2006
Ethnographic Resources	NPS Management Policies 5.3.5.3, 2006
Museum Collections	NPS Management Policies 5.3.5.5, 2006

**TABLE 1. POLICIES AND REGULATIONS PERTAINING TO IMPACT TOPICS**

<b>Impact Topics</b>	<b>Relevant Regulations or Policies</b>
Socioeconomics	40 Code of Federal Regulations 1500 (regulations for implementing National Environmental Policy Act)
Environmental Justice	Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations)
Land Use	NPS Management Policies 3.4, 2006
Concession Operations and Commercial Services	NPS Management Policies 10.2, 2006

### **Impact Topics Included in the Environmental Assessment**

The following impact topics represent resource areas that have the potential to be affected by the proposed action to at least a minor extent. The existing conditions and anticipated effects for these resource areas are described in Chapter 3.

**Visitor Use and Experience:** Construction of a multi-use trail would offer a new recreational visitor experience within the park and would reduce conflict between motorized and non-motorized visitor uses along NC-12. Visitor use and experience was retained as an impact topic in this document.

**Public Health and Safety:** Public health and safety is associated with the proposed action and a key factor associated with the need for the project. Public health and safety was retained as an impact topic in this document.

**Transportation:** Construction of a multi-use trail would provide a corridor for non-motorized transportation between the NPS Campground and the Village of Ocracoke. Transportation was retained as an impact topic in this document.

**Park Operations:** The required maintenance for the proposed multi-use trail would result in an increased burden on park operations. It is anticipated that maintenance of the proposed trail would require one additional maintenance full-time equivalent position and the use of equipment for the purpose of sand sweeping. Park operations is an impact topic that was retained in this document.

**Coastal Processes - Dunes:** The project corridor is located on a barrier island which is defined by dynamic coastal processes. Although the proposed multi-use trail is located in the vegetated sand flats unit, the nearby artificial dune field provides protection from overwash damage. Therefore, coastal processes - dunes is an impact topic that was retained in this document.

**Floodplains:** The NPS requires development of a Statement of Findings describing the impacts to floodplain resources when it is not practicable to locate or relocate proposed development to a site outside and not affecting the floodplain (NPS 2003b). Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps show that the project area is within 100-year-flood floodplain. Therefore, floodplains is an impact topic that was retained in this document and a Statement of Findings for Floodplains was prepared (Appendix C).

**Wetlands:** For proposed new development or other new activities, plans, or programs that are either located in or otherwise have the potential for direct or indirect adverse impacts on wetlands, the NPS will employ a sequence of: a) avoiding adverse wetland impacts to the extent practicable, b) minimizing impacts that could not be avoided, and c) compensating for remaining unavoidable adverse wetland impacts via restoration of degraded wetlands. Wetlands are abundant and extensive on Ocracoke Island. Under Alternative B, the proposed action would permanently affect less than 0.1 acre of wetlands within the proposed trail corridor. Therefore, wetlands is included as an impact topic in this document.

Alternative C (the Preferred Alternative) would meet the goal of avoidance of adverse impacts on wetlands. Therefore, a Statement of Findings for Wetlands is not required (NPS 2008b).

**Vegetation:** Clearing of vegetation would be required prior to construction of the multi-use trail resulting in loss of vegetation. Vegetation was retained as an impact topic.

**Wildlife:** Wildlife habitat is present within the project corridor. Several species of mammals, birds (resident and migratory), reptiles, and amphibians are likely to occur within the project corridor. Construction and operation of the proposed multi-use trail could increase disturbance to wildlife. Wildlife was retained as an impact topic.

**Special-Status Species:** Habitat for at least 12 protected species (Federally, state, or locally listed species with endangered, threatened, or special concern status) is present in the vicinity of the project corridor. The proposed action would have no effect on any Federally or state-listed endangered or threatened species. However, Federal Species of Concern and state-listed significantly rare species that potentially occurs in the project corridor is dune bluecurls (*Trichostema* sp.). Therefore, special status species is an impact topic that was retained in this document.

### **Impact Topics Dismissed from Further Analysis**

Certain potential impact topics were dismissed because these resources would not be affected by the alternatives or the potential for impacts under all alternatives would be negligible. These topics and the rationale for their dismissal are listed below.

**Air Quality:** Air quality in the Outer Banks is considered to be good. Wind and atmospheric instability generally disperse air pollutants rapidly during the day, but fog often develops at night. Air quality at the park is protected under several provisions of the Clean Air Act (CAA), including the National Ambient Air Quality Standards (NAAQS) and the Prevention of Significant Deterioration (PSD) Program. Cape Hatteras National Seashore is designated Class II airshed (NPS 2001a). Only a limited amount of additional air pollution, due to moderate growth, can be allowed in the area over time (NPS 2001a). The proposed action would result in negligible, short-term, adverse effects to air quality during construction. Any short-term, adverse effects to air quality during construction would be within state and federal air quality standards. In addition, construction of a multi-use trail would potentially result in less motorized vehicular traffic, which would ultimately be beneficial to air quality. Hence, air quality is an impact topic that was dismissed from analysis.

**Geologic Resources:** Geologic resources related to the barrier island/dune complex would be addressed under coastal processes, which is a separate impact topic.

**Soils:** Soils associated with the barrier island/dune complex would be addressed under coastal processes, which is a separate impact topic.

**Prime or Unique Farmlands:** The Farmland Protection Policy Act and the U.S. Department of the Interior require an evaluation of impacts on prime and unique agricultural lands. As prime and unique farmlands do not occur in the vicinity of the project, this topic was dismissed as an impact topic.

**Water Quality and Aquatic Resources:** Aquatic resources and water bodies are not present within the project corridor (NPS 2006a). For this reason, water quality and aquatic resources were dismissed.

**Ecologically Critical Areas:** No congressionally designated natural resources, such as ecologically critical areas, Wilderness, Wild and Scenic Rivers, or other unique natural resources are located at the park or within the project site. Therefore, ecologically critical areas is an impact topic that was dismissed from further consideration.

**Soundscape:** The project corridor is located along NC-12 where sounds related to intermittent motorized vehicular traffic are common. Operation of the multi-use trail would contribute additional sounds associated with non-motorized forms of transportation (bicycling, walking, etc.); however, these sounds would be negligible when compared to sounds currently generated by motorized forms of transportation in the project corridor. During construction of the multi-use trail, the soundscape would be affected by sounds emitted by machinery; however these effects would be short-term and negligible to minor. In addition, construction would be scheduled to correspond with a timeframe that does not coincide with the nesting season of any special status species. For these reasons, soundscape is an impact topic that was dismissed from analysis.

**Cultural Resources:** Establishment and use of the proposed multi-use trail would not adversely effect historic structures, National Register Historic Districts, or cultural landscapes in the project corridor. The NPS Southeast Archeological Center and park resource managers concluded that an archeological survey was not necessary for the proposed action. The probability for occurrence of archeological resources is quite low, and it would not be necessary to have an archeological monitor on site during construction. Should any artifacts or bone be encountered in the construction of the trail, work would cease and the park archeologist would be contacted. Therefore, cultural resources are dismissed from further consideration.

**Indian Trusts:** There are no Indian trust resources, as defined by Directors Order #72, in or near the Seashore. For this reason, Indian trusts is an impact topic that was dismissed from analysis.

**Ethnographic Resources and Sacred Sites:** There are no sacred sites or ethnographic resources, as defined by Executive Order 13007, in or near the project corridor. For this reason, ethnographic resources and sacred sites were dismissed.

**Museum Collections:** There would be no changes to the protection of museum collections at the park as a result of the proposed action or the alternatives. Therefore, museum collections was dismissed as an impact topic.

**Socioeconomics:** Impacts on the socioeconomic environment due to the implementation of actions proposed in the alternatives would be negligible and such impacts would not be expected to substantially alter the physical and social structure of nearby communities. Therefore, socioeconomics was dismissed as an impact topic.

**Environmental Justice:** Executive Order 12898 requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities.

For the purpose of fulfilling Executive Order 12898, in the context of the National Environmental Policy Act, the alternatives addressed in this plan were assessed during the planning process. It was determined that none of these alternatives would result in disproportionately high adverse effects on any minority or low-income populations or community. The following information contributed to this conclusion:

- The developments and actions in the alternatives would not result in any identifiable human health effects. Therefore, there would be no direct or indirect effects on human health within any minority or low-income populations or community.
- The impacts on the natural and physical environment that would occur due to any of the alternatives would not disproportionately adversely affect any minority or low-income populations or community, or be specific to such populations or communities.

Therefore, environmental justice was dismissed as an impact topic.

**Land Use:** The proposed action would not affect any existing or proposed land uses either at the park or near the park. The proposed action has been coordinated with neighboring governing agencies that are in support of the proposed action. There are no inholdings, or nonfederal property owners affected by any of the alternatives. The alternatives are consistent with land use plans, policies or controls that are planned by the Village of Ocracoke, Hyde County, the North Carolina Department of Transportation, and other agencies. Coastal zone management requirements are addressed under the coastal processes – dunes impact topic. Therefore, land use was dismissed as an impact topic.

**Concessions and Commercial Services:** There would be no changes to the existing concessions or commercial services at the park as a result of the proposed action or the alternatives. Therefore, concessions and commercial services was dismissed as an impact topic.

## CHAPTER 2: THE ALTERNATIVES

### INTRODUCTION

This chapter provides a description of the No Action Alternative and two action alternatives. It also identifies alternatives or actions eliminated from further consideration. The environmentally preferred alternative is described. Summaries of the important features of the alternatives and the effects of the alternatives are provided.

### Development of the Preferred Alternative

The NPS considered a range of alternatives during planning for the multi-use trail. The range of options considered is presented below in the discussion of the Alternatives A, B, and C, as well as those described in “Alternatives Considered but Dismissed” section. To meet the project objectives, including limiting impacts to park resources, careful consideration was given to policies and regulations pertaining to coastal resources and wetland protection.

Under the Preferred Alternative, avoidance or mitigation measures and Best management practices (BMPs) would prevent or minimize potential adverse effects associated with the project. These practices and measures would be incorporated into the project design and construction plans.

In the course of developing project alternatives and implementing actions, the NPS must seek to avoid direct or indirect adverse impacts on park resources and avoid support of activities that would result in such impacts, wherever practicable.

Mitigation involves measures taken to reduce or minimize potentially adverse impacts. It is a key concept in resource management planning. Mitigation and best management practices are regularly used to ensure that the park’s natural and cultural resources are protected. The NPS routinely evaluates mitigation measures to ensure their effectiveness.

Resource protection measures undertaken during project implementation would include, but would not be limited to, those listed below. The impact analyses in the “Affected Environment and Environmental Consequences” section were performed assuming that these best management practices and mitigation measures would be implemented as a part of project implementation. All protection measures would be clearly stated in construction documents and specifications.

To minimize impacts to wetlands, the park employed EPA, U.S. Corps of Engineers, NPS, and North Carolina Department of Coastal Management reference material and professional consultation. Site visits, wetland delineation and mapping, avoidance measures, and best management practices (BMPs) were incorporated into the planning effort to avoid or minimize adverse effects on wetlands. The preferred alternative therefore represents the "least environmentally damaging practicable alternative" as required by U.S. Environmental Protection Agency 404(b) Clean Water Act Guidelines (USEPA 2005).

In recognition of the highly dynamic and sensitive nature of barrier islands and dune systems (Godfrey and Godfrey 1976, 2005), the NPS has established guidelines in Section 4.8.1.1 of Management Policies 2006 for construction and operation of projects in these areas (NPS 2006). In general, these policies require that:

1. Natural shoreline processes will be allowed to continue without interference;
2. Previous or existing alterations to shoreline processes will be mitigated or natural processes will be restored; and

3. New developments will not be placed in areas subject to wave erosion or active shoreline processes.

To assure that these requirements are met for the proposed multi-use trail project, the NPS carefully assessed options for locating the trail in relation to dunes and other sensitive barrier resources and consulted with the Acting Coastal Geology Coordinator for the NPS Southeast Regional Office and North Carolina's Division of Coastal Management. The proposed trail under Alternatives B and C would be located in an area that is not considered an inlet formation hazard zone by NC DCM (2008b). The entire project area is located in the Ocean Erodible Area of Concern (Appendix A, letter from S. Rynas of the NC DENR) and must comply with the setback requirements for development (15A NCAC 7H .0306). The entire project corridor is located within the 2.0 feet/year setback factor zone. The proposed action would require a setback factor of 60 and would require a 120 foot setback from the first line of natural stable vegetation. Under Alternatives B and C, the proposed trail would be located well beyond this setback, and therefore meets this requirement. Furthermore under Alternatives B and C, the proposed trail would be located in the vicinity of a dune field that is less active than most of the dune fields within the Park. The proposed location under Alternatives B and C, as well as the construction of elevated boardwalk under Alternative B, result in avoidance of areas where shoreline processes are active. Under Alternatives B and C, short and long-term disturbance is introduced into vegetative communities that are tolerant of development and visitor use.

### **ALTERNATIVE A, THE NO ACTION ALTERNATIVE**

Under this alternative, NC-12 would continue to be a shared transportation corridor in the 3.08 mile section between the Village of Ocracoke and the NPS Campground. Bicyclists and pedestrians would continue to share the existing road shoulders, and would continue to merge into the vehicle traffic lane when multiple bicycles and/or pedestrians are present.

The width of the road shoulders varies in this section of NC-12, but it is typically 3 to 4 feet wide on each of the north and southbound lanes (Figure 3). Vehicles would continue to use the NC-12 road corridor within the posted speed limit of 55 miles per hour, slowing to 25 miles per hour as they approach the Village of Ocracoke. The NC-12 and parking lots would remain as currently exist with no changes proposed. There would be no plans to widen NC-12 or create a new parking lot in this corridor along NC-12.



**FIGURE 3. EXISTING ROAD SHOULDER OF NC-12 USED BY PEDESTRIANS AND BICYCLISTS**

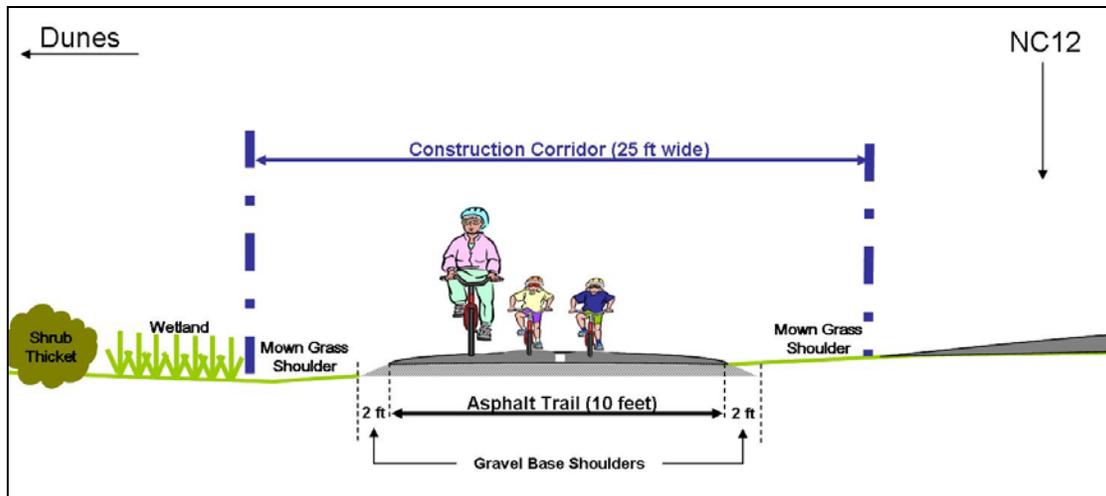
## ELEMENTS COMMON TO THE ACTION ALTERNATIVES

### Trail Description

A new multi-use trail corridor would be established between the Village of Ocracoke and the NPS Campground. The multi-use trail alignments under Alternatives B and C have been developed to be consistent with the Park's *General Management Plan* (1981, 1984b). The trail would be located primarily in the vegetated sand flats unit, where NC-12 and other facilities are located. However, short segments of the trail would be constructed on the backdune in the ocean/beach unit. Furthermore, the trail would be constructed using best management practices to minimize impacts on the dune system and wetlands in the project area. The trail corridor would also be linear, which is consistent with the configuration of the Island and NC-12, and link to existing parking lots and beach access routes. To the maximum extent possible, the trail would be located on previously disturbed land.

The new trail corridor would be approximately 3¼ miles long and would be accessible by bicyclists, pedestrians, and visitors with mobility restrictions. The trail would separate visitors from NC-12, where the posted speed limit for vehicular traffic is 55mph from the NPS Campground to the final ¼ mile approaching the Village limit.

Along the ½ mile of NC-12 between Village of Ocracoke and the NPS Ocracoke Airstrip/Ramp 70 area, the trail would be located within the existing NC-12 right-of-way, in the mown grassy swale between the existing paved road surface and wetlands. The trail would be constructed parallel to the NC-12 road corridor, but separated from the road by a distance of approximately 8-10 feet (Figure 4). The remaining 2¾ miles of the trail from the NPS Ocracoke Airstrip/Ramp 70 area to the NPS Campground would be located south of NC-12, between the secondary dune and shrub thicket. The trail would intersect with the existing Day Use Area parking lot, to allow visitors to access the trail from an existing parking area equipped with sweet-smelling toilets and shower facilities.



**FIGURE 4. PROPOSED TRAIL PROFILE IN THE ½ MILE SECTION FROM THE VILLAGE OF OCRACOKE TO RAMP 70**

The multi-use trail would be constructed using hard surface materials. The maximum width of the hard surface would be 10-feet wide, and an additional 2-feet wide of pervious shoulders on either side of the trail would be constructed, resulting in a total path width of 14 feet. The entire trail would comply with accessibility requirements under the Architectural Barriers Act (1968) and the Americans with Disabilities Act (1990) to provide full and equal access for all visitors, regardless of mobility limitations.

The North Carolina Department of Transportation would construct the trail with funding from the Federal Highway Administration. Costs for trail installation are currently estimated at \$900,000. The National Park Service would manage, operate, and maintain the trail after construction.

#### *Construction Methods*

The trail corridor would require a 25-foot-wide construction footprint located between the secondary dune and shrub thicket. The NPS would clearly identify the centerline of the proposed trail, the 25 foot-wide construction corridor, and any wetlands within 30 feet of the construction corridor. NC DOT would install erosion and sedimentation controls placed where needed to protect wetlands and dunes. The NPS would oversee all construction activities.

Unidirectional construction would be implemented. That is, the trail would be constructed in one direction, with construction equipment working in one direction and not making turns to avoid increasing the construction footprint/potential impact area. A small blade motor grader would be used to remove surface vegetation and level uneven ground surfaces within the construction corridor. All removed materials would be retained within the construction corridor. Geotextile and a rock base (using “57” stone) would be installed as the base. Hot mix asphalt would be delivered in small quantities and overlaid on the stone to create the 10 foot-wide trail.

A portion of the NPS Campground would be used as the primary staging area for construction materials and vehicles because it has recently been used by NC DOT as a staging area. Supplemental potential staging areas include the NPS Day Use Area parking lot and the NPS Airstrip parking lot. Only existing paved parking areas would be used for staging construction vehicles and materials. No new disturbed areas would be established for staging.

Construction would not occur during peak visitation to avoid displacing visitors to these facilities.

#### *Mitigation Measures*

Construction zones would be identified and fenced with construction tape, snow fencing, or some similar material prior to any construction activity. The fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing.

Temporary impacts associated with trail construction activities would occur, such as soil and vegetation disturbance and the possibility of soil erosion. In an effort to avoid introduction of exotic plant species, no hay bales would be used. Hay often contains seed of undesirable or harmful alien plant species. Therefore, on a case-by-case basis the following materials would be used for any erosion control dams that would be necessary: rice straw, straws determined by NPS to be weed-free, cereal grain straw that has been fumigated to kill weed seed, and wood excelsior bales. Standard erosion control measures such as silt fences and/or sand bags would also be used to minimize any potential soil erosion. Silt fencing would be installed to protect wetlands within 30 feet of the construction corridor limits.

Silt fencing fabric would be inspected weekly or after every major storm. Accumulated sediments would be removed when the fabric is estimated to be approximately 75% full. Silt removal would be accomplished in such a way as to avoid introduction into any wetlands or flowing water bodies.

Although soil side-cast during construction would be susceptible to some erosion, such erosion would be minimized by placing silt fencing around the excavated soil. Excavated soil would be used in the construction project; excess soil would be stored in approved areas.

In many areas soils and vegetation are already impacted to a degree by various human and natural activities. Construction would take advantage of these previously disturbed areas wherever possible. Soils within the project construction limits would be compacted and trampled by the presence of construction equipment and workers. Soils would be susceptible to erosion until revegetation takes place.

Vegetation impacts and potential compaction and erosion of bare soils would be minimized by conserving topsoil in windrows. The use of conserved topsoil would help preserve micro-organisms and seeds of native plants. The topsoil would be respread in as near as original location as possible, and supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area. This would reduce construction scars and erosion.

Some petrochemicals from construction equipment would seep into the soil. To minimize this possibility, equipment would be checked frequently to identify and repair any leaks.

Should construction unearth previously undiscovered archeological resources, work would be stopped in the area of any discovery and the park would consult with the state historic preservation officer/tribal historic preservation officer and the Advisory Council on Historic Preservation, as necessary, according to §36 CFR 800.13, Post Review Discoveries. In the unlikely event that human remains are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed.

The NPS would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown archeological resources are uncovered during construction. Equipment traffic would be minimized in the area of the site. Equipment and materials staging areas would also avoid known archeological resources.

The flow of vehicle traffic on the road would be maintained as much as possible during the construction period. Construction delays would normally be limited to 30 minutes. There would be some periods when the nature of the construction work would require temporary road closures. All efforts would be made to reduce these as much as possible and to alert park staff as soon as possible if delays longer than normal are expected. Visitors would be informed of construction activities and associated delays. Traffic would be managed to ensure timely access to private residents along the road.

Contractors would coordinate with park staff to reduce disruption in normal park activities. Equipment would not be stored along the roadway or in existing parking lots overnight without prior approval of park staff. Construction workers and supervisors would be informed about the special sensitivity of park values, regulations, an appropriate housekeeping.

## **ALTERNATIVE B**

### *Trail Description*

In addition to the “Elements Common to the Action Alternatives,” described above, Alternative B would encompass the following components. The trail surface would primarily be asphalt-paved, but it would also include two short segments of elevated boardwalk (Figure 5). Each of the elevated boardwalk segments would be constructed at a height which would allow for natural wetland and dune processes to continue unimpeded. One 0.02 mile-long trail segment immediately south of the NPS Day Use Area would be constructed to avoid filling a nearby wetland; however, footings for structural support are assumed to be placed in the wetland. The second boardwalk trail segment would be a ¼ mile-long segment located on the back dune, immediately north of Ramp 70, to avoid adversely impacting a nearby wetland and to minimize adverse impacts on the backdune.

### *Construction Methods*

Constructing the asphalt-paved sections would be consistent with the description above in the “Elements Common to the Action Alternatives.” Construction of the two boardwalk segments would be conducted using special techniques that would minimize adverse impacts on wetlands or backdunes and minimize the amount of vegetation that would have to be cleared.

1. Construction would start from the end closest to an existing, developed area (e.g., Day Use Area parking lot or adjacent to Ramp 70), setting the first pilings.
2. The stringers and supports between the pilings would be constructed.
3. The boardwalk deck would be constructed.
4. The pile-setting equipment would be walked out on the constructed deck to install the next set of pilings.
5. Steps 2-4 would be repeated.
6. The materials would be brought to the equipment on the constructed boardwalk.
7. Materials could also be brought to the end of the boardwalk on a temporary walkway aligned parallel to the constructed boardwalk that is placed on top of the sensitive area, and then removed when construction is finished.

## **ALTERNATIVE C, THE PREFERRED ALTERNATIVE**

### *Trail Description*

In addition to the “Elements Common to the Action Alternatives,” described above, Alternative C would encompass the following components. The entire trail length would be asphalt-paved. The trail would be aligned to avoid adverse impacts to wetlands in the project corridor. The removal of shrub vegetation would be minimized. The trail would be located on the backdune for a ½ mile-long segment immediately north of the NPS Day Use Area parking lot, and a ½ mile-long segment from the NPS Day Use Area parking lot south to Ramp 70 (Figure 6). Constructing the trail on the backdune in these sections would allow for avoidance of wetlands, minimization of vegetation clearing, and simplification of construction and maintenance of a continuous, asphalt-paved trail.

### *Construction Methods*

Constructing the asphalt-paved sections would be consistent with the description above in the “Elements Common to the Action Alternatives.”

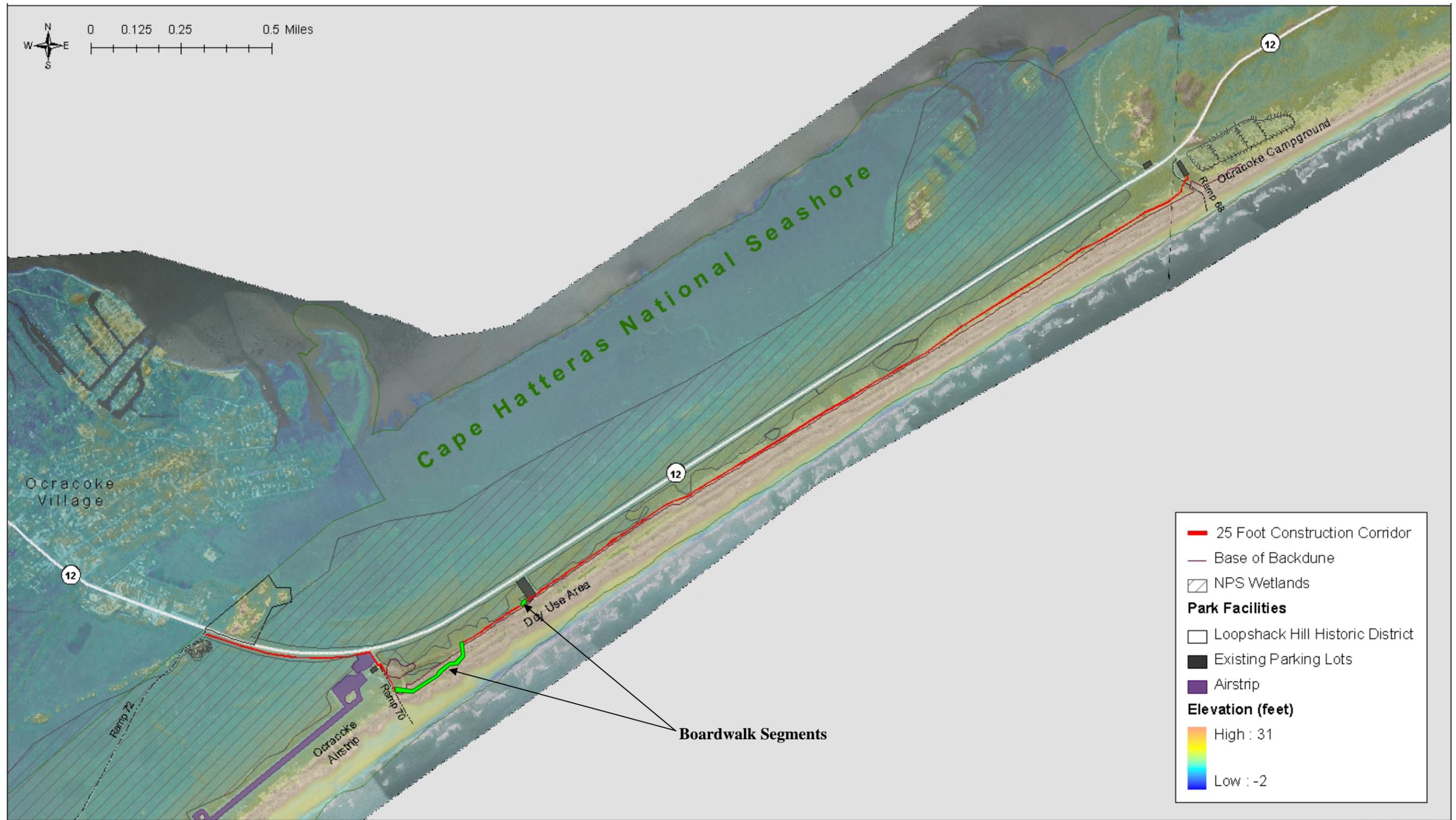


FIGURE 5. ALTERNATIVE B: ASPHALT-PAVED MULTI-USE TRAIL WITH TWO BOARDWALK SEGMENTS

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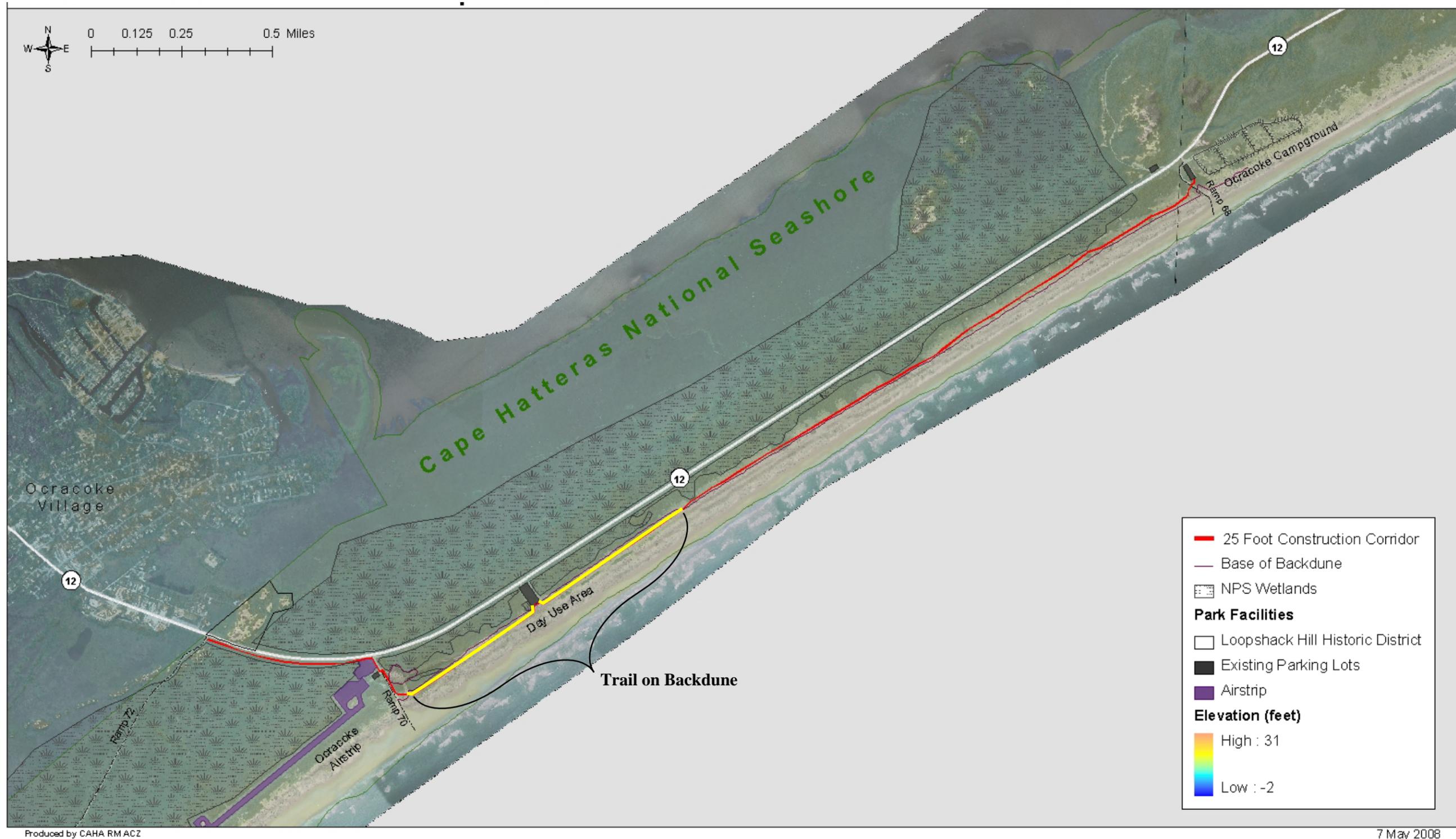


FIGURE 6. ALTERNATIVE C: ASPHALT-PAVED MULTI-USE TRAIL

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## **ALTERNATIVES CONSIDERED BUT DISMISSED**

### **Widen Paved Shoulders of NC-12**

Widening of the paved shoulders of NC-12 to a standard width of five feet was considered. Although widening the paved shoulders of NC-12 would improve the safety of NC-12 for motorists and advanced bicyclists, it would not improve safety for inexperienced bicyclists, pedestrians, children, or mobility-restricted visitors. Also, widening of the paved shoulders would require widening and elevation of the road prism to facilitate stormwater runoff. NC-12 would need to be widened and elevated from the NPS Campground to Ramp 70; the ½ mile segment of NC-12 from Ramp 70 to the Village of Ocracoke is sufficiently wide and elevated to allow for stormwater drainage without modification. The widening of the road prism would require relocation of the seaward drainage ditch into the abutting wetlands. Direct adverse impacts to approximately 10 acres of wetlands would result. For these reasons, this alternative was dismissed from further analysis.

### **Establish Trail Corridor within NC-12 Right-Of-Way and Separated From NC-12**

Establishment of a proposed trail within the right-of-way of NC-12, between the road and the drainage ditch, was considered. Placement of the trail in this corridor would improve the safety of NC-12 for motorists, bicyclists, and pedestrians by providing non-motorized traffic with a separate corridor for travel. Establishment of an ADA-compliant trail in this area would require the trail to have rails and resting platforms. To accomplish the required trail design features, the trail construction would be significantly complicated by the presence of the drainage ditches along NC-12. Additionally, placement of the trail in this area effectively increases the road prism and would require moving the drainage ditch further from the road and deeper into the wetlands. Relocation of the drainage ditches into the shrub thicket would adversely impact approximately 10 acres of wetlands. For these reasons, this alternative was dismissed from further analysis.

### **Establish Trail Corridor within Sound-side Utility Corridor**

Alignment of a proposed trail along the existing electrical utility corridor on the Pamlico Sound side of NC-12 was considered. The utility corridor is actively maintained by the electrical company using heavy vehicles and can create temporary ruts in the ground surface. If a multi-use trail was to be established along this corridor, materials used in its construction would have to be capable of withstanding the weight of utility corridor maintenance vehicles and result in limited damage to the surface. Additionally, utility corridor maintenance activities would interfere and potentially restrict visitor use of the multi-use trail. Accessing the trail from existing parking areas and facilities (e.g., NPS Campground, Day Use Area, Airstrip parking) would require visitors to cross NC-12 where the posted vehicular speed limit is 55 mph. Therefore, establishment of the trail corridor within the existing utility corridor on the sound-side of NC-12 was dismissed from further analysis.

### **Consideration for New Parking Lot**

Investigation of several potential locations for establishment of a new parking lot was undertaken. A new parking area on uplands within the Seashore and near the Village of Ocracoke was proposed as a component to be considered in the development of a proposed tram/trolley service for the Seashore facilities and Village attractions. Additionally, this proposed parking lot could serve visitors intending to use the proposed multi-use trail. The new parking lot would support up to 150 vehicles daily.

Although several alternatives to add a parking facility within the corridor were considered, each of the proposed locations considered was dismissed from further analysis due to environmental and visitor safety concerns. The consideration of each of these facilities and the rationale for their dismissal is addressed in the paragraphs that follow.

### *East of South Point Road / Ramp 72*

A new parking lot was proposed to be constructed adjacent to and on the remnant dune system located on the eastside of South Point Road / Ramp 72. A site visit by the NPS, U.S. Army Corps of Engineers, and the NC Division of Coastal Management resulted in the identification of limited upland (<0.56 acres noncontiguous upland) acreage on this proposed site. Due to the prevalence and sinuosity of the wetland/upland boundary, it is highly likely that a proposal to establish a parking lot on this site would require compensatory wetland mitigation under the NPS Procedural Manual # 77-1: Wetland Protection (2008) and an application for an Individual Permit from the U.S. Army Corps of Engineers for the construction of a parking lot in this location. Avoidance and minimization of adverse impacts to wetlands would be unachievable at this site and would require compensatory mitigation for wetland impacts if no viable alternative could be identified. Therefore, this alternative was considered but dismissed from further analysis.

### *Loopshack Hill Historic District*

The Loopshack Hill Historic District was recently designated on the NPS' List of Classified Structures, immediately adjacent to the Village of Ocracoke limits and north of NC-12. Two areas within the Loopshack Hill Historic District were considered for the development of a parking area. One proposed area was located on the eastside of the Historic District, and one was located on the Westside of the Historic District. Both sites were dismissed due to the prevalence of wetland vegetation and being inundated with water. Avoidance and minimization of adverse impacts to wetlands would be unachievable at this site, and would require compensatory mitigation for wetland impacts if no viable alternative could be identified. Therefore, this alternative was considered but dismissed from further analysis.

### *Interdunal Parking Lot at Ramp 70*

An interdunal area north of Ramp 70 was considered as an alternative for the proposed parking lot. A preliminary wetland survey was performed by the NPS and U.S. Army Corps of Engineers. Although this area does not qualify as wetland under the jurisdiction of either agency, establishment of a parking area in this dune system would prove technically challenging and costly to construct and maintain. Additionally, existing vehicular traffic on Ramp 70 and associated with the NPS Airstrip parking area would directly conflict with the proposed tram/trolley services and users of the interdunal parking lot. Also, establishment of a parking lot within the dune system would not be consistent with resource protection objectives identified in the Park's GMP (1981 and 1984b). Therefore, this parking lot alternative was considered but dismissed from further analysis.

### *Expansion of the Existing NPS Day Use Area Parking Lot*

Expansion of the existing NPS Day Use Area Parking Lot was considered but ultimately dismissed. Following a site visit by the NPS and U.S. Army Corps of Engineers performing a preliminary wetland determination, wetlands were present to the west and throughout the area between the NC-12 drainage ditch and the backslope of the secondary dune. Avoidance and minimization of adverse impacts to wetlands would be unachievable at this site, and would require compensatory mitigation for wetland impacts if no viable alternative could be identified. Therefore, westward expansion of the existing NPS Day Use Area Parking Lot was considered but dismissed from further analysis.

Although wetlands are not present south of the existing NPS Day Use Area Parking Lot, extension of the existing parking lot into the dune field would technically challenging and costly to construct and maintain. Vehicular access and potentially future tram access to this parking lot would compete with peak season traffic in this parking lot. The existing parking lot reaches capacity during peak season, and expansion of the lot would need to support the existing need plus additional spaces to allow for potential future tram users to park. The combined need would result in expansion of the parking lot access and total parking lot area and the proposed trail alignment within the dune system. Infringing into the secondary

dune would cause impacts to the dune system that could not be avoided. Establishment of a large parking lot to include potential future tram operation within the dune system would also be highly visible to trail users. Therefore, southward expansion of the existing NPS Day Use Area Parking Lot was considered but dismissed from further analysis.

## **THE ENVIRONMENTALLY PREFERRED ALTERNATIVE**

The Environmentally Preferred Alternative is the alternative that will best promote the national environmental policy expressed in the National Environmental Policy Act. The Environmentally Preferred Alternative would cause the least damage to the biological and physical environment, and would best protect, preserve, and enhance historical, cultural, and natural resources.

Section 101(b) of the National Environmental Policy Act identifies six criteria to help determine the environmentally Preferred Alternative. The act directs that federal plans should:

- 1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.** Alternative A would not introduce any short or long-term disturbance or construction to sensitive coastal dune and wetland environments. Alternatives B and C would introduce short- and long-term disturbance and construction to coastal dune and wetland environments. Therefore, Alternative A would best meet this criterion.
- 2. Assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.** Alternative A would not result in any improvement of these conditions, while Alternatives B and C would result in improved safety because the multi-use trail offers pedestrians, bicyclists, and visitors with mobility restrictions an alternate corridor for travel between the Village of Ocracoke and NPS Campground. The multi-use trail would be separated from NC-12 road shoulder by 8-10 feet, thereby improving the safety conditions for visitors in the project area. Additionally, the multi-use trail would be designed and located in culturally pleasing surroundings. Therefore, Alternatives B and C would better meet this criterion.
- 3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.** Alternative A would not result in any improvement of existing safety risks associated with NC-12 in the project area nor would any new development which would potentially result in environmental degradation or other undesirable or unintended consequences. Alternatives B and C would help to resolve a safety concern on Ocracoke Island with adverse impacts on the natural environment. For these reasons, Alternative A better meets this criterion.
- 4. Preserve important historical, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice.** None of the three alternatives would conflict with preservation of important historical or cultural aspects of national heritage. Alternative A allows for the preservation of important natural aspects of our national heritage by not altering the existing environmental conditions, while Alternatives B and C would result in the creation of a new visitor experience on Ocracoke Island with adverse impacts on the natural environment in the project area. Therefore, Alternative A better meets this criterion.
- 5. Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities.** Alternative A would not result in any change the resources in the project area and they would continue to be altered naturally in the dynamic coastal environment of eastern North Carolina. Alternatives B and C would create a new opportunity for visitors to enjoy resources in the project area while minimizing adverse impacts on those resources. Therefore, Alternatives B and C better meet this criterion.

- 6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.** Alternative A would not result in any change to existing conditions, and would neither enhance the quality of renewable resources nor require any recycling of depletable resources. Alternatives B and C would not enhance the quality of renewable resources nor would either of these alternatives recycle depletable resources.

Alternative A, the No Action Alternative, better meets the criteria related to protection and preservation of unaltered natural and cultural environments. However, Alternatives B and C better meet the criteria related to safety and enjoyment associated with the natural and cultural environments. Therefore, Alternative A, the No Action Alternative, is the Environmentally Preferred Alternative.

## COMPARISON OF THE ALTERNATIVES

### Meeting the Objectives of the Proposed Action

For the proposed action to be considered successful, the Preferred Alternative should meet the stated objectives. How well each of the alternatives meets the stated objectives is presented in Table 2.

**TABLE 2. ALTERNATIVE COMPARISON ON MEETING OBJECTIVES**

<b>Objective</b>	<b>Alternative A: No Action</b>	<b>Alternative B: Asphalt-Paved Trail with Two Boardwalk Segments</b>	<b>Alternative C: Asphalt-Paved Trail</b>
Reduce conflicts among user groups on NC-12	Fails to meet this objective.	Meets this objective by separating bicycle and pedestrian traffic from vehicle traffic.	Meets this objective by separating bicycle and pedestrian traffic from vehicle traffic.
Provide a satisfying visitor experience along the project corridor for pedestrians, bicyclists, and motorists	Fails to meet this objective.	Meets this objective by providing access to park resources and reducing potential risks of using the highway for bicycle or pedestrian travel.	Meets this objective by providing access to park resources and reducing potential risks of using the highway for bicycle or pedestrian travel.
Work cooperatively with local communities and other government agencies to address mutual concerns	Partially meets this objective because the park would continue to work with area and regional planners to address transportation and other concerns.	Better meets this objective because the park would actively implement an alternative transportation route that supports local and regional transportation goals.	Better meets this objective because the park would actively implement an alternative transportation route that supports local and regional transportation goals.

**TABLE 2. ALTERNATIVE COMPARISON ON MEETING OBJECTIVES**

Protect the park's natural, cultural, scenic, and aesthetic values	Meets this objective because no additional construction would be undertaken and no resources would be affected.	Design and careful trail alignment limits impacts to wetlands, vegetation, and coastal dune processes, thereby protecting park resources. However, new construction would cause some adverse effects to park resources.	Design and careful trail alignment avoids impacts to wetlands and minimizes impacts to vegetation and coastal dune processes, thereby protecting park resources. However, new construction would cause some adverse effects to park resources.
Minimize areas of disturbance and the potential for other long-term, adverse impacts to park resource	Meets this objective because no additional construction would be undertaken and no resources would be affected.	Design and careful trail alignment limits impacts to wetlands and coastal dune processes, thereby protecting park resources. However, new construction would cause some adverse effects to park resources.	Design and careful trail alignment avoids impacts to wetlands and minimizes impacts to vegetation and coastal dune processes, thereby protecting park resources. However, new construction would cause some adverse effects to park resources.
Allow for a satisfying experience that is consistent with the purposes for which the park was established	Fails to meet this objective.	Meets this objective by providing alternative experiences and reducing risks of pedestrian and bicycle travel between two highly-visited sites.	Meets this objective by providing alternative experiences and reducing risks of pedestrian and bicycle travel between two highly-visited sites.

**Impact Summary**

A comparison of the impacts potentially resulting from implementing any one of the three alternatives is presented in Table 3. More detailed information on the effects of the alternatives is provided in Chapter 3 “Affected Environment and Environmental Consequences.”

**TABLE 3. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

**Visitor Use and Experience**

**Alternative A**

Existing conditions would continue to result in localized, long-term, negligible to minor, adverse impacts on motorists, bicyclists, and pedestrians on NC-12.

Perceived limitations of having limited trail opportunities near the NPS Campground would continue to result in localized, long-term, minor, adverse impacts.

Alternative A would contribute an imperceptible, adverse increment to the long-term, minor, beneficial cumulative impacts on visitor use and experience.

**Alternative B**

Localized, short-term, negligible, adverse impacts to the visitor experience at the NPS Campground and NPS Day Use Area would result from using the parking areas as staging areas for trail construction activities. In the long-term, installation of the multi-use trail would result in a localized, moderate, beneficial impact on visitor experience in the project corridor.

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**TABLE 3. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

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Alternative B would contribute a noticeable, beneficial increment to the long-term, beneficial, and minor cumulative impact.

**Alternative C**

Same as Alternative B.

**Public Health and Safety**

**Alternative A**

The potential for safety incidents between bicycle riders and motor vehicles on NC-12 would persist, resulting in localized, long-term, negligible to minor, adverse impacts on public health and safety.

Alternative A would contribute an imperceptible, adverse increment to the long-term, minor, adverse cumulative impacts on public health and safety.

**Alternative B**

Establishment of a new multi-use trail between the NPS Campground and Village would result in localized, long-term, minor, beneficial impact on public health and safety for motorists, bicyclists, pedestrians, and users with restricted mobility in the project area.

The two elevated boardwalk segments of the trail and intersections with beach access ramps and the NPS Day Use Area would present a localized, negligible to minor, adverse impact for trail users and emergency response personnel.

Alternative B would contribute a noticeable, beneficial increment to the cumulative minor, adverse impacts on public health and safety associated with past, present, and future actions.

**Alternative C**

Establishment of a new, continuously asphalt-paved, multi-use trail between the NPS Campground and Village would result in localized, long-term, minor, beneficial impact on public health and safety for motorists, bicyclists, pedestrians, and users with restricted mobility in the project area.

A new potential for conflict among users at trail intersections with beach access ramps and the NPS Day Use Area would present a localized, long-term, negligible to minor, adverse impact.

Establishment of a new multi-use trail that offers a continuously paved surface would result in a localized, long-term, minor, beneficial impact for emergency response personnel.

Alternative C would contribute a noticeable, beneficial increment to the cumulative minor, adverse impacts on public health and safety associated with past, present, and future actions.

**Transportation**

**Alternative A**

Continued sharing of NC-12 by motorists, bicyclists, and pedestrians would continue to result in localized, long-term, minor, adverse impacts on transportation.

Alternative A would contribute an imperceptible, adverse increment to the long-term, minor, adverse cumulative impacts on transportation.

**Alternative B**

Providing an alternative route of travel for pedestrians, bicyclists, and visitors with mobility restrictions between the Village of Ocracoke and the NPS Campground would result in a localized, long-term, minor, beneficial impact on transportation.

Alternative B would contribute a noticeable, beneficial increment to the long-term, minor, adverse cumulative impacts on transportation.

**Alternative C**

Same as Alternative B.

**Park Operations**

**Alternative A**

There would be no change in park operations under Alternative A.

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**TABLE 3. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

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Alternative A would not contribute to the cumulative impacts of past, present, and future actions impacting park operations.

**Alternative B**

The overall impact of establishing and maintaining the new multi-use trail with two boardwalk segments would have a localized, long-term, moderate, adverse impact on park operations. Of the Park's operational divisions, the Maintenance and Facility Operations Division would experience the greatest portion of these impacts.

Alternative B would contribute a noticeable, adverse increment to the cumulative minor, adverse impacts on park operations.

**Alternative C**

Park operations would be impacted under Alternative C as they would be under Alternative B, with the exception of the Park's Maintenance and Facility Operations Division. The Maintenance and Facility Operations Division would experience a lower intensity of adverse impacts because the trail would be a continuously asphalt-paved trail. There would be no boardwalk sections to maintain, thereby making trail maintenance easier. The overall impact of establishing and maintaining the new, continuously asphalt-paved, multi-use trail would have a localized, long-term, minor, adverse impact on park operations.

Alternative C would contribute a noticeable, adverse increment to the cumulative minor, adverse impacts on park operations.

**Coastal Processes**

**Alternative A**

Alternative A would not change the existing coastal processes nor would it contribute to the overall localized, long-term, major, adverse effects of other past, ongoing, and future plans, projects and activities on coastal processes.

There would be no impairment of coastal processes – dunes resulting from park actions taken under Alternative A.

**Alternative B**

Alternative B would result in the long-term alteration of 5.04 acres of vegetated sand flat, 0.42 acre of backdune, and 0.03 acre of wetland in the project area. The overall effects of Alternative B on coastal processes – dunes are estimated to be localized, short- and long-term, moderate, and adverse.

Implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative long-term, moderate, and adverse impacts on coastal processes - dunes.

There would be no impairment of coastal processes – dunes resulting from park actions taken under Alternative B.

**Alternative C**

Alternative C would result in the long-term alteration of 3.8 acres of vegetated sand flat and 1.7 acres of backdune in the project area. The overall effects of Alternative B on coastal processes – dunes are estimated to be localized, short- and long-term, moderate, and adverse.

Implementation of Alternative C would contribute an imperceptible, adverse increment to the cumulative long-term, moderate, and adverse impacts on coastal processes - dunes.

There would be no impairment of coastal processes – dunes resulting from park actions taken under Alternative C.

**Floodplains**

**Alternative A**

Floodplains would not be affected and would continue to exist and function in their present state.

When the adverse effects of other past, ongoing, and future plans, projects and activities affecting floodplain functions and values and flood potential are considered, the resulting cumulative effects of Alternative A would be localized, long-term, minor, and adverse.

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**TABLE 3. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

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There would be no impairment of floodplain functions and values under Alternative A.

**Alternative B**

The proposed action would result in placement of approximately 5.5 acres of a hard-surface trail in the 100-year floodplain of Ocracoke Island. This small relative area of impervious surface would have a limited effect on the conveyance of floodwaters and would not contribute to flood potential on Ocracoke Island. The effects of the proposed action on floodplain functions and values would be localized, long-term, minor, and adverse.

Alternative B would contribute an imperceptible increment to the cumulative impact scenario. When the adverse effects of other past, ongoing, and future plans, projects and activities affecting floodplains are combined with actions under Alternative B, the resulting cumulative effects would be localized, long-term, minor, and adverse.

There would be no impairment of floodplain functions and values resulting from park actions taken under Alternative B.

**Alternative C**

Same as Alternative B.

**Wetlands**

**Alternative A**

Wetlands would not be affected and would continue to exist in their present high quality state.

When the beneficial and adverse effects of other past, ongoing, and future plans, projects and activities affecting wetlands are considered, the resulting cumulative effects of Alternative A would be major, long-term and beneficial.

There would be no impairment of wetland functions and values under Alternative A.

**Alternative B**

Alternative B would result in the long-term alteration of 5.04 acres of vegetated sand flat, 0.42 acre of backdune, and 0.03 acre of wetland in the project area. Overall, construction and operation of proposed action would have localized, short- and long-term, minor, adverse effects on wetlands.

Alternative B would contribute an imperceptible, adverse increment to the cumulative effects of long-term, major, beneficial impacts to wetlands.

There would be no impairment of wetland functions and values under Alternative B.

**Alternative C**

Alternative C would result in the long-term alteration of 3.8 acres of vegetated sand flat and 1.7 acres of backdune in the project area. Wetlands would not be affected and would continue to exist in their present high quality state.

Alternative C would not contribute to the cumulative effects of long-term, major, beneficial impacts to wetlands.

There would be no impairment of wetland functions and values under Alternative C.

**Vegetation**

**Alternative A**

Under Alternative A, terrestrial vegetation on Ocracoke Island would continue to exist in its present state. Continued current management under Alternative A would make no contribution to the effects of these other projects and plans. Therefore, overall cumulative effects to vegetation would be localized, long-term, moderate, and beneficial.

There would be no impairment of terrestrial vegetation resulting from park actions taken under Alternative A.

**Alternative B**

Construction of the new trail would temporarily disturb 9.8 acres of terrestrial vegetation during construction and result in a long-term loss of 5.5 acres terrestrial vegetation. Approximately 8.13 acres of

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**TABLE 3. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

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vegetated sand flats, 0.85 acre of mown grassy swale, 0.76 acre of dune grasses and maritime shrubs on the backdune, and 0.06 acre of wetland vegetation would be temporarily altered as a result of trail construction. Of the 5.5 acres altered due to the trail, 5.04 acres would be paved and inhibit regrowth of vegetation and the remaining 0.46 acres would be boardwalk. Revegetation may occur naturally beneath the boardwalk segments. The overall impact of this alternative on terrestrial vegetation would be localized, short- and long-term, minor, and adverse.

Alternative B would contribute a noticeable, adverse increment to the overall cumulative long-term, moderate, and beneficial impacts.

There would be no impairment of terrestrial vegetation Alternative B.

**Alternative C**

Construction of the new trail would temporarily disturb 9.8 acres of terrestrial vegetation during construction and result in a long-term loss of 5.5 acres terrestrial vegetation. Approximately 5.95 acres of vegetated sand flats, 3 acres of dune grasses and maritime shrubs on the backdune, and 0.85 acre of mown grassy swale would be temporarily altered as a result of trail construction. The 5.5 acres altered due to the trail would be paved and inhibit regrowth of vegetation. The overall impact of this alternative on terrestrial vegetation would be localized, short- and long-term, minor, and adverse.

Alternative C would contribute a noticeable, adverse increment to the overall cumulative long-term, moderate, and beneficial impacts.

There would be no impairment of terrestrial vegetation Alternative C.

**Wildlife**

**Alternative A**

Alternative A would result in no change to existing wildlife resources or habitats because no development or site alteration activities would occur in the area considered for the trail corridor. Existing conditions would be retained.

Cumulative effects would be localized, long-term, minor to moderate, and beneficial.

There would be no impairment of wildlife resources or values at Cape Hatteras National Seashore.

**Alternative B**

Alternative B would result in localized, short- and long-term, minor, adverse effects to wildlife and habitats due to construction and maintenance of the multi-use trail.

In combination with the localized, long-term, minor, adverse effects of Alternative B, the overall cumulative effects to wildlife would be localized, long-term, minor, and beneficial.

There would be no impairment of wildlife resources or values.

**Alternative C**

Same as Alternative B.

**Special Status Species**

**Alternative A**

Alternative A would have no effect on special-status species.

The overall cumulative effects would be localized, long-term, minor to moderate, and beneficial (may affect, not likely to adversely affect).

There would be no impairment of special-status species or their habitats under Alternative A.

**Alternative B**

Because no special-status animal species or critical habitats would occur in the trail corridor, Alternative B would have no effect on listed animal species. However, localized, long-term, minor, adverse effect to the dune bluecurls could occur (may affect, not likely to adversely affect).

Cumulative effects would be localized, long-term, minor to moderate, and beneficial (may affect, not likely to adversely affect).

There would be no impairment of special-status species or their habitats under Alternative B.

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**TABLE 3. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

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**Alternative C**

Same as Alternative B.

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## **CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

### **INTRODUCTION**

This section describes the affected environment within the project area and the environmental consequences associated with implementing each of the alternatives. It is organized by impact topic, to allow comparison between the alternatives. Consistent with the National Environmental Policy Act, the analysis also considers the context, intensity, and duration of impacts, indirect impacts, cumulative impacts, and measures to mitigate impacts. NPS policy also requires that “impairment” of resources be evaluated in all environmental documents associated with resource analysis.

Federal regulations, guidance, and policies relevant to the impact topics are summarized in Table 1 which can be found in Chapter 1. Where more specific regulations or guidance apply, these are summarized prior to the environmental consequences analysis.

### **METHODOLOGY**

#### **General Evaluation Methodology**

For each impact topic, the analysis includes a brief description of the affected environment and an evaluation of the effects of implementing each alternative. The impact analyses were based on information provided by park staff, relevant references and technical literature citations, and subject matter experts. The impact analyses involved the following steps:

- Define issues of concern, based on scoping;
- Identify the geographic area that could be affected;
- Define the resources within the area that could be affected;
- Develop appropriate mitigation measures;
- Impose the action on the resources within the area of potential effect; and
- Identify the effects caused by the alternative, in comparison to the baseline represented by the No Action Alternative, to determine the relative change in resource conditions.
- Characterize the effects based on the following factors:
  - Context or area affected by the proposed action: site-specific, local, park-wide, regional; and
  - Duration of the effect: short-term or long-term;
  - Intensity of the effect: negligible, minor, moderate, or major. Impact topic specific thresholds for each of these classifications are provided for each impact topic. Threshold values were developed based on federal and state standards, consultation with regulators, and discussions with subject matter experts;
  - Whether the effect would be beneficial or adverse;
  - Whether the effect would be a direct result of the action or would occur indirectly because of a change to another resource or impact topic.

## Cumulative Effects Methodology

The Council on Environmental Quality (1978) regulations for implementing the National Environmental Policy Act also require an assessment of cumulative effects in the decision making process for federal projects. Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 Code of Federal Regulations 1508.7).

Cumulative effects are considered for both no action and action alternatives. They are presented at the end of each impact topic analysis.

The cumulative impacts of Alternative A are limited to the effects of past, present, and reasonably foreseeable future actions on Ocracoke Island. These other projects and plans are summarized below.

### *Past Actions*

**Creation of artificial dunes.** Ocracoke Island is a simple barrier island, with a relatively limited sediment supply available to generate dunes. The natural, low topographic relief of Ocracoke's dune system was altered by various dune construction projects between the 1930s and the 1970s. Although recent storm events have resulted in destruction of some dunes on Ocracoke Island, only dunes deemed to be protective of NC-12 as a transportation corridor have been actively rebuilt. The dune field in the project area was established following installation of sand fencing and vegetation planting in the 1960s. During the 1970s, the NPS ceased dune stabilization and rebuilding, beach nourishment, construction of engineering works, and any other means by which the natural coastal processes would be altered (NPS 1981). The dunes in the project area have been allowed to develop and change naturally. The current dune field is less active than most of the dunes in the Park and is stable, as evidenced by areas of dune grasses and patchy shrubs, and is not in an identified inlet hazard area (NC DCM 2008b). The sand flats area between the backdune and the Pamlico Sound were naturally vegetated as a result of the dune development. NC-12 and numerous park facilities were established in this vegetated sand flat unit, and the Park's General Management Plan (1981, 1984b) have identified that continued operation of existing facilities and future development will occur in this unit.

**Repair of NC 12 after storm damage.** Numerous high energy storm events have occurred on the Outer Banks resulting in damage on Ocracoke Island. Although some portions of NC-12 on Ocracoke Island have been destroyed and subsequently rebuilt, the section of NC-12 in the project area has remained intact since its construction.

**Construction of Day Use Area.** The NPS Day Use Area at Ocracoke was a development project identified in the Park's *General Management Plan* (1981, 1984b). It was constructed adjacent to NC-12, approximately ½ mile north of the NPS Ocracoke Airstrip, to provide a "safer, more comfortable, and organized environment" for visitor activities.

**Construction of Ramps 68, 70, and 72.** In the project area, three beach access ramps were established to provide improved access for off road vehicles to the beach area.

**Construction of NPS Campground.** The NPS constructed the Ocracoke Campground at milepost 68 prior to 1979. Since then, the NPS has continued to operate, maintain, and minimally improve the NPS Campground as needed.

**Construction of Ocracoke Airstrip.** Under a Special Use Permit, the NPS authorized NC DOT to construct the NPS Ocracoke Airstrip near milepost 70 during the 1960s.

**Replacement of seven bridges.** NC DOT completed replacement of seven NC-12 bridges on Ocracoke Island during the winter of 2007/8. All of the bridges are located north of the project area.

**Construction of helipad.** NC DOT constructed an emergency helipad in late 2007 adjacent to the NPS Ocracoke Airstrip, near the intersection of NC-12 and Ramp 70. The safety fence surrounding the helipad would provide sufficient space for the construction of the multi-use trail without infringing on the required safety zone associated with helipad operation.

### ***Ongoing and Reasonably Foreseeable Future Actions***

**Bodie Island bike path.** The park would construct a bicycle path on Bodie Island from the southern end of the South Nags Head Bike Path to the Oregon Inlet Bridge through the Cape Hatteras National Seashore. This project would provide a 5 foot-wide asphalt-paved, marked bike path on each shoulder of NC-12. The length of the path would be 4 miles and it will be constructed in accordance with American Association of State Highway and Transportation Officials guidance (AASHTO 1994 and 1999). It would be separated from the existing highway pavement for safety, but likely located parallel to NC-12 (USDOT 2008).

**Parkwide accessibility improvement project.** The park proposes to create partnerships to develop and implement an accessibility plan for the use and enjoyment of special populations of NPS visitors. The plan would be based on an Accessibility Assessment of deficiencies, specifically targeting beach access in the park. The plan would identify each eligible site; develop conceptual designs, cost estimates, and list necessary compliance actions. Upon completion of the plan, the park would develop an Implementation Plan to phase in the recommendations as funding becomes available (NPS 2007).

**Partnering for trolley system/expansion of access to Ocracoke Lighthouse.** The park is considering partnering with the North Carolina Department of Transportation and Hyde County to develop a shuttle/trolley system within the Village of Ocracoke. The North Carolina Department of Transportation funded a feasibility study in 2005. This shuttle system would assist in relieving traffic congestion at several NPS sites located within the Village of Ocracoke. In conjunction with the initiation of shuttle service on Ocracoke, the park hopes to expand usage of the Ocracoke lighthouse site to include the addition of a gift/book store within the keepers quarters structure and pedestrian access throughout the site. Currently, visitors are restricted to using only a pedestrian walkway located outside of the original lighthouse yard area. Expanding the visitor use of this developed area would require that numerous deferred maintenance projects be completed in order to make this area safe for visitor access. In addition, in order to provide expanded access to the lighthouse and other NPS sites on Ocracoke, Americans with Disabilities Act accessibility compliance improvements would need to be implemented (NPS 2007).

**General Management Plan.** Cape Hatteras National Seashore is currently operating under the 1984 *General Management Plan*. The process for developing a new General Management Plan / Environmental Impact Statement (GMP/EIS) is planned to begin within the next five years. A new GMP/EIS will provide the park with an updated guide to improving park resource protection and management while reducing the harmful environmental impacts of those actions. In the interim, proposed actions would be consistent with the Park's 1984 GMP.

**Other park improvement programs and associated projects.** Many other construction projects are planned for the near future to improve the transportation, building and utility infrastructure in the park. These include, for example, the Bonner Bridge replacement project over Oregon Inlet (USDOT 2005, 2007) and the erosional "Hot Spots" projects that include road relocation, dune reconstruction/stabilization, beach nourishment, relocation of ferry terminal, placement of sandbags, sheet piling, and road elevations at several locations in the park (Outer Banks Task Force 2008; USDOT 2007). The following is a partial list of these types of transportation projects:

- Planning and environmental studies for the long-term maintenance of NC 12 from Ocracoke Island to the southern terminus of Bonner Bridge. A joint NCDOT/US Army Corps of Engineers feasibility study (Hatteras and Ocracoke islands, NC).

- Planning for interim measures to protect NC 12 from sand and ocean overwash at identified “hot spots” on Bodie, Hatteras, and Ocracoke Islands.
- Supplement to the Bonner Bridge NCDOT TIP Project Number B-2500 Replacement SDEIS
- Relocation of NC 12 from north of Rodanthe to south of the Refuge Boundary (Rodanthe ‘S’ Curves Hot Spot) to protect roadway from sand and ocean overwash. Planning is in progress.
- Planning and environmental studies for maintaining NC 12 from Buxton to Avon.
- Restoration of Chicamacomico Life Saving Station (1874-1954) historic site.

Other types of projects may also be conducted in the park in the future. These include channel maintenance (dredging), electrical, water and wastewater utility construction and maintenance, and construction and maintenance of park buildings.

### **Impairment Analysis Methodology**

In addition to determining the environmental consequences of the preferred and other alternatives, the NPS Management Policies 2006 (NPS 2006a) and Directors Order #12 (NPS 2001b), require analysis of potential effects to determine if actions would impair park resources.

The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on park resources and values. However, the laws do give NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given NPS management discretion to allow certain impacts within parks, that discretion is limited by statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute impairment. However, an impact would more likely constitute impairment to the extent it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified in the park’s general management plan or other relevant NPS planning documents as being of significance.
- Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park.

A determination of impairment is made for each relevant impact topic within each “Conclusion” section of this environmental assessment.

## VISITOR USE AND EXPERIENCE

### Affected Environment

Approximately 3 million visitors come to the Outer Banks Group each year. Most visitors come from Pennsylvania, Ohio, North Carolina, and Virginia (NPS 2003a). The primary reasons visitors come to the Outer Banks are to enjoy visiting the ocean/beaches, dining at unique restaurants, scenic beauty, shopping, and visiting historic sites and lighthouses (SMRI 2003). Almost half of the visitors coming to the area to vacation have children less than 18 years of age, and the average age of the parents is mid-forties. The most popular attractions are those with programs and exhibits that appeal to these age groups. Visitors come from upper income families and are well-educated, with an average annual income of approximately \$75,000. The average length of stay in the Outer Banks in the summer is 6.3 nights. Visitors are more likely to bring children to the Outer Banks in summer than in the colder seasons of spring and fall, 75% and 30 to 35%, respectively (Table 4).

**TABLE 4. FIVE YEAR OVERVIEW OF OUTER BANKS GROUP VISITATION STATISTICS**

	2001	2002	2003	2004	2005	2006	2007
Cape Hatteras National Seashore	2,729,082	2,923,894	2,660,535	2,208,189	2,260,628	2,125,005	2,237,378
Ocracoke Visitor Center	120,311	118,475	56,843	60,262	74,680	68,227	81,535
NPS Campground (Tents, RVs, Groups)	16,520	11,490	9,580	10,370	10,717	10,928	10,818
Ferry	71,378	71,990	63,465	57,066	57,061	55,434	52,132

Source: NPS Public Use Statistics Office (2008a)

The Village of Ocracoke has approximately 769 year-round residents (US Census Bureau 2000). Ocracoke Island is accessible by airplane and ferry, with an average of 32,175 people arriving to Ocracoke on the Hatteras-Ocracoke ferry during July for the years of 1999 to 2004 (KFH Group, Inc. 2005). NC-12 is the only paved road providing access to the Seashore attractions. Within the Village, NC-12 continues as the major thoroughfare, connecting a network of secondary roads and neighborhoods.

Following the 40-minute ferry ride to Ocracoke, visitors drive south on NC-12 to reach their destination on Ocracoke Island. The primary destinations within the Seashore on Ocracoke are:

- accessing the beach by vehicle using any of the numerous ramps on Ocracoke Island; and
- visiting the horses at the Ocracoke Pony Pen (6.1 miles south of the Hatteras-Ocracoke ferry);
- checking-in at the NPS Campground (9.4 miles south of the Hatteras-Ocracoke ferry);
- visiting the life-guarded beach via the NPS Day Use Area (11.6 miles south of the Hatteras-Ocracoke ferry); and
- visiting the Village of Ocracoke (13 miles south of the Hatteras-Ocracoke ferry).

Within the Village of Ocracoke, visitors have numerous shopping, restaurant, and recreational opportunities. Seashore attractions in the Village of Ocracoke include the Ocracoke Lighthouse, Visitor's Center, gift shop, and boat launch sites.

The NPS Campground at Ocracoke is the busiest campground in the seashore and is located within the project area. With 125 sites and parking for two cars per site, the NPS Campground is typically full Thursday through Sunday from Memorial Day to Labor Day. The NPS Campground supports 500 visitors on busy weekends. During peak visitation season approximately 90% of the NPS Campground users are families (NPS 2007). A ½ mile-long Nature Trail is located 200 feet north of the NPS Campground, on the opposite side of NC-12 in a 55 mph posted speed limit zone.

The NPS Day Use Area is accessed from NC-12 approximately one mile north of Village of Ocracoke and is located within the project area. It provides parking and beach access for day users (both residents and seashore visitors), and is the only beach access between the NPS Campground and the Village for visitors, other than those with off road vehicles. The beach at the NPS Day Use Area is the busiest swim beach on the island and provides the closest guarded beach to the NPS Campground. Approximately 200 visitors per day use the area during the peak season (Ballance personal communication 2008)

Off-road vehicles access the beach via a system of ramps located off of NC-12 on Ocracoke Island. This vehicular beach access ramp system provides controlled entry and exit to beach areas. The ramps began as an informal system of unimproved access points connecting the roadway to the beaches. Over time, this system was formalized and ramps are now numbered, maintained, and identified on the seashore's off road vehicle route maps as official vehicle routes for beach access. There are three access ramps within the project area, Ramps 68, 70, and 72. Use of the ramps in the project area can be as low as a few vehicles per day to over 200 vehicles per day. Ramp use is heaviest from June through August (NPS 2007, Ballance personal communication 2008).

While no counts have been made of bicycle use of the NC-12 corridor, survey results indicate 17% of visitors report bicycling during their visit (NPS 2003a). Current bicycle traffic on NC-12 is approximately 70% experienced riders and 30% inexperienced. This includes some families, as well as larger bicycle tour groups, such as the Vermont Bike Tour. Within the Village of Ocracoke, pedestrian and bicycle use is extensive as most local roadways have relatively light automobile traffic volumes and posted speed limits are low, but the narrow road shoulder and high speeds on NC-12 discourage bicycle riders from traveling north of the Village limit into the Park.

The 2002 NPS Visitor Services Project Study reported that 65% of Park visitors hike, walk, or jog during their visit (NPS 2007). Visitors bicycle and walk/hike most during the summer when temperatures are warm and least in the winter (Outer Banks Visitor Bureau 2006).

## **Environmental Consequences**

### ***Methods***

Visitor surveys and personal observation of visitation patterns combined with assessment of what is available to visitors under current management were used to estimate the effects of the actions in the various alternatives. The impact on the ability of the visitor to experience a full range of park resources was analyzed by examining resources mentioned in the park significance statement. The following definitions are used to define intensity levels:

**Negligible:** Visitors would not be affected, or changes in visitor experience and/or understanding would be below or at the level of detection. Visitors would not likely be aware of the effects associated with the alternative. Accessibility for individuals with disabilities would not be affected, or effects would not be noticeable or measurable.

**Minor:** Changes in visitor experience and/or understanding would be detectable, although the changes would be slight. Visitors could be aware of effects associated with the alternative, but only slightly. Changes to reduce or increase accessibility would be noticeable, but would affect only a small portion of the individuals with mobility-related disabilities who use the park.

**Moderate:** Changes in visitor experience and/or understanding would be readily apparent. Visitors would be aware of the effects associated with the alternative and would likely express an opinion about the changes. Changes to reduce or increase accessibility would be readily apparent to many individuals with mobility-related disabilities who use the park.

**Major:** Changes in visitor experience and/or understanding would be readily apparent and would have important consequences. Visitors would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes. The effects on accessibility would be readily apparent to most individuals with mobility-related disabilities who use the park and would substantially change their ability to access and experience park features and resources.

Impact duration is described as either short- or long-term. Short-term impacts would be recognized for less than one year. Long-term impacts would be recognized for more than one year.

### ***Impacts of Alternative A, the No Action Alternative***

Under Alternative A, visitors would continue to use NC-12 as the sole travel route within the project area. This would continue to result in the mixing of pedestrian, bicycle and motorized vehicles on NC-12. The design of NC-12 would continue to provide conditions that are not consistent with standards for mixed highway use promulgated by the American Association of State Highway and Transportation Officials guidance (AASHTO 1994 and 1999).

Motor vehicle operators who encounter bicyclists or pedestrians may have to slow down or change lanes to avoid them. When traffic volumes are heavier, this would continue to result in localized, long-term, negligible to minor, adverse impacts on the experience of drivers.

Experienced bicyclists would continue to be the primary group using the existing road shoulder, and other bicyclists and pedestrians would continue to use the existing road shoulder. Due to this group's high level of experience and their preference for or choice of open-road riding conditions, Alternative A would continue to have no impact on their experience. Larger cycling groups would continue to use the highway and continue to experience conflicts with traffic on NC-12. Localized, long-term, negligible, adverse impacts would continue as a result of conflicts with traffic. Perceived limitations of not having a safe alternative to driving between the NPS Campground and Village of Ocracoke results in localized, long-term, minor, adverse impacts on visitor experience.

Under continued current conditions, less experienced bicyclists, pedestrians, and visitors with mobility restrictions would continue to use NC-12 to travel between the NPS Campground and Village of Ocracoke. The perceived unsafe conditions would effectively restrict them from undertaking this journey other than by vehicle. This restriction would result in localized, long-term, minor, adverse effects on the experience of less experienced bicyclists, pedestrians, and mobility-restricted visitors.

Village of Ocracoke has a large number of bicycle riders and congested traffic conditions encourage bicycle riding as a mode of transportation. There would continue to be limited opportunity for bicyclists in the Village to travel north into the Park. This would continue to result in long-term, minor, adverse impacts for those who seek this opportunity.

Access to the beach and to natural and scenic resources in the project area would continue to be limited to the NPS Campground, Day Use Area, and via Ramps 68, 70, and 71. Campground visitors would have access to interpretive programs and access to the portions of the beach adjacent to the NPS Campground, but would have limited opportunity to explore outside of the NPS Campground without driving. The NPS Campground at Ocracoke is the most popular campgrounds in the Seashore. Current conditions would continue to result in long-term, moderate, beneficial impacts on visitor experience. The nearest walking trail is located on the opposite side of NC-12 and would require pedestrians to cross NC-12 in the 55 mph speed limit zone by foot or vehicle. Accessing other Park facilities south of the NPS Campground and to the Village of Ocracoke would continue to be by motor vehicle. The perceived limited access to these

destinations results in a localized, long-term, minor, adverse impacts on the experience of Campground users.

### *Cumulative Impacts*

Overall, visitors to the Seashore express high satisfaction with the opportunities and experiences provided (NPS 2007). Under Alternative A, the conditions that contribute to high-quality visitor experience would continue. Anticipated actions including the construction of the Bodie Island bicycle path, improved park signage, campground and lighthouse facility and accessibility improvements, and an Village of Ocracoke trolley would further improve visitor experiences. The impacts of Alternative A on visitor use and experience would continue to have an imperceptible adverse contribution to overall cumulative long-term, minor, beneficial impacts of implementing the reasonably foreseeable future actions.

### *Conclusion*

The conditions present on NC-12 would continue to result in localized, long-term, negligible to minor, adverse impacts on motorists, bicyclists, pedestrians, and mobility-restricted visitors. Perceived limitations of not having a safe alternative to driving between the NPS Campground and Village of Ocracoke would result in long-term, minor, adverse impacts. The lack of opportunity for bicyclists and pedestrians from Village of Ocracoke to continue north of the Village on a facility that is consistent with national safety standards for bicycle and pedestrian facilities would result in localized, long-term, minor, adverse impacts.

With respect to the cumulative effect on overall visitor experience at Cape Hatteras National Seashore, Alternative A would contribute a imperceptible adverse contribution to the long-term, minor, beneficial impacts of implementing the reasonably foreseeable future actions.

### ***Impacts of Alternative B***

Under Alternative B, a variety of park visitors would experience benefits from establishment of a new multi-use trail connecting the NPS Campground with the Village of Ocracoke and connecting with other Park facilities within the project corridor. These beneficial impacts would range from minor to major, with the overall change in visitor experience being localized, long-term, and moderate.

The availability of the new travel corridor would improve safety conditions on NC-12. Pedestrians, bicyclists, and those with mobility restrictions would likely choose to use the new trail, which would be constructed approximately 8-10 feet from the road shoulder of NC-12 near the Village limit. The potential for conflicts or incidents between visitors on NC-12 would be reduced. Although some visitors would be expected to continue to use the road shoulder of NC-12, the availability of the new paved trail would be an improvement over the current condition. Overall, the trail would provide a long-term, minor, beneficial impact for visitor enjoyment, in the park and near the Village limit, independent of the mode of transportation used.

The multi-use trail would be particularly beneficial to families, inexperienced bicycle riders, pedestrians, and visitors with mobility restrictions. The trail would be accessible at numerous locations in the project area: NPS Campground; NPS Day Use Area; NPS Airstrip/Heliport; Village of Ocracoke; and Ramps 68, 70, and 72. Existing parking lots at the NPS Campground, Day Use Area, Airstrip/Heliport, and within the Village would be available for users intending on using the new multi-use trail. The intersection of the new multi-use trail with the NPS Day Use Area is especially beneficial because the NPS Day Use Area offers restrooms at the midway of the new trail. Traffic volumes at these crossings would be relatively low, but all visitors would have to use caution, be aware of other visitors, and adjust their speed or behavior to ensure safety. Overall, the improved connectivity of the Village and destinations within the Seashore would result in localized, long-term, major, beneficial impacts to visitor experience.

The trail would offer visitor experiences that are presently unavailable. The trail would open a 3¼-mile section of the Seashore to visitors, facilitating a new experience of viewing and enjoying dune, wetland, and beach resources on Ocracoke Island.

During construction, visitors using the NPS Campground and NPS Day Use Area could find a reduced number of parking spaces and encounter construction crews and equipment. However, construction would not take place during peak visitation season, few visitors would be affected. Because the trail site is not currently visited or accessible, trail establishment would not interfere with existing visitor use in the area. Thus, the short-term effects on visitor use during project implementation would be negligibly adverse.

Overall, the experience of visitors in the project area would be improved. Impacts would range from negligibly adverse in the short-term. In the long-term, the impact would be beneficial and range from minor to major. Overall, the effect on visitor use and experience would be long-term, moderate, and beneficial.

### *Cumulative Impacts*

The cumulative impacts of past, present, and future actions on visitor use and experience would be the same as described in Alternative A, long-term, beneficial, and minor. Alternative B would contribute a noticeable, beneficial increment to the cumulative long-term, minor, beneficial impacts of past, present, and future actions.

### *Conclusion*

While under construction, the experience of visitors at the NPS Campground and NPS Day Use area would result in negligible, adverse impacts in the short-term. In the long-term, the multi-use trail would result in moderate, and beneficial impacts on the visitor use and experience in the project area and of the Seashore under this alternative.

### *Impacts of Alternative C, the Preferred Alternative*

The impacts of Alternative C on visitor use and experience in the project area and the Seashore would be the same as under Alternative B.

### *Cumulative Impacts*

The cumulative impacts of past, present, and future actions on visitor use and experience would be the same as described in Alternatives A and B. Alternative C would contribute a noticeable, beneficial increment to the cumulative long-term, beneficial, minor impacts of past, present, and future actions.

### *Conclusion*

The impacts of Alternative C on visitor use and experience in the project area and the Seashore would be the same as under Alternative B.

## **PUBLIC HEALTH AND SAFETY**

### **Affected Environment**

Providing for visitor safety is especially important at the Outer Banks Group due to the proximity to growing towns and the abundance of land- and water-based recreational opportunities. Currently, the NPS employs 13 Protection and Visitor Services rangers, who patrol over 31,000 acres at the three Outer Banks Group parks (Cape Hatteras National Seashore, Fort Raleigh National Historic Site, and the Wright

Brothers National Memorial). The Protection and Visitor Services rangers are responsible for law enforcement, including the investigation, apprehension, and detention of individuals suspected of crimes within the Park. Protection and Visitor Services work cooperatively, under concurrent jurisdiction, with at least eight different state and local law enforcement agencies and one federal agency on a routine basis (NPS 2001b). The Protection and Visitor Services respond to unsafe activities witnessed during regular patrols.

In 2006 and 2007, there were a total of 38 safety incidents in the Seashore. Five incidents involved motor vehicles on NC-12. There are no documented safety incidents involving pedestrians or bicycles on Ocracoke Island. However, vehicles leaving the roadway on NC-12 have been reported (USDOT 2008).

Since there have previously been no documented crashes on the Ocracoke Island stretch of NC-12, crash data for Bodie Island were analyzed. The road conditions and use of the existing road shoulder by pedestrians and bicyclists on Bodie Island are similar to those within the segment of NC-12 on Ocracoke Island. Crash data for NC-12 within the Seashore, on Bodie Island, was made available from the NPS and NC DOT. The NC DOT provided data for the 3-year period from 2003 to 2006 and NPS crash data was reviewed for the period between 1999 and 2006 between US 64/US 264 intersection with NC-12 to Bodie Island Maintenance Access Road. A total of 16 crashes were reviewed and the majority of crashes reported may be attributed to driver error and animal-vehicle collisions. The primary crash contributing factors related to driver error incidents include failure to give full time and attention, improper backing or turning maneuvers, and following too closely. Several of the crashes related to driver error involved multi-vehicle left turn and rear end collisions. One of these crashes resulted in a fatality from a driver making a left turn by U-turn on the roadway. However, the remaining reported crashes were property damage only incidents without injuries. No crashes involving bicycles or pedestrians were noted in the crash reports for Bodie Island.

According to incident reports, overall public health and safety is affected the most by visitors engaging in boating and water activities (e.g. boating, swimming, and surfing). In 2006 and 2007, the seashore reported a total of 263 public safety incidents of all types. Boating and water use activities accounted for 144 of these (55%). Between 2005 and 2007, there were 18 reported fatalities in the Seashore. No vehicle versus bicyclist or pedestrian fatalities have occurred within the Seashore during 2006-2007.

## **Environmental Consequences**

### ***Regulations and Policies***

In its 2008 report, the Eastern Federal Lands Highway Division of the Federal Highway Administration reviewed the feasibility of improving vehicle-bicycle safety by adding bicycle lanes to northern portions of NC-12 within the Seashore, on Bodie Island. The characteristics of this portion of NC-12 are similar to the study area considered. Several applicable standards and guideline documents were reviewed in analyzing the need to widen the existing roadway to improve vehicle and bicycle safety, as summarized below. (USDOT 2008)

According to the NPS Park Road Standards (NPS 1984b), the minimum roadway cross section requirement is 11 foot-wide lanes plus 4 foot-wide shoulders for a Principal Park Road with an average daily traffic of between 4,000 and 8,000. The NC DOT Division of Highways published a *Guide for Resurfacing, Restoration, and Rehabilitation (R-R-R) of Highways and Streets* (2004) with guidelines for acceptable minimum lane and shoulder widths for R-R-R projects. For roadways classified as collector or local roads on level terrain, with design speeds of 50 mph and greater, and average daily traffic over 2,000, the minimum lane width is 11 feet with shoulder width of 6 feet.

Factors for evaluating bicycle facilities along rural roads provided in the Federal Highway Administration's report, *Selecting Roadway Design Treatments to Accommodate Bicycles*

(FHWA-RD-92-073), indicate that due to the high speeds and presence of larger vehicles, NC-12 would be best suited for advanced cyclists and not designing for less experienced riders.

The American Association of State Highway and Transportation Officials' A Policy on Geometric Design of Highways and Streets (AASHTO 1994), Guide for the Development of Bicycle Facilities (AASHTO 1999), and North Carolina Bicycle Facilities Planning and Design Guidelines (NC DOT 1999) call for 4-foot minimum width paved shoulders to accommodate bicycles in rural areas. However, these guides do recommend additional width when vehicle speeds exceed 50 mph or when the percentage of trucks, buses, or recreational vehicles is high. Therefore, a more comfortable operating space of 5-foot paved shoulders for bicyclists is more desirable.

### ***Methods***

The impact intensity thresholds for Public Health and Safety are as follows:

**Negligible:** Public health and safety would not be affected; effects on employee and visitor health or safety would not be appreciable or measurable.

**Minor:** Effects on employee and/or visitor health and safety would be detectable; however, they would not produce an appreciable change in public health or safety.

**Moderate:** The effects would be readily apparent, and would result in significant, noticeable effects on employee and/or visitor health and safety. Changes in rates or severity of injury or illness could be measured.

**Major:** The effects would be readily apparent, and would result in substantial, noticeable effects on staff and/or visitor health and safety, and could lead to staff or visitor mortality. Changes in rates or severity of injury or illness could be measured.

Impact duration is described as either short- or long-term. Short-term impacts would be recognized for less than one year. Long-term impacts would be recognized for more than one year.

### ***Impacts of Alternative A, the No Action Alternative***

Under Alternative A, bicyclists would continue to ride on NC-12, a roadway that is designed to a standard less than that prescribed by state and national agencies' guidelines for optimal safe use. To date there have been no recorded safety incidents on the stretch of NC-12 within the project area, but the potential would continue to be present and would continue to result in localized, long-term, minor, adverse impacts on public health and safety.

### ***Cumulative Impacts***

Based on the relative number of reported incidents, the cumulative Seashore-wide public health and safety conditions would continue to be long-term, minor, and adverse. Alternative A would continue to contribute an imperceptible increment to the overall cumulative impact of the Seashore's public health and safety conditions.

### ***Conclusion***

Under Alternative A, the potential for safety incidents between bicyclists or pedestrians versus motor vehicles on NC-12 in the project area would continue and result in localized, long-term, minor, adverse impacts on public health and safety.

Alternative A would continue to contribute an imperceptible increment to the long-term, minor, and adverse cumulative impact of the Seashore's public health and safety conditions.

### ***Impacts of Alternative B***

The multi-use trail would present an alternate route of travel for bicycling and other non-motorized uses within the project area. The trail would be constructed to design specifications for bi-directional traffic of pedestrians, bicyclists, and mobility restricted users. The trail would be separate from the NC-12 road, providing a safer corridor of travel for many different user groups. The existing road shoulder of NC-12 would remain unimproved and would likely continue to be used by some visitors. Establishment of the new trail corridor would likely separate the more experienced road bicyclists from inexperienced riders and pedestrians, thereby reducing the conflicts among these user groups on the existing narrow road shoulder of NC-12. Motorists would continue to avoid conflict with non-motorized traffic on the road shoulder, but there would likely be fewer individuals using the road shoulder under this alternative. Furthermore, establishment of a multi-use trail separate from NC-12 would improve health and safety conditions for visitors with mobility restrictions. Overall, establishment of the multi-use trail corridor that is separate from NC-12 would improve health and safety conditions within the project corridor, resulting in a localized, long-term, major, beneficial impact.

Establishment of the multi-use trail would improve the connectivity of the Village with Park facilities in the project area. The trail would provide an alternate corridor for travel between destinations and facilitates exploration of the multiple destinations. Visitors at the NPS Campground would travel 1¾ miles south to the life-guarded beach, restroom, and shower facilities at the NPS Day Use Area; visitors from the Village of Ocracoke would reach the NPS Day Use Area and its facilities by traveling north on the trail for a distance of 1 mile. Establishment of the multi-use trail corridor improves connectivity to the park's life-guarded beach, restroom, and showering facilities at the NPS Day Use Area. Overall, this would result in a localized, long-term, moderate, beneficial impact on the health and safety conditions.

Under this alternative, two segments of the multi-use trail south of the NPS Day Use Area would be elevated bridge structures to avoid impacts to sensitive resources. The surface of the structures would most likely be wood or composite plastic planking. This surface would be less even and more prone to become slippery under wet conditions than the asphalt-surfaced portions of the trail. This would present a localized, negligible to minor, adverse impact on the safety for those using bicycles, inline skates, or walking.

A new potential conflict with existing uses would be created where the multi-use trail intersects with existing facilities (Ramps 68, 70, 72; Day Use Area). There would be the potential for collisions between vehicles, visitors approaching the NPS Day Use Area boardwalk, and trail users. Intersections would be signed to inform the various user groups about the potential conflicts. Bollards or other devices would be placed at intersections of the new trail and existing beach access ramps. Vehicular traffic on the multi-use trail would be strictly limited to emergency response vehicles and NPS Maintenance vehicles.

Emergency response vehicles (e.g., ambulance) would be permitted to respond to users on the multi-use trail. The 14 foot-wide trail would be sufficiently wide to permit access by the emergency response vehicles. Although the majority of the trail would offer a 10 foot-wide paved surface with 2 foot-wide gravel shoulders, there would be two segments of 14 foot-wide boardwalk located between the NPS Day Use Area and Ramp 70. The boardwalk segments would be constructed to withstand rare use by emergency response vehicles. Local emergency response personnel would be well-informed on the use of the trail in the event of a visitor need on the multi-use trail. A trail with two boardwalk segments creates a localized, long-term, minor, adverse impact for emergency responders with the responsibility to protect the public health and safety.

### *Cumulative Impacts*

The cumulative impacts of past, present, and future actions on public health and safety would be the same as described in Alternative A. Alternative B would contribute a noticeable, beneficial increment to the cumulatively long-term, adverse, and minor impacts to health and safety.

### *Conclusion*

Establishment of a new multi-use trail between the NPS Campground and Village would result in localized, long-term, minor, beneficial impact on public health and safety for motorists, bicyclists, pedestrians, and users with restricted mobility in the project area. The two elevated boardwalk segments of the trail and intersections with beach access ramps and the NPS Day Use Area would present a localized, negligible to minor, adverse impact. Establishment of a new multi-use trail that primarily offers a paved surface but includes two boardwalk segments creates a localized, long-term, minor, adverse impact for emergency responders with the responsibility to protect the public health and safety.

Overall, establishment of a multi-use trail that is constructed with two different hard-surface materials contributes a noticeable, minor, beneficial increment to the cumulative minor, adverse impacts on public health and safety associated with past, present, and future actions.

### ***Impacts of Alternative C, the Preferred Alternative***

As under Alternative B, Alternative C would result in the establishment of a multi-use trail corridor that is separate from NC-12. Separation of motorized and non-motorized user groups would improve health and safety conditions within the project corridor, resulting in a localized, long-term, major, beneficial impact.

As under Alternative B, Alternative C would improve the connectivity of the Village with Park facilities in the project area. The resulting would be a localized, long-term, moderate, beneficial impact on the health and safety conditions.

Under Alternative C, the entire trail would offer a 10 foot-wide, asphalt-paved surface. The continuously paved surface would offer users a predictable trail conditions along the entire 3¼ mile trail corridor. The continuity of trail surface would result in a localized, long-term, moderate, beneficial impact on the health and safety conditions.

As under Alternative B, Alternative C would result in the creation of a new potential conflict with existing uses would be created where the multi-use trail intersects with existing facilities (Ramps 68, 70, 72; Day Use Area).

Under Alternative C, emergency response vehicles (e.g., ambulance) would be permitted to respond to users on the multi-use trail. The 14 foot-wide trail would be sufficiently wide to permit access by the emergency response vehicles. Since the entire 3¼ mile trail would offer a 10 foot-wide paved surface with 2 foot-wide gravel shoulders, it would support emergency response vehicle access and responders would be well-informed that the trail was a continuous, asphalt-paved surface. A continuously paved trail surface designed to withstand emergency access would result in localized, long-term, minor, beneficial impact for emergency responders with the responsibility to protect the public health and safety.

### *Cumulative Impacts*

The cumulative impacts of past, present, and future actions on public health and safety would be the same as described in Alternative A. Alternative C would contribute a noticeable, beneficial increment to the cumulatively long-term, adverse, and minor impacts to health and safety.

## *Conclusion*

Establishment of a new, continuously asphalt-paved, multi-use trail between the NPS Campground and Village would result in localized, long-term, minor, beneficial impact on public health and safety for motorists, bicyclists, pedestrians, and users with restricted mobility in the project area. A new potential for conflict among users at trail intersections with beach access ramps and the NPS Day Use Area would present a localized, long-term, negligible to minor, adverse impact. Establishment of a new multi-use trail that offers a continuously paved surface would result in a localized, long-term, minor, beneficial impact for emergency responders with the responsibility to protect the public health and safety.

Overall, establishment of a multi-use trail that is constructed with one hard-surface material contributes a noticeable, beneficial increment to the cumulative minor, adverse impacts on public health and safety associated with past, present, and future actions.

## **TRANSPORTATION**

### **Affected Environment**

NC-12 is classified as a “Principal Park Road,” as described in the Park Road Standards (NPS 1984b), and is the main access route for park visitors along the three main islands at Cape Hatteras National Seashore. The posted speed limit along NC-12 is 55 mph along most of its length, including most of the project area. It drops to 25 mph nearing Village of Ocracoke. The existing typical section is a two-lane roadway, offering 11-foot paved lanes with 2-foot paved shoulders and turf shoulder (typically at least 12 feet wide) for each lane of travel. The road shoulder within the project area is 4 feet-wide or less. The measured available roadside recovery (clear zone) width varies between 15 and 20 feet long, with good sightlines and flat terrain for passing maneuvers (USDOT 2008).

From a dynamic traffic count study performed by the NC DOT in April 1996, the average annual daily traffic in the Seashore is approximately 4,500 vehicles per day. Peak season daily traffic flows during June through September were estimated to be approximately 66% higher than the average annual daily traffic rate. Vehicle speeds along NC-12 averaged at 56 mph for all classified vehicles, and the 85<sup>th</sup> percentile speed (or operating speed) was 63 mph.

The volume of bicycle traffic in the Seashore has not been estimated, but the mix of bicycle riders is estimated to be approximately 70% experienced riders and 30% inexperienced, which includes some families. Road shoulders of NC-12 within the project area are suitable for experienced riders but not suitable for typical families and inexperienced riders. According to a feasibility study for the improvement of bicycle lanes on NC-12 following culvert replacement on Bodie Island within the Seashore (USDOT 2008), the peak bicycling months of use were in April, May, and October. During these times official sponsored bicycle tours occur and consist of large groups of approximately 500 riders without any vehicle restrictions using NC-12. During the winter months of December through March, bicycle use is very limited due to cold weather and high winds. Also, bicycle use along NC-12 is less during the summer due to peak vehicle travel along the roadway.

Within the Village of Ocracoke, walking and bicycling are strongly encouraged as an alternative to driving and numerous businesses offer bicycle rentals for hourly and daily use. Traffic circulation within the Village is restricted by narrow roads; high visitation by car, truck, RV, or tour bus during the summer; and delivery vehicles of all sizes supplying the Village’s bustling businesses.

Within the Seashore, most visitors travel by vehicle and park their vehicle to travel on foot to their final destination. Parking is available at the NPS Campground (48 spaces), NPS Day Use Area (48 spaces), and NPS Airstrip/Heliport (25 spaces). A series of beach access ramps are available on the Seashore, allowing vehicular access to the ocean beach. Within the project area there are three ramps providing

ocean beach access: Ramps 68 at the NPS Campground; Ramp 70 at the NPS Airstrip/Heliport; and Ramp 72 near the Park/Village boundary. Use of the ramps in the project area can be as low as a few vehicles per day to over 200 vehicles per day (NPS 2006b, Ballance personal communication 2008). Use of the ramps is dependent on whether the beach is open to ORV traffic and if the beach conditions are consistent with the visitor's desired experience.

## **Environmental Consequences**

### ***Methods***

The impact intensity thresholds for transportation are as follows:

**Negligible:** No effects would occur or the effects to transportation would be below the level of detection.

**Minor:** Effects to transportation would be detectable. If mitigation measures were needed to offset potential adverse effects, it would be simple and successful.

**Moderate:** The effects to transportation would be readily apparent. If mitigation measures were needed to offset potential adverse effects, it could be extensive but would likely be successful.

**Major:** The effects to transportation would be readily apparent and would cause substantial changes. Mitigation measures to offset potential adverse effects would be extensive, and their success could not be guaranteed.

Impact duration is described as either short- or long-term. Short-term impacts would be recognized for less than one year. Long-term impacts would be recognized for more than one year.

### ***Impacts of Alternative A, the No Action Alternative***

Along most of NC-12 within the project area, traffic speeds are maintained and congestion is low until nearing the Village. Individual or groups of bicyclists and pedestrians would continue to use the existing, narrow road shoulders. Vehicular traffic would continue to be periodically disrupted or slowed to safely pass pedestrians or bicyclists on the road shoulders. Although there have been no known traffic incidents between motorists and bicyclists or pedestrians, the potential for such remains unchanged. Under this alternative, NC-12 would not be improved to accommodate these uses on the road shoulders. Therefore, NC-12 in the project area would continue to be a shared highway and result in localized, long-term, minor, adverse impacts on transportation.

### ***Cumulative Impacts***

Traffic and transportation congestion within Village of Ocracoke can be high during the peak season, but traffic issues on NC-12 are low. Visitor use and population growth on Ocracoke Island have been slow (Hyde County 2006) and traffic issues would not be expected to change substantially over the next ten years. Planned improvements with the Bodie Island bicycle path and the proposed Village of Ocracoke trolley are expected to enhance transportation conditions. Cumulative impacts of past, present, and future actions under Alternative A on transportation would be long-term, adverse and minor. This alternative contributes an imperceptible, adverse increment to the cumulative impact scenario.

### ***Conclusion***

Current conditions on NC-12 remain unchanged, contributing an imperceptible impact on the cumulatively minor, adverse impacts of past, present, and future actions on transportation.

### ***Impacts of Alternative B***

Expressions of interest in the multi-use trail have been given by different types of riders, including inexperienced riders and large groups (Ballance personal communication 2008). The new trail would provide less stressful and more interesting corridor for pedestrians, bicyclists, and visitors with mobility restrictions. Although many experienced bicyclists would continue to find the highway the more desirable route, this user group typically has a negligible impact on motorized traffic flow on NC-12 within the project area.

The availability of a multi-use trail also allows visitors to park their vehicles and take an alternate means of transportation to their destination. This may reduce vehicular traffic in the project corridor and near the Village of Ocracoke limit. Residents and visitors of the Village would have a safer corridor by which to explore the Park on foot or by bike. Providing an alternate and separate corridor for non-motorized means of transportation in the project would result in a localized, long-term, major, beneficial impact on transportation.

A new potential conflict with existing uses would be created where the multi-use trail intersects with existing facilities (Ramps 68, 70, 72; NPS Day Use Area). There would be the potential for collisions between vehicles, visitors approaching the NPS Day Use Area boardwalk, and trail users. Intersections would be signed to inform the various user groups about the potential conflicts. Bollards or other devices would be placed at intersections of the new trail and existing beach access ramps. Vehicular traffic on the multi-use trail would be strictly limited to emergency response vehicles and NPS Maintenance vehicles. Creating new intersections with existing facilities would result in a localized, long-term, negligible to minor, adverse impact on transportation.

### ***Cumulative Impacts***

The cumulative impacts of past, present, and future actions on transportation would be the same as described in Alternative A. Alternative B would contribute a noticeable, beneficial increment to the cumulative minor, adverse impacts of past, present, and future transportation-related actions.

### ***Conclusion***

Alternative B would provide an alternative route for non-motorized users in the project area. The alternate route would be available for pedestrians, bicyclists, and visitors with mobility restrictions to travel between the NPS Campground and the Village of Ocracoke with four short intersections with existing corridors for motorized traffic. Overall the establishment of the trail, separate from NC-12, reduces the conflicts with motorized traffic and results in localized, long-term, moderate, beneficial impact on transportation. Alternative B would contribute a noticeable, beneficial increment to the cumulative minor, adverse impacts of past, present, and future transportation-related actions.

### ***Impacts of Alternative C, the Preferred Alternative***

The impacts of Alternative C on transportation would be the same as under Alternative B.

### ***Cumulative Impacts***

The cumulative impacts of past, present, and future actions on transportation would be the same as described in Alternative A. As under Alternative B, Alternative C would contribute a noticeable, beneficial increment to the cumulative minor, adverse impacts of past, present, and future transportation-related actions.

## *Conclusion*

The impacts of Alternative C on transportation in the project area and the Seashore would be the same as under Alternative B.

## **PARK OPERATIONS**

### **Affected Environment**

The NPS employs a total of 80 permanent and 65 seasonal park staff to manage the three national park units in the Outer Banks Group (Cape Hatteras National Seashore, Fort Raleigh National Historic Site, and the Wright Brothers National Memorial). Staff are employed under five functional group divisions: Park Management and Administration; Resource Management; Maintenance and Facility Operations; Protection and Visitor Services; and Interpretation (Hand personal communication 2008). Within these five divisions, the park manages 35 programs for specific park operations. Their primary duties are listed below.

#### ***Park Management and Administration***

The Park Management and Administration Division conducts all Park-wide management and support activities, including external affairs activities, Park-level planning, human resource management, information technology, and financial management.

#### ***Resource Management***

The Resource Management Division is responsible for activities related to the management, preservation, and protection of the park's cultural and natural resources, including scientific research, management, restoration, and resource protection planning.

There is no permanent Resource Management staff on Ocracoke year-round, but four GS-5 seasonal employees are staffed on Ocracoke during the summer. Their primary duties include daily monitoring of protected species and maintenance of resource closures established for the protection of those species.

#### ***Maintenance and Facility Operations***

The Maintenance and Facility Operations Division is responsible for the daily activities required to ensure the proper functioning, repair, rehabilitation of the park's assets and infrastructure, including tasks related to buildings, trails, roads, utilities, campgrounds, and on-going operational monitoring.

The Ocracoke District is currently staffed with one permanent WG-3 maintenance worker and three WG-5 seasonal employees in the summer. An additional permanent WS-8 supervisor position and at least one WG-6 maintenance worker positions are anticipated to be filled. Current staff duties include maintenance of the Ocracoke Campground (125 sites), the Visitor Center, two boat ramps, the boat docking station on Silver Lake, eight housing units, five beach ramps, the pony pen, and Day Use Area facilities (paved parking lot for 48 vehicles, restrooms, and showers).

Maintenance activities, such as sand clearance and grading of beach ramps require regular use of heavy equipment. Equipment (e.g., graders, front-end loaders, bobcats) is transported from the Hatteras Island District twice per month. The Hatteras-Ocracoke ferry is used to bring the equipment to Ocracoke Island (Wescott personal communications 2008).

### ***Protection and Visitor Services***

The Protection and Visitor Services Division is responsible for activities related to providing visitors a safe experience, emergency services, and law enforcement.

The Ocracoke Island District employs four full-time commissioned law enforcement officers, three seasonal law enforcement officers, six seasonal visitor use assistants, and four seasonal lifeguard employees ranging from GS-2 through GS-5.

Enforcement activities include concurrent jurisdiction on NC-12. Patrol activities takes place in boat marinas, NPS parking lots, sound-side roads, the NPS Campground, and 16 miles of beach. Typical actions include DUI stops, illegal camping violations, illegal entering of closed area violations, search and rescue, and accident investigations.

Protection and Visitor Services staff also assists the other park Divisions with activities such as sign maintenance, resource management, pony pen maintenance, trail repair and maintenance, vehicle counts, and administrative support (Ballance personal communications 2008).

### ***Interpretation***

The Interpretation Division is responsible for the daily activities required to provide visitors with the desired educational experience, including interpretation, visitor center management, interpretive media, in-park concessions management, fee collection, and visitor safety services.

In 2007 7,219 visitors participated in Ocracoke interpretative programs and activities (NPS 2007 unpublished park statistics). Activities offered in or near the project area include interpretive programs on the beach during the daylight hours and the evening hours (both from NPS Campground parking lot) and programs on the Visitor Center on pirates, shipwrecks, and barrier island natural history.

Interpretation functions are performed by one permanent GS-7 interpretive employee stationed at the Ocracoke Visitor Center from approximately April through Columbus Day and four seasonal GS-5 employees. The rest of the year the Visitor Center is staffed by employees of Eastern National, a cooperating association.

### **Environmental Consequences**

#### ***Methods***

The impact intensity thresholds for park operations are as follows:

**Negligible:** Park operations would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on park operations.

**Minor:** Management actions would affect operations in a way that would be difficult to measure. The impacts on the park staff workload would be short-term, with little material effect on other ongoing park programs.

**Moderate:** Management actions would measurably affect operations. Costs associated with management actions would not exceed the current park budget but may draw on discretionary funding, and require a review of priorities and reallocation of personnel to the highest priority activities.

**Major:** Management actions would measurably affect operations. Costs associated with management actions would exceed the current park budget, consume all discretionary funding, and require additional personnel over and above what would normally be expected to be funded.

Impact duration is described as either short- or long-term. Short-term impacts would be recognized and measureable for less than one year. Long-term impacts would be recognized and measureable for more than one year.

### ***Impacts of Alternative A, the No Action Alternative***

Under this alternative, there would be no change to existing park operations.

#### *Cumulative Impacts*

This alternative would not contribute to the cumulative long-term, minor, adverse impact to park operations resulting from implementation of past, present, and future actions.

#### *Conclusion*

This alternative would result in no impact on park operations and would not contribute to the cumulative long-term, minor, adverse impact to park operations resulting from implementation of past, present, and future actions.

### ***Impacts of Alternative B***

#### *Park Management and Administration*

Park Management and Administration would experience a short-term, negligible to minor, adverse increase in activity associated with the establishment of the new trail on Ocracoke Island. This increased activity would be related primarily to the creation of a Memorandum of Understanding between the NPS and NC DOT for the construction and maintenance of the trail, press coverage of the project, and responding to inquiries about the new trail.

#### *Resource Management*

Resource Management would experience a short-term, minor, adverse increase in activity related to resource protection prior to, during, and following construction of the new trail. A long-term, minor, adverse impact to Resource Management would result if visitor use of the trail results in unintended adverse impacts to resources near the trail. Since the trail will not be constructed with handrails, some trail users may stray from the trail into the nearby dunefield or wetlands.

#### *Maintenance and Facility Operations*

The new multi-use trail would require regular maintenance to clear sand from the trail to ensure that it remains passable by visitors. Sand clearing would be accomplished by a WG-6 maintenance worker operating a bobcat, approximately three days per month. Sand clearing would be complicated by the fact that two different surfaces, asphalt and boardwalk, would require maintenance. Care of the trail surface and use of the appropriate equipment to perform the sand clearing would be required. Minimal vegetation maintenance along the trail would be required, as needed.

Maintenance of the trail would most likely be accomplished with the equipment that is currently transported to the island. Existing and currently programmed staff would be tasked with trail maintenance, a new duty added to their existing workload. Both the asphalt and boardwalk surfaces would require periodic surface repair, with the boardwalk requiring a greater investment of effort, supplies, and materials (Wescott personal communication 2008). Maintenance costs associated with maintaining boardwalk segments would be approximately double the cost of maintaining an asphalt trail of the same dimensions.

The improved opportunity to bicycle between the NPS Campground and the Village of Ocracoke may necessitate the installation and maintenance of additional, new bicycle racks at each of the destinations along the new trail.

The overall impact of establishing and maintaining the new multi-use trail with two boardwalk segments would have a localized, long-term, moderate, adverse impact on Maintenance and Facility Operations.

### *Protection and Visitor Services*

Establishment of a new multi-use trail that separates visitors from NC-12 would result in increased non-motorized traffic in the project corridor. This would reduce the potential for incidents between non-motorized and motor vehicles on NC-12. However, the multi-use trail would intersect with three beach access ramps (68, 70, and 72) and existing parking lots at or near the NPS Campground, the NPS Day Use Area, and NPS Airstrip/Heliport. These intersections create a potential for incidents between motorized and non-motorized traffic. Signage and pavement markings would be used to inform visitors of nearby trail intersections.

Any reported incidents along the new 3¼ mile-long trail would add to the existing workload for Protection and Visitor Services within the Ocracoke District. Local emergency response services may be required to respond to incidents. Therefore, the impact on Protection and Visitor Services would be localized, long-term, minor, and adverse.

### *Interpretation*

Establishment of a new multi-use trail would require the Park's Interpretation staff to update the Park brochures, maps, and other interpretive materials to inform the visitors of its creation. Signage would also be developed by Interpretation staff to inform visitors of the trail corridor and warning signs for the trail intersections with existing facilities (e.g., NPS Campground; NPS Day Use Area; NPS Airstrip/Heliport; and Ramps 68, 70, and 72). Interpretation staff would also work with other local visitor services entities (e.g., Outer Banks Visitors Bureau) about the new trail. Establishment of the new multi-use trail would not be expected to alter existing use patterns at the Ocracoke lighthouse, Visitor Center, or Campground. Overall, the impact to workload of the Park's Interpretation staff would be short-term, negligible to minor, and adverse.

The overall impact of establishing and maintaining the new multi-use trail with two boardwalk segments would have a localized, long-term, moderate, adverse impact on park operations.

### *Cumulative Impacts*

The cumulative impacts of past, present, and future actions described under Alternative A would also continue under Alternative B. The development of a multi-use trail would contribute a noticeable, adverse increment to the cumulative minor, adverse impacts on park operations.

### *Conclusion*

The overall impact of establishing and maintaining the new multi-use trail with two boardwalk segments would have a localized, long-term, moderate, adverse impact on park operations. Of the Park's operational divisions, the Maintenance and Facility Operations Division would experience the greatest portion of these impacts.

The development of a multi-use trail would contribute a noticeable, adverse increment to the cumulative minor, adverse impacts on park operations.

### ***Impacts of Alternative C, the Preferred Alternative***

Park operations would be impacted under Alternative C as they would be under Alternative B, with the exception of the Park's Maintenance and Facility Operations Division. The Maintenance and Facility Operations Division would experience a lower intensity of adverse impacts because the trail would be a continuously asphalt-paved trail. There would be no boardwalk sections to maintain, thereby making trail maintenance easier.

The overall impact of establishing and maintaining the new, continuously asphalt-paved, multi-use trail would have a localized, long-term, minor, adverse impact on park operations.

### ***Cumulative Impacts***

The cumulative impacts of past, present, and future actions described under Alternative A would also continue under Alternative C. The development of a multi-use trail would contribute a noticeable, adverse increment to the cumulative minor, adverse impacts on park operations.

### ***Conclusion***

The overall impact of establishing and maintaining the new, continuously asphalt-paved, multi-use trail would have a localized, long-term, moderate, adverse impact on park operations. Of the Park's operational divisions, the Maintenance and Facility Operations Division would experience the greatest portion of these impacts.

The development of a multi-use trail would contribute a noticeable, adverse increment to the cumulative minor, adverse impacts on park operations.

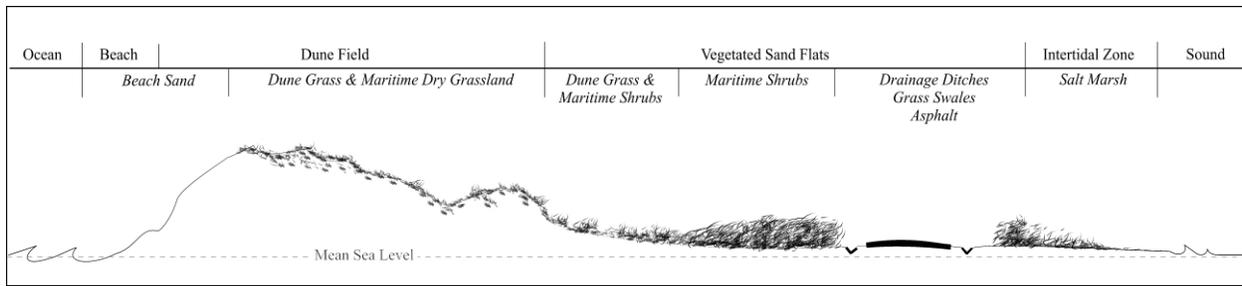
## **COASTAL PROCESSES – DUNES**

### **Affected Environment**

#### ***Description of Barrier Island Dunes***

In general, barrier islands are low strips of sand that lie parallel to the mainland. Broad salt marshes and estuaries typically occur behind the barrier island and are associated with shallow bays and estuaries. Lines of dunes occur in parallel rows immediately upland of the beach. The primary dune is the first dune inland from the ocean and receives the direct effects of waves, currents and wind, including those associated with storms. The secondary and tertiary dunes are more protected from the force of direct erosion by the sea and wind, but they are still affected, especially during major storms. Collectively, the dunes are referred to as the dune field and are part of the ocean/beach unit.

A generalized cross-section of the dunes on Ocracoke Island and the approximate location is presented in Figure 7. The NPS has estimated that the base of the backdune corresponds approximately to the inland, gently sloping area (generally less than 5% grade) of vegetated sand flats, between the backdune ridge and maritime shrub thicket. In the project area, the maritime shrub thicket includes wetland habitat.



**FIGURE 7. GENERALIZED CROSS-SECTION OF OCRACOKE ISLAND SHOWING LANDSCAPE FEATURES AND PRIMARY VEGETATION TYPES (NOT TO SCALE) (NPS 2008)**

The existing dune system on Ocracoke Island is the combined result of dune creation by the NPS and subsequent natural dune building processes. Prior to the 1930s, there were no or very few dune ridges on Ocracoke Island. Between the 1930s and 1970s, the Civilian Conservation Corps planted dune vegetation and installed sand fencing. Between 1936 and 1940 more than 600 miles of sand fencing was erected in the Park to create a protective, continuous barrier dune. Additional stabilization, including planting efforts, was undertaken in the 1950s. As winds moved landward, blowing sand was trapped by the planted vegetation and sand fencing generated dune height and steepness. Installation of these effective sand traps facilitated the development of the dune field present on Ocracoke today (Godfrey and Godfrey 1976; 2005). At the present time, a continuous mass of vegetation blankets most of the man-made dunes on Ocracoke Island (USDOT 2005, 2007). The dune field within the project area is less active than many dune fields in the Park and is stable, as evidenced by the presence and persistence of patchy shrubs and grassy vegetation from the ridge of the primary dune landward. Landward of the dune field, vegetated sand flats have developed. NC-12 and numerous park facilities were established in the vegetated sand flat unit, and the Park's General Management Plan (1981, 1984b) identified that continued operation of existing facilities and future development will occur in this unit. The proposed multi-use trail would be located primarily in this vegetated sand flat unit.

Regardless of whether they are man-made or natural, barrier islands are constantly being reshaped by winds, bayside flooding, and ocean waves, currents and overwash that create, move and close inlets, erode and build the shoreline, and cause changes in topography and migration of dunes (NPS 1984a, Godfrey and Godfrey 1976, 2005). The most dramatic changes occur during northeasters and hurricanes. Both types of storms can be extremely destructive and can cause flooding from both the ocean and sound sides of the barrier islands (NPS 1984a). Flooding associated with overwash can eliminate entire dune systems and create inlets, as happened on Ocracoke Island in 2003 during Hurricane Isabel (NCCGC 2003). The inlet created on Ocracoke Island is located at the northern end of Ocracoke Island, where the island is less than ½ mile wide. In the project area, Ocracoke Island ranges from ¾ mile to 1½ mile wide and is not within an identified inlet hazard area (NC DCM 2008b).

The NPS stopped maintaining sand dunes, via beach nourishment or sand fencing, in the Park during the 1970s when it was shown that barrier island processes were being seriously impaired (NPS 1981). However, dune repair by NC DOT is conducted in areas where the dune provides the only protection for NC-12, the major thoroughfare through the Seashore. Much of the dune line still remains, however, and has had adverse effects on coastal processes in that they are contrary to the natural evolution and change that a simple barrier island would experience. Woody vegetation behind the dunes has also increased in the absence of overwash (NPS 2007).

## *Coastal Processes that Affect Barrier Islands*

The following is a discussion of the various coastal processes that affect dune structure and stability on barrier islands, including Ocracoke Island. These processes include wind erosion, stabilization by vegetation, shoreline erosion and sand scour, overwash, and sea level rise.

### *Wind Erosion*

Wind constantly moves sand on barrier islands, resulting in erosion of beaches and dunes. Vegetation, especially dune grasses, counteracts these effects by binding the soil with roots and capturing sand in the leaves. The amount of wind erosion is greatest during storm events. During hurricanes, entire sections of an island can be eroded completely away. The dune field within the project area does not experience significant erosion under normal weather conditions.

### *Stabilization by Vegetation*

Vegetation is the primary factor responsible for stabilization of the soil on barrier islands dunes. The presence of dune grasses is particularly critical in building and maintaining the dune fields, which are easily denuded by human traffic. The tolerance of the primary dune ridge for use is extremely low. Even a small amount of vehicular or foot traffic destroys the dune-building vegetation and erodes the dunes. Dune grass and shrub thickets stabilize the soil in the area behind the second and tertiary dunes. Disturbance of this vegetation has a potential to destabilize dunes and cause erosion, but this habitat is fairly tolerant of visitor use (NPS 1984a). The dune field, vegetated sand flats, and maritime shrub thicket within the project corridor are well-vegetated and stable.

### *Shoreline Erosion and Sand Scour*

Currents caused by daily tidal exchange erode barrier island soils in inlets and other tidal channels on barrier islands. Wave activity erodes sand from the beach and creates a littoral drift current that scours the sand and moves it down the beach in one direction. Sand is eroded on a seasonal basis, with the largest amounts of erosion occurring during storms. Erosion also varies along the length of the barrier island. Erosion rates and patterns are affected by larger physical structure of the barrier island and the creation of artificial dunes.

On Ocracoke Island, shoreline erosion and inlet formation occurred at the northern end of the island. The proposed trail under Alternatives B and C would be located in an area that is not considered an inlet formation hazard zone by NC DCM (2008b).

On Ocracoke Island, rates of shoreline erosion are highest at the two ends of the island (NCDCM 2008b). The entire project area is located in the Ocean Erodible Area of Concern (Appendix A, letter from S. Rynas of the NC DENR) and must comply with the setback requirements for development (15A NCAC 7H .0306). The entire project corridor is located within the 2.0 feet/year setback factor zone. The setback factor is multiplied by the erosion rate factor to arrive at the required distance a project must be located from the first line of natural stable vegetation. The proposed action would be approximately 3/4 miles in length (17,160 feet) and would have a permanent width of 14 feet of constructed surface. The permanent paved area of the proposed action would be 240,240 square feet (5.5 acres). The proposed action would require a setback factor of 60 and would require a 120 foot setback from the first line of natural stable vegetation. Under Alternatives B and C, the proposed trail would be located well beyond this setback, and therefore meets this requirement. Furthermore under Alternatives B and C, the proposed trail would be located in the vicinity of a dune field that is less active than most of the dune fields within the Park.

### *Overwash*

Overwash is the movement of storm surge and sand across and towards the back of the barrier island during storms. In major storms such as tropical cyclones, highly destructive overwash of barrier islands occurs as a result of storm surge. For example, the North Carolina Coastal Geology Cooperative reported that during Hurricane Isabel in 2003, severe overwash occurred over 6 miles of northeastern Ocracoke Island that destroyed the barrier-dune ridge and either destroyed or severely buried NC-12 with significant shoreline recession. This temporarily closed the highway from the Ferry Terminal to the Pony Pens (NCCGC 2003).

Over 82 tropical cyclones have passed North Carolina since 1886 (Table 5). At least 149 hurricanes affected the North Carolina coast between 1585 and 1966 (Carney and Hardy 1967 in Godfrey and Godfrey 2005). Winter northeasters can be expected to drive high water over the beach, and hurricanes will also continue to affect the area. It is therefore just a matter of time before an overwash event occurs. These events would affect the entire island, including the area behind the secondary and tertiary dunes (NCCGC 2003).

**TABLE 5. NORTH CAROLINA TROPICAL CYCLONE STATISTICS 1886 TO 1996**

<b>Statistic</b>	<b>Direct Landfalling Tropical Cyclones in NC</b>	<b>Tropical Cyclones That Passed Through NC</b>
Number of Storms	28	82
Percentage of Storms	2.9	8.6
Average Number of Years Between Storms	4	1.3
Average Number of Storms Per Year	0.25	0.74

Source: State Climate Office of North Carolina (2008a)

The area along the base of the secondary or tertiary dunes on the island is a more stable area than the primary dune because it is better sheltered from the effects of wind and wave erosion, and is more protected from effects of overwash. However, overwash can affect nearly the entire island, as was demonstrated in 2003 during Hurricane Isabel, in which dunes were severely impacted along a 6 mile section of Ocracoke Island, approximately 2 miles north of the northern limit of the project area (NCCGC 2003).

### *Sea Level Rise*

The U.S. Geological Survey, in partnership with the NPS Geologic Resources Division, has developed an index that assigns a rating to areas that are vulnerable to impacts of future sea-level rise (Pendleton et al. 2004). Based on this study, it was concluded that the project area is vulnerable to the effects of sea level rise, as is the rest of the Seashore.

## **Environmental Consequences**

### ***Regulations and Policies***

The NPS determined that the proposed development of this multi-use trail is necessary and appropriate, and that there is no practicable alternative location for its development outside of the Park. Suitable

alternatives for trail siting, alignment, and construction materials were developed with integration into the Park's landscape and environs to minimize environmental impact, as well as avoid or mitigate the risks to human life and property. Therefore, the proposed trail is consistent with *NPS Management Policies* (2006). Furthermore, the proposed trail alignments under Alternatives B and C are consistent with the Park's *GMP* (NPS 1981, 1984b) for the development facilitating visitor use and enjoyment of the Seashore.

The NPS submitted a Federal Consistency Determination request to the North Carolina Division of Coastal Management (dated May 20, 2008) to ensure conformity with 15 CFR Part 930 which fully maintains the authority and ability of North Carolina to review proposed federal actions that would have a "reasonably foreseeable effect" on any land or water use or natural resource of North Carolina's coastal zone, as provided for and in the CZMA and NOAA's regulations, as revised in 2000, "to the maximum extent practicable." The NPS believes that the establishment of the trail, under Alternatives B and C, is fully in conformity and fully consistent to the maximum extent practicable with the standards and management objectives of North Carolina's State Guidelines for: Areas of Environmental Concerns, 15A NCAC 07H.0101, et seq.; The Estuarine and Ocean Systems, 15A NCAC 07H.0201, et seq.; and Ocean Hazard Areas, 15A NCAC 07H.0301, et seq.

A detailed description of the applicable North Carolina Division of Coastal Management requirements for construction and operation of projects in state-designated "Areas of Concern" is included as Appendix B.

### ***Methods***

The effects of constructing the proposed trail were estimated as follows:

- The location of the proposed trail in relation to existing dunes along the alignment was mapped using a Geographic Information System.
- The proposed trail under Alternatives B and C was estimated at 3¼ miles long.
- The total area that would be affected by clearing of a 25 foot-wide by 3¼ mile-long corridor was calculated (429,000 square feet or 9.8 acres). This represents the outer boundary of the combined temporary and permanent construction zones.
- The total area that would be permanently covered by a 14 foot-wide trail extending for a distance of 3¼ mile-long was calculated (240,240 square feet or 5.5 acres). This represents the area that would be permanently covered by asphalt (10 feet) and porous material shoulders (2 feet on either side).
- The delineation of the base of the backdune was estimated by the NPS as the 7 foot elevation contour line and where the seaward side of this contour was estimated to have slopes of greater than 5%. Construction activity above the 7 foot elevation contour and in areas with a slope greater than 5% would increase the potential for erosion and destabilization of the backdune.
- Using this information and available scientific literature, conclusions were made regarding the potential for adverse effects of construction on dune stability, vegetation recovery, and coastal processes. The primary references used for the literature review were Godfrey and Godfrey (1976, 2005) and the National Biological Service (1995).
- Effects of maintenance of the proposed trail on dunes and coastal processes were assessed by describing the potential effects of the permanent fill and placement of impervious surfaces. The effects of increased stormwater runoff from the additional paved area were estimated based on potential erosion effects.

The intensity of potential effects on coastal processes and dunes were evaluated using the following system of impact thresholds:

**Negligible:** Effects on coastal processes in terms of dune resource conditions, and sand distribution would not be measurable or of perceptible consequence to coastal processes.

**Minor:** Effects on coastal processes in terms of dune resources would be altered such that changes in dune resource condition and sand distribution would be detectable. Any changes would be of little consequence.

**Moderate:** Effects on coastal processes in terms of dune resources would be detectable, and would be altered such that changes in dune resource condition and sand distribution would be readily apparent and measurable.

**Major:** Effects on coastal processes in terms of dune resources would be altered such that changes in dune resource condition and sand distribution would be readily apparent, and would substantially change the characteristics of the secondary dune.

Impact duration is described as either short- or long-term. Short-term impacts would be recognized and measurable for less than one year. Long-term impacts would be recognized and measurable for more than one year.

### ***Impacts of Alternative A, the No Action Alternative***

Under Alternative A, the proposed multi-use trail would not be constructed and coastal processes on Ocracoke Island would continue to occur as described. Therefore, Alternative A would have no impact on these coastal processes.

### ***Cumulative Impacts***

A summary table of other projects and plans affecting coastal processes is presented in Table 6. The primary cumulative effects of past actions have included the creation of higher and steeper dunes on the island as a result of stabilization by sand fences and planted vegetation, especially dune grasses. This has also limited the amount of sand that can move across the island from the beach. The secondary and tertiary dune systems have therefore been provided with increased protection from erosion, except during major storms, which could easily destroy the dunes, as occurred in 2003 during Hurricane Isabel.

In addition, past projects have resulted in increased amounts of paved or excavated areas in dunes, and have contributed to their destabilization. The potential for these effects are less in the project area as compared with either end of the island where erosion rates are higher due to historic efforts to stabilize dunes and provide access via NC-12 to Village of Ocracoke and Hatteras. Construction in dunes of any type can contribute to their destabilization because of excavation and erosion associated with stormwater runoff from increased amounts of impervious paved surfaces. In comparison with the effects of the past dune enhancement and creation programs, the effects from construction, excavation and paving activities are minor. Because of the dune creation and stabilization program, the overall effects of past actions are therefore long-term, major, and adverse.

The primary effects of ongoing and reasonably foreseeable future projects and actions would be similar to the effects of past projects since continued dune stabilization is proposed under the offshore sand resources program. Some paving would also be done for numerous projects, but the effects of these actions on dune stability and dynamics would be minor in comparison with the larger dune stabilization program. The overall effects of ongoing and reasonably foreseeable future projects and actions are therefore long-term, major, and adverse.

Continued current park management efforts would not change the adverse effects of past actions. Overall, the cumulative effects under Alternative A on coastal processes would be long-term, major, and adverse.

**TABLE 6. OTHER PROJECTS AND PLANS AFFECTING COASTAL PROCESSES**

<b>Category of Action/Action</b>	<b>Effects on Dunes</b>
<i>Past Actions</i>	
Creation of artificial dunes	Creation of man-made dunes on Ocracoke Island that are higher and steeper than natural barrier island dunes. Total area of island is approximately 6,144 acres (9.6 square miles).
Construction of NC-12 after Hurricane Isabel	Paving of approximately 12 miles (approximately 36 acres) of backdunes along the full length of Ocracoke Island.
Construction of Day Use Area	Paving of approximately (1.2 acres) of backdunes.
Construction of Ramps 68, 70 and 72	Excavation through artificial dunes at three locations in the primary and backdune areas.
Construction of NPS Campground	Partial clearing and partial paving of an approximately 16 acre backdune area.
Construction of seven bridges project by North Carolina Department of Transportation	Replacement of seven bridges on the island in backdune areas, with no increase in impervious surface over existing conditions.
<i>Ongoing and Reasonably Foreseeable Future Actions</i>	
Construction of helipad adjacent to park boundaries	Paving of an approximately 1 acre backdune area.
Ocracoke Lighthouse improvement project by the NPS and Outer Banks Lighthouse Society	Clearing and partial paving of an unknown area of backdune habitat.
Partnering for trolley system/expansion of access to Ocracoke Lighthouse	Unknown amount of paving at the Ocracoke lighthouse to increase pedestrian access.
Offshore sand resources program the Outer Banks Task Force and North Carolina Geological Survey	An immediate proposed action is to reconstruct and revegetate dunes on the island. This will continue the trend of dune stabilization and artificial dune creation on Ocracoke island. Dunes will continue to grow higher and steeper and will be relatively stable until a major storm occurs.

*Conclusion*

Alternative A would not change the existing coastal processes nor would it contribute to the overall localized, long-term, major, adverse effects of other past, ongoing, and future plans, projects and activities on coastal processes.

There would be no impairment of coastal processes – dunes resulting from park actions taken under Alternative A.

*Impacts of Alternative B*

The alignment of the multi-use trail under this alternative has been developed to be consistent with the Park’s General Management Plan (1981, 1984b). The trail would be located primarily in the vegetated

sand flats unit, where NC-12 and other facilities are located; two short segments of boardwalk would be constructed. Furthermore, the trail would be constructed using best management practices to minimize impacts on the dune system and wetlands in the project area.

From the Village of Ocracoke/Park boundary to Ramp 70, the multi-use trail would be located in the existing grassy swale between NC-12 and tidal marsh. Establishment of the trail in this area would have no impact on coastal processes.

From Ramp 70 north to the NPS Campground (2¼ miles), the multi-use trail would be located between the backdune and shrub thicket and approximately 330 to 660 feet to the east of NC-12, depending on the location along the alignment. The trail as established will sit back between 275 feet (at its nearest point) to 495 feet (at its furthest point) from the first line of stable natural vegetation on the ocean beach.

Under this alternative, minimization of the acreage of backdune impacted by establishment of the trail was achieved. Of the 2¼ mile trail located between the backdune and shrub thicket, only ½ mile would have to be located in an area above the 7 foot elevation contour and in an area with a slope greater than 5%; this segment is located immediately north of Ramp 70 and would be boardwalk (Table 7; Figure 4). The boardwalk segment would be constructed at a height that would allow natural coastal processes to continue unimpeded. Construction techniques specific to boardwalk construction are described in Chapter 2.

The remaining 1¾ miles would be located in the vegetated sand flats or shrub thicket (Figure 4); a short segment (105 feet long) would be boardwalk over the shrub thicket wetland adjacent to the southwest corner of the NPS Day Use Area parking lot. The asphalt-paved segments of the trail would be underlain by a gravel base and have 2 foot-wide shoulders constructed of pervious materials on either side. This will allow stormwater to be captured as it runs off the paved trail and allowed to infiltrate on the 2 foot-wide shoulder, minimizing the potential for erosion to occur in the dunes. Upon completion of the trail, the remaining cleared area on either side of the pavers would be replanted with native vegetation and allowed to grow over the long term. Based on these features, the effects of construction of the proposed action were estimated as summarized in Table 7.

A total of approximately ¾ acre of backdune in the project corridor would be temporarily disturbed by construction but would be replanted with native vegetation following construction. This ¾ acre was calculated by multiplying the length of boardwalk needed to span the backdune (¼ mile or 1320 feet) by the width of the construction corridor (25 feet). Of the ¾ acre of temporarily disturbed backdune, 0.42 acre would be affected in the long-term due to the installation of the trail.

A total of approximately 0.06 acre of wetland in the project corridor would be temporarily disturbed by construction but would be replanted with native vegetation following construction. This 0.06 acre was calculated by multiplying the length of boardwalk needed to span the wetland (105 feet) by the width of the construction corridor. Of the 0.06 acre of temporarily disturbed wetland, 0.03 acre would be affected in the long-term due to the installation of the trail.

**TABLE 7. SHORT- AND LONG-TERM DISTURBANCE ESTIMATE FOR CONSTRUCTION OF THE MULTI-USE TRAIL UNDER ALTERNATIVE B**

Type of Affect	Length and Area Affected	Dune Effects Assessment		
		Length (Miles)	Length (Feet)	Area (Acres)
<i>Short-term Effects of Clearing and Construction</i>				
	Total Length and Area of 25 foot-wide Construction Corridor	3.25	17,160	9.8
	Area to be Occupied by 14 foot-wide Trail	3.25	17,160	5.5
	Area to be Restored	3.25	17,160	4.3
<i>Long-term Effects of Trail Installation</i>				
	Paved Vegetated Sand Flat Segments	2.98	15,734	5.04
	Boardwalk Backdune Segment	0.25	1,320	0.42
	Boardwalk Wetland Segment	0.02	105	0.03

The primary potential effect of placing a hard-surfaced trail between the backdune and shrub thicket area is the physical presence of the trail over the long term, and the resulting potential effects on sand movement and dune structure. Dunes are highly dynamic and changing systems, and the blocking of sand movement by any structure has a potential for interfering with these processes. Except for the boardwalk section, the trail would be located below the 7 foot contour (generally less than 5% slope), which would minimize potential effects on dune stability in this area as a result of the presence of the trail. The boardwalk would also minimize potentially adverse effects on dune stability in the more steeply sloping area seaward of the 7-foot contour.

The project would create a total of 5.5 acres new impervious surface between the backdune and shrub thicket area that would result in increased stormwater runoff. This has a potential to increase soil erosion and to cause dune destabilization. However, the pervious materials used on the trail shoulder would minimize these effects by allowing the stormwater to percolate into the sands gradually.

During major storms such as hurricanes, overwash could cause destruction of the proposed trail and/or burial and distribution of broken fragments of asphalt or other construction materials (i.e., treated lumber from the boardwalk pilings and other materials) in the area. Depending on the storm, any of the roads, buildings and other infrastructure on the island could be damaged. This could spread construction materials such as asphalt and treated lumber into the surrounding area, resulting in the introduction of contaminants into the surrounding wetlands or estuarine waters.

Overall, the proposed action would be located to avoid and minimize potential adverse effects on coastal processes. In addition, only 0.09% of the total area of the island would be affected, and the portion of the trail greater than 5% slope would be boardwalk. Implementation of Alternative B would have localized and detectable effects on dune structure and sand distribution in the long-term, but these would be of minor consequence. The overall effects of Alternative B on coastal processes – dunes are therefore estimated be localized, short- and long-term, moderate, and adverse.

### *Cumulative Impacts*

The combined effects of past, ongoing and future dune enhancement and creation programs would be as described for Alternative A. Effects would be long-term, major and adverse effect on coastal processes – dunes.

Implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative long-term, moderate, and adverse impacts on coastal processes - dunes.

### *Conclusion*

The proposed action would be located between the backdune and shrub thicket area of the island to avoid and minimize potential adverse effects to dune processes. One ¼ mile-long segment that is 14 feet wide (18,480 square feet or 0.42 acres) would be boardwalk on the backdune. Construction and maintenance of the trail would have detectable effects on dune structure and sand distribution in the long-term, but these would be of minor consequence. The overall effects of Alternative B on coastal processes – dunes are estimated to be localized, short- and long-term, moderate, and adverse.

Implementation of Alternative B would contribute an imperceptible, adverse increment to the cumulative long-term, moderate, and adverse impacts on coastal processes - dunes.

There would be no impairment of coastal processes – dunes resulting from park actions taken under Alternative B.

### ***Impacts of Alternative C, the Preferred Alternative***

The alignment of the multi-use trail under this alternative has been developed to be consistent with the Park's *General Management Plan* (1981, 1984b). The entire length of the new trail would have a asphalt-paved surface. Construction techniques specific to trail construction are described in Chapter 2.

The trail would be located primarily in the vegetated sand flats unit, where NC-12 and other facilities are located. Two short segments of the trail would be constructed on the backdune. Furthermore, the trail would be constructed using best management practices to minimize impacts on the dune system and avoid wetlands in the project area.

From the Village of Ocracoke/Park boundary to Ramp 70, the multi-use trail would be located in the existing grassy swale between NC-12 and tidal marsh. Establishment of the trail in this area would have no impact on coastal processes.

From Ramp 70 north to the NPS Campground (2¾ miles), the multi-use trail would be located between the backdune and shrub thicket and approximately 330 to 660 feet to the east of NC-12, depending on the location along the alignment. The trail as established will sit back between 275 feet (at its nearest point) to 495 feet (at its furthest point) from the first line of stable natural vegetation on the ocean beach.

Under this alternative, avoidance of wetland impacts was achieved by siting longer segments of the trail on the backdune as compared to Alternative B. Minimization of shrub thicket impacted by establishment of the trail was also achieved. Of the 2¼ mile trail located between the backdune and shrub thicket, 1 mile would have to be located in an area above the 7 foot elevation contour and in an area with a slope greater than 5%. There are two segments where alignment of the trail is on the backdune: the ½ mile segment from Ramp 70 to the NPS Day Use Area, and the ½ mile segment from the NPS Day Use Area north (Figure 5). The remaining 1¼ mile would be located in the vegetated sand flats.

The asphalt-paved trail would be underlain by a gravel base and have 2 foot-wide shoulders constructed of pervious materials on either side. This will allow stormwater to be captured as it runs off the paved trail and allowed to infiltrate on the 2 foot-wide shoulder, minimizing the potential for erosion to occur in the dunes. Upon completion of the trail, the remaining cleared area on either side of the pavers would be

replanted with native vegetation and allowed to grow over the long term. Based on these features, the effects of construction of the proposed action were estimated as summarized in Table 8.

A total of approximately 3 acres (132,000 square feet) of backdune in the project corridor would be temporarily disturbed by construction but would be replanted with native vegetation following construction. This 3 acres was calculated by multiplying the length of trail spanning the backdune (1 mile or 5,280 feet) by the width of the construction corridor (25 feet). Of these 3 acres of temporarily disturbed backdune, 1.7 acres would be affected in the long-term due to the installation of the trail.

There would be no short- or long-term disturbance of wetlands in the project area under this alternative.

**TABLE 8. SHORT- AND LONG-TERM DISTURBANCE ESTIMATE FOR CONSTRUCTION OF THE MULTI-USE TRAIL UNDER ALTERNATIVE C**

Type of Affect	Length and Area Affected	Dune Effects Assessment		
		Length (Miles)	Length (Feet)	Area (Acres)
<i>Short-term Effects of Clearing and Construction</i>				
	Total Length and Area of 25 foot-wide Construction Corridor	3.25	17,160	9.8
	Area to be Occupied by 14 foot-wide Trail	3.25	17,160	5.5
	Area to be Restored	3.25	17,160	4.3
<i>Long-term Effects of Trail Installation</i>				
	Paved Vegetated Sand Flat Segments	2.25	11,880	3.8
	Paved Backdune Segments	1	5,280	1.7

The primary potential effect of placing a hard-surfaced trail between the backdune and shrub thicket area is the physical presence of the trail over the long term, and the resulting potential effects on sand movement and dune structure. Dunes are highly dynamic and changing systems, and the blocking of sand movement by any structure has a potential for interfering with these processes. Except for the 1 mile-long segment on the backdune, the trail would be located below the 7 foot contour (generally less than 5% slope), which would minimize potential effects on dune stability in this area as a result of the presence of the trail.

The project would create approximately 5.5 acres of new impervious surface between the backdune and shrub thicket area that would result in increased stormwater runoff. This has a potential to increase soil erosion and to cause dune destabilization. However, the pervious pavers located on each side of the trail would minimize these effects by allowing the stormwater to enter the soil gradually.

During major storms such as hurricanes, overwash could cause destruction of the proposed trail and/or burial and distribution of broken fragments of asphalt or other construction materials (i.e., treated lumber from the boardwalk pilings and other materials) in the area. Depending on the storm, any of the roads, buildings and other infrastructure on the island could be damaged. This could spread construction materials such as asphalt and treated lumber into the surrounding area, resulting in the introduction of contaminants into the surrounding wetlands or estuarine waters.

Overall, the proposed action would be located to avoid adverse impacts to wetlands and minimize adverse effects on dunes. In addition, only 0.09% of the total area of the island would be affected, and the portion

of the trail greater than 5% slope would be limited to 1 mile. Implementation of Alternative C would have detectable effects on dune structure and sand distribution, but these would be of minor consequence. The overall effects of Alternative C on coastal processes – dunes are therefore estimated to be localized, long-term, moderate, and adverse.

### *Cumulative Impacts*

The combined effects of past, ongoing and future dune enhancement and creation programs would be as described for Alternative A. Effects would be long-term, major and adverse effect on coastal processes – dunes.

Implementation of Alternative C would contribute an imperceptible, adverse increment to the cumulative scenario. The overall cumulative effects would be localized, long-term, moderate, and adverse.

### *Conclusion*

The proposed action would be located between the backdune and shrub thicket area of the island to avoid adverse impacts on wetlands and minimize adverse effects to dune processes. Construction and maintenance of the trail would, however, have detectable effects on dune structure and sand distribution, but these would be of moderate consequence. The overall effects of Alternative C on coastal processes – dunes – are therefore estimated to be localized, long-term, moderate, and adverse.

When the adverse effects of other past, ongoing, and future plans, projects and activities affecting coastal processes – dunes - are combined with actions under Alternative C, the resulting cumulative effects would be localized, long-term, moderate, and adverse.

There would be no impairment of coastal processes – dunes resulting from park actions taken under Alternative C.

## **FLOODPLAINS**

### **Affected Environment**

Due to the low topography, the entire project area on Ocracoke Island is located within the 100-year flood zone and is subject to inundation during extreme storm events. Elevations in the immediate vicinity of the project corridor ranges from sea level to 22 feet above sea level. The primary dune elevation in the project corridor is as much as 22 feet above sea level, while the secondary dune ranges in elevation from 8-14 feet above sea level.

Base flood elevations in the project area range 6-8 feet. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps show that the entire project area is within 100-year-flood floodplain (Appendix C). Between the NPS Campground and Ramp 70, the proposed trail would be located within the “VE” flood zone, where the VE flood zone is defined as areas subject to inundation by the 1% annual chance flood event with additional hazards due to storm-induced velocity wave action. The 1% annual chance flood is defined as the flood having a 1% chance of being equaled or exceeded in any given year. This is the regulatory standard also referred to as the “100-year flood.” Base Flood Elevations derived from detailed hydraulic analyses apply. For Ocracoke Island, the base flood elevation is 8 feet above sea level. Between Ramp 70 and the Seashore/Village of Ocracoke boundary, the proposed trail would be located in the “AE” flood zone, where the AE flood zone is defined as areas subject to inundation by the 1% annual chance flood event, as determined by detailed methods. For Ocracoke Island, base flood elevations in this zone are 6-7 feet above sea level.

The enhanced dune system would continue to provide protection of backdune areas from flooding during smaller storms. Eventually, however, a major storm would occur and flood the area. Since the entire

island is located in the 100-year floodplain, it would be subject to periodic flooding in the VE and AE Zones assigned by the Federal Emergency Management Agency. There is a 1% chance that such an event would be equaled or exceeded in any given year. For Zone VE, this probability would exist for the area between the NPS Campground and the Ramp 70. For Zone AE, this probability would exist for the area between the Ramp 70 and the NPS/Village of Ocracoke boundary.

During such an event, the backdune area could potentially be washed completely away or greatly reduced, depending on the nature of the individual storm. The main effect on dunes would be associated with overwash. The effects would be similar to those produced by Hurricane Isabel in 2003, in which a 6 mile section of the island was leveled. This is a natural process that occurs on all barrier islands during major storms because of the powerful forces involved.

## **Environmental Consequences**

### ***Regulations and Policies***

Statement of Findings for Floodplains (Appendix C) provides a summary of floodplain regulatory requirements.

### ***Methods***

Effects of construction on floodplains were estimated by determining where the proposed trail would be located in relation to the different categories of 100-year flood zones, and qualitatively estimating the effects on floodplain functions and values, including the ability of the floodplain to convey floodwaters and the potential effects on the contribution of the project to increasing flood potential.

Effects of operation of the proposed multi-use trail on floodplain functions and values were assessed by qualitatively defining the nature of potential effects stormwater runoff resulting from the paved surface of the trail. These effects could include increased soil erosion and potential introduction of chemical contaminants into the soils adjacent to the trail. In addition, the potential effects of introduction of asphalt and/or treated lumber into the floodplain and surrounding area during storm events are described qualitatively.

The intensity of potential effects on floodplains was evaluated using the following system of impact thresholds:

**Negligible:** There would be no change in the ability of a floodplain to convey floodwaters, or changes in its values and functions. Actions taken would not contribute to a flood.

**Minor:** Changes in the ability of a floodplain to convey floodwaters, or changes in its values and functions, would be measurable. Actions taken would not contribute to flood potential. No mitigation would be needed.

**Moderate:** Changes in the ability of a floodplain to convey floodwaters, or changes in its values and functions, would be measurable. Actions taken could contribute to flood potential. The impact could be mitigated by modification of proposed facilities in floodplains.

**Major:** Changes in the ability of a floodplain to convey floodwaters, or changes in its values and functions, would be measurable and, widespread. Actions taken would contribute to flood potential. The impact could be mitigated by modification of proposed facilities in floodplains, and the success of mitigation measures could not be assured.

Impact duration is described as either short- or long-term. Short-term impacts would be recognized and measurable for less than one year. Long-term impacts would be recognized and measurable for more than one year.

### ***Impacts of Alternative A, the No Action Alternative***

Under Alternative A, the proposed multi-use trail would not be constructed and floodplains on Ocracoke Island would remain as described. Therefore, Alternative A would have no impact on floodplains in the project area.

### ***Cumulative Impacts***

The processes summarized in the cumulative analysis for coastal processes also apply to effects on floodplains, since coastal processes are interrelated. Past dune construction and stabilization activities and any proposed new dune construction and stabilization activities would have the consequences of altering flood regimes and natural processes. However, these actions would not contribute to flood potential. Alternative A would not change these effects. When the adverse effects of other past, ongoing, and future plans, projects and activities affecting floodplain values and functions are considered, the resulting cumulative effects of Alternative A would be long-term, minor, and adverse.

### ***Conclusion***

There would be no construction and no effect to the park's floodplain function or values under Alternative A.

When the adverse effects of other past, ongoing, and future plans, projects and activities affecting floodplain functions and values and flood potential are considered, the resulting cumulative effects of Alternative A would be long-term, minor, and adverse.

There would be no impairment of floodplain functions and values resulting from park actions taken under Alternative A.

### ***Impacts of Alternative B***

The proposed action would be placed in a Class III Action area, in accordance with *DO #77-2: Floodplain Management* (NPS 2003b). Class III Actions include Class I or Class II Actions in high hazard areas, which include coastal high hazard areas and areas subject to flash flooding. In high hazard areas, picnic facilities, scenic overlooks, foot trails, and associated day-time parking facilities are allowed to be placed within the 100-year floodplain, but these facilities must contain signs informing visitors of flood risk and suggested actions in the event of flooding. Additional levels of flood protection are also required to be considered. For other activities, Class III Actions are subject to the floodplain policies and procedures if they lie within the extreme floodplain.

A Floodplain Statement of Findings summarizing the effects of the proposed action on floodplains is included as Appendix C. The following is a summary of the effects of Alternative B on floodplains.

The construction and maintenance of the proposed action would temporarily affect 9.8 acres of the floodplain and would have a limited effect on the ability of the floodplain to convey floodwaters, or change its values and functions. The actions taken for the construction and maintenance of the trail would not contribute to flood potential. The proposed action would result in placement of approximately 5.5 acres of a hard-surface trail in the 100-year floodplain of Ocracoke Island. Since the entire island is located within the 100-year floodplain, avoidance of these effects is not possible. The affected area represents 0.09% of the Island's total 6,144 acres (9.6 square miles).

The proposed development of a trail in a high hazard area is classified as a Class III Action, in accordance with *DO #77-2*. During major storms, sections of the dunes could be severely eroded and washed away. The proposed action would not make the island more vulnerable to the effects of major storms.

In view of the limited anticipated effects, the proposed action is estimated to have a localized, long-term, minor, adverse impact on floodplain functions and values of Ocracoke Island.

### *Cumulative Impacts*

As described for Alternative A, other projects and plans have resulted in long-term, minor, adverse impacts on floodplain functions and values by hindering natural barrier island processes and the ability of the floodplain to convey floodwaters.

Alternative B would have limited effects of floodplains and values because of the small project footprint and location of the trail. Alternative B would contribute an imperceptible increment to the cumulative impact scenario. When the adverse effects of other past, ongoing, and future plans, projects and activities affecting floodplains are combined with actions under Alternative B, the resulting cumulative effects would be localized, long-term, minor, and adverse.

### *Conclusion*

The proposed action would result in placement of approximately 5.5 acres of a hard-surface trail in the 100-year floodplain of Ocracoke Island. This small relative area of impervious surface would have a limited effect on the conveyance of floodwaters and would not contribute to flood potential on Ocracoke Island. The effects of the proposed action on floodplain functions and values would be localized, long-term, minor, and adverse.

Alternative B would contribute an imperceptible increment to the cumulative impact scenario. When the adverse effects of other past, ongoing, and future plans, projects and activities affecting floodplains are combined with actions under Alternative B, the resulting cumulative effects would be localized, long-term, minor, and adverse.

There would be no impairment of floodplain functions and values resulting from park actions taken under Alternative B.

### ***Impacts of Alternative C, the Preferred Alternative***

The impacts of Alternative C on floodplains would be the same as under Alternative B.

### *Cumulative Impacts*

As described for Alternative A and B, other projects and plans have resulted in localized, long-term, minor, adverse impacts on floodplain functions and values by hindering natural barrier island processes and the ability of the floodplain to convey floodwaters.

Alternative C would have the same impact on floodplain functions and values as under Alternative B. Alternative C would contribute an imperceptible increment to the cumulative impact scenario. When the adverse effects of other past, ongoing, and future plans, projects and activities affecting floodplains are combined with actions under Alternative C, the resulting cumulative effects would be localized, long-term, minor, and adverse.

### *Conclusion*

The impacts of Alternative C on floodplains in the project area and the Seashore would be the same as under Alternative B.

There would be no impairment of floodplain functions and values resulting from park actions taken under Alternative C.

## WETLANDS

### Affected Environment

Wetlands are highly productive, valuable natural resources that provide important habitat for fish and wildlife, protect and maintain water quality, balance groundwater recharge and discharge, and prevent flooding and erosion. The NPS approach for management of wetlands is provided under *DO #77-1: Wetland Protection* (NPS 2008b).

This section describes how the NPS and other agencies define wetlands and provides a summary of the types, location, and acreages of wetlands in the project area. A summary of the ecological functions and associated values of wetlands to man is also provided. This analysis provides a basis for showing how wetlands would be impacted by construction and operation of the proposed action, and how effects on wetlands were avoided and minimized.

### Definition of Wetlands

The NPS has adopted the broad definition of wetlands employed by the U.S. Fish and Wildlife Service, which defines wetlands as:

...lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes:

- (1) at least periodically, the land supports predominantly hydrophytes;
- (2) the substrate is predominantly undrained hydric soil; and
- (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of the year. (Cowardin et al 1979)

The NPS requires that at least hydrology be present for an area to be defined as a wetland, whereas the U.S. Army Corps of Engineers requires indicators of all three parameters to be present (USACOE 1978). The State of North Carolina definition of wetlands is strictly defined as “Marshland” upon which specific wetland plant species grow (G.S. 113-229(n)(3) in the Coastal Area Management Act of 1974). Marshes where some, not necessarily all, of these species grow are considered Marshland: smooth or salt water cordgrass (*Spartina alterniflora*), black needlerush (*Juncus roemerianus*), glasswort (*Salicornia* spp.), salt grass (*Distichlis spicata*), sea lavender (*Limonium* spp.), bulrush (*Scirpus* spp.), saw grass (*Cladium jamaicense*), cattail (*Typha* spp.), salt-meadow grass (*Spartina patens*), and salt reed-grass (*Spartina cynosuroides*).

### Types of Wetlands Present in the Project Area

The following types of wetlands are present in the project area:

**Salt/Brackish Marsh.** Any salt marsh or other marsh subject to regular or occasional flooding by tides, including wind tides (whether or not the tide waters reach the marshland areas through natural or artificial watercourses), as long as this flooding does not include hurricane or tropical storm waters. Coastal wetland plant species include: smooth cordgrass; black needlerush; glasswort; salt grass; sea lavender; salt marsh bulrush; saw grass; cattail; salt meadow cordgrass; and big cordgrass. These wetlands are highly productive and export large amounts of decaying plant material to adjacent estuarine areas where it is incorporated into the detritus food chain. They also protect shorelines against erosion, help filter pollutants and maintain water quality, and are critical nursery and spawning areas for many species of commercially important fish and shellfish. The assessment showed that salt/brackish marshes wetlands present within the project area are of Exceptional Functional Significance.

**Estuarine Shrub/Scrub.** Any shrub/scrub dominated community subject to occasional flooding by tides, including wind tides (whether or not the tide waters reach these areas through natural or artificial

watercourses). Typical species include wax myrtle (*Morella cerifera*) and eastern red cedar (*Juniperus virginiana*). This community helps dampen the effects of flooding, helps to maintain groundwater balance, and is an important wildlife habitat in the dune system. The assessment showed that estuarine shrub/scrub wetlands present within the project area are of Exceptional Functional Significance.

*Cutover Wetland.* These are areas for which satellite imagery indicates a lack of vegetation in 1994. These areas are likely to still be wetlands; however, they have been recently cut over. Vegetation in these areas may be regenerating naturally. Functions and values of these wetlands are similar to estuarine shrub-scrub habitats.

*Cleared Wetland.* These are areas of hydric soils for which satellite imagery indicates a lack of vegetation in both 1988 and 1994. These areas are likely to no longer be wetlands. These areas support some vegetation which is important in maintaining dune stability.

Wetlands provide a wide variety of ecological functions that are of value to man. The specific approach used by the NPS to assess functions and associated values, of wetlands in the vicinity of the proposed action is described in the sections that follow.

### ***Location and Acreages of Wetlands***

Wetlands in and adjacent to the project corridor were identified using available information. An initial map of wetlands in the area along the corridor was created in a geographical information system using available State of North Carolina Division of Coastal Management maps, National Wetland Inventory maps, Natural Resource Conservation Service soil maps, and available aerial photographs.

Using the initial set of maps, field surveys were conducted in the fall of 2007 by qualified NPS scientists to assess the occurrence of wetlands along the project corridor and within the preliminary construction footprint. The objective was to identify wetlands that could potentially be affected by the proposed multi-use trail and to provide a basis for achieving avoidance and minimization during the project planning phase.

Based on the initial mapping effort, it was determined that NPS wetlands could be effectively demarcated by the 4 foot topographic contour line, and because it is a conservative approach and would result in the incorporation of both the U.S. Army Corps of Engineers designated wetlands and the State of North Carolina designated wetlands. Specifically, it was estimated that all areas of the corridor located at or below the 4-foot contour would meet the hydrology requirement to be considered NPS wetlands. This was verified in the field by two qualified NPS scientists and the field representative of the U.S. Army Corps of Engineers during the course of several surveys along the project corridor. More detailed mapping of wetlands was also required for wetlands located within 30 feet of the proposed 25 foot-wide construction corridor. This method was applied, and the results were incorporated into the Geographic Information System maps.

## **Environmental Consequences**

### ***Regulations and Policies***

Executive Order (EO) 11990: "Protection of Wetlands" (42 Fed. Reg. 26961) was issued by President Carter in 1977 in order "...to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative...."

EO 11990 was issued in furtherance of the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321 et seq). The policies, requirements, and standards in DO #77-1: Wetland Protection (NPS 2002), as implemented under the procedures outlined in NPS Procedural Manual #77-1:

Wetland Protection (NPS 2008b), supplement and must be used in conjunction with the Department of the Interior procedures and policies for implementing EO 11990 (520 DM 1); the Council on Environmental Quality (CEQ) Implementing Regulations for NEPA (40 CFR Part 1500); the Department of the Interior policies and procedures for complying with NEPA (516 DM 1-7, 12); and NPS NEPA procedures (DO #12 and the DO #12 Handbook).

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers issues permits for activities that result in the discharge of dredged or fill material into waters of the United States, including wetlands. Regulated activities range from depositing fill for building pads or roads to discharges associated with mechanized landclearing. Although portions of the Corps of Engineers 404 permit procedures (33 CFR 320-330) are similar to some of the requirements found in DO #77-1 and these implementing procedures, there are significant differences in scope that warrant a separate NPS wetland protection process.

In addition to the above, the NPS must also assure compliance with:

- 1) Coastal Zone Management Act, which requires that NPS actions be consistent, to the maximum extent practicable, with approved state coastal zone management programs;
- 2) Section 10 of the Rivers and Harbors Act, which requires Department of the Army permits for work in navigable waters;
- 3) Fish and Wildlife Coordination Act;
- 4) Wild and Scenic Rivers Act;
- 5) Endangered Species Act;
- 6) National Historic Preservation Act; and
- 7) other relevant laws and regulations governing actions in wetlands and other aquatic environments.

### ***Methods***

Impacts of project construction on wetlands were estimated by calculating the wetland acreage within the 25 foot-wide construction corridor for the 3¼ mile-long trail. Effects of operation were assessed by estimating the amount and quality of stormwater runoff that might enter wetlands adjacent to the project corridor, based on the total surface area and types of materials to be used.

The intensity of potential effects on wetlands was evaluated using the following system of impact thresholds:

**Negligible:** Wetlands would not be affected or the effects would be at or below the level of detection. There would be no measurable or perceptible effects on wetland plant and animal populations, soils, or hydrology.

**Minor:** Effects on wetland plant and animal populations, soils, or hydrology would be measurable or perceptible. Mortality of individual plants and animals might occur, but the viability of wetland populations and habitats would not be affected and the community, if left alone, would recover. Changes in wetland soils or hydrology might occur but if left alone, the wetland would recover in time.

**Moderate:** A readily measurable change in abundance, distribution, quantity, or quality of populations of plants and animals would occur. Readily measurable changes in soils or hydrology would occur. The wetland would be slow to recover from these changes, or might not recover fully over time. Mitigation measures would be necessary to offset adverse effects, and would likely be successful.

**Major:** Effects on wetland plant and animal populations, soils, or hydrology would be readily apparent, and measurable. Extensive mitigation would be needed to offset adverse effects, and the success of mitigation measures could not be assured.

Impact duration is described as either short- or long-term. Short-term impacts would be recognized for less than one year, and recovery would occur within one year. Long-term impacts would be recognized for more than one year, and recovery would take more than one year.

### ***Impacts of Alternative A, the No Action Alternative***

Under Alternative A, the project would not be constructed. The wetlands on Ocracoke Island would continue to exist in their present state and would continue to exist in the created and stabilized dune system. There would be no affect to the park's wetland plant and animal populations, soils, or hydrology.

### ***Cumulative Impacts***

The primary effect of past, ongoing and reasonably foreseeable actions on wetlands on the island has been the establishment of a complex, vegetated dune system and the resulting establishment of high-quality wetlands inland from the backdune. These conditions would continue under Alternative A. When the beneficial and adverse effects of other past, ongoing, and future plans, projects and activities affecting wetlands are considered, the resulting cumulative effects of Alternative A would be localized, long-term, major, and beneficial.

### ***Conclusion***

Under Alternative A, wetlands on Ocracoke Island would not be affected and would continue to exist in their present high quality state.

When the beneficial and adverse effects of other past, ongoing, and future plans, projects and activities affecting wetlands are considered, the resulting cumulative effects of Alternative A would be localized, long-term, major, and beneficial.

There would be no impairment of wetland functions and values resulting from park actions taken under Alternative A.

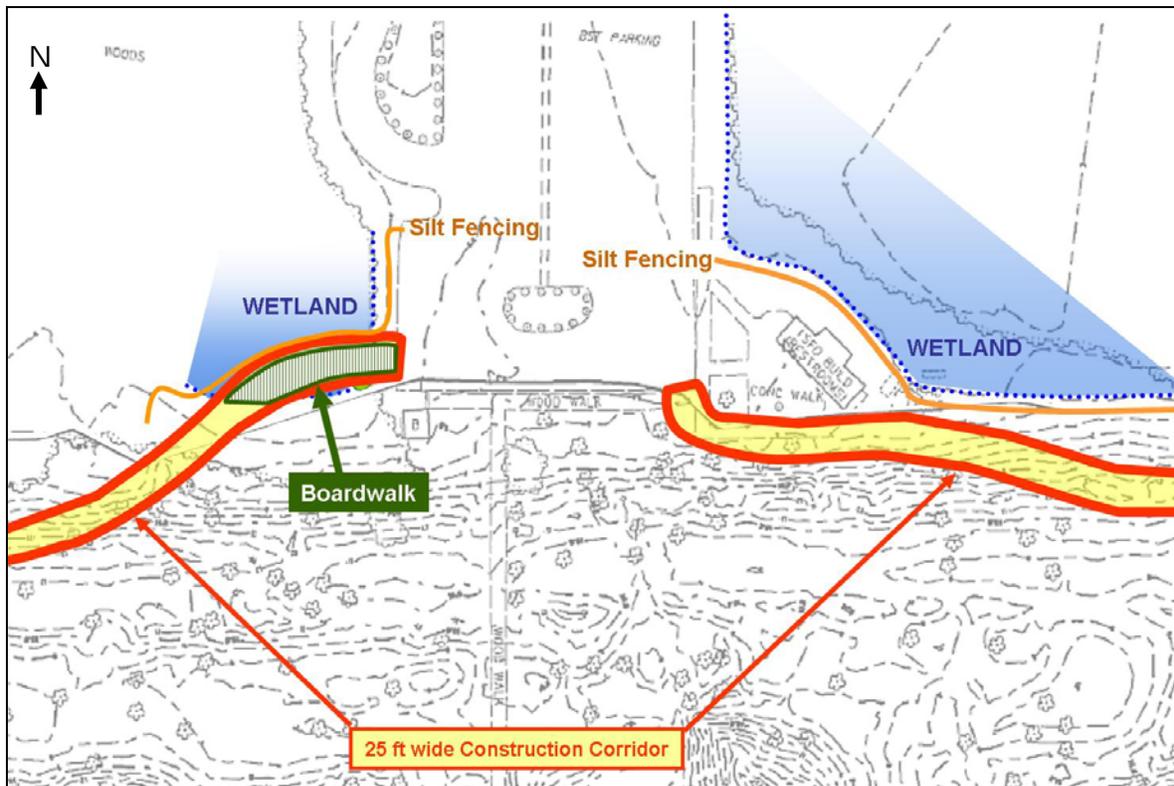
### ***Impacts of Alternative B***

Under this alternative, impacts to wetlands would be minimized rather than completely avoided along the entire 3¼ mile trail corridor. The proposed action therefore meets the requirements for avoidance and minimization as specified under the Section 404 (b)(1) guidelines (USEPA 2005). This has been achieved through early identification of wetlands along the corridor and shifting the alignment to avoid and minimize adverse impacts on wetlands. Also construction of a 14 foot-wide boardwalk for a distance of 0.02 over a wetland near the southwest corner of the NPS Day Use Area parking lot would minimize direct impacts on NPS wetlands. The boardwalk would span an area of 0.03 acres over the estuarine shrub/scrub wetland (Figure 8).

To minimize effects of the proposed action, the 14 foot-wide boardwalk supported by footings made of treated lumber would be constructed across this wetland. The main body of the boardwalk would be constructed using treated lumber or recycled lumber materials. As a result, the only effects on wetlands resulting from construction would be the temporary effects of limited clearing within the approximately 0.06 acre area, and permanent effects of filling associated with the boardwalk footings (estimated to be roughly 0.001 acre) (Table 7).

Construction of the boardwalk across this wetland would be further minimized using special techniques that would limit the need to clear wetland vegetation, as described in Chapter 2.

The wetland of interest was identified by the US Army Corps of Engineers as a wetland over which the US Army Corps of Engineers has jurisdiction. Proposed actions with the potential to adversely impact US Army Corps of Engineers jurisdictional wetlands on a barrier island would require a full Jurisdictional Determination and permit approval for any wetland filling activities. Therefore, a permit application to construct the boardwalk would be prepared and submitted to the US Army Corps of Engineers for review and permitting decision. The permit application would have to demonstrate that there is no other viable alternative alignment for construction of the trail in the vicinity of the wetland.



**FIGURE 8. BOARDWALK CONSTRUCTION OVER HIGH-QUALITY ESTUARINE SHRUB/SCRUB WETLAND ADJACENT TO DAY USE AREA**

Extensive NPS wetlands also occur along much of the corridor in the vicinity of the proposed action. During construction, best management practices would be used to minimize the potential for effects of soil erosion on wetlands within 30 feet of the construction corridor.

During operation of the proposed trail, the creation of 5.5 acres of paved and boardwalk area along the corridor would produce stormwater runoff that would have a potential to affect adjacent wetlands by causing erosion or by introduction of contaminants. The potential effects of erosion would be minimized by installation of 2 feet of pervious shoulders on either side of the asphalt portion of the trail. The shoulders allow stormwater to infiltrate directly into the sand on either side of the trail, minimizing potential effects on adjacent wetlands. Effects of contaminated stormwater runoff on adjacent wetlands would be expected to be negligible because the only motorized vehicles permitted on the trail would be maintenance equipment and emergency response vehicles, thereby limiting runoff of grease, oil and trace metals normally associated with motorized traffic.

Since a high degree of avoidance and minimization have been achieved in the planning stage and there would limited motorized vehicles would be used on the trail, the construction and operation of proposed action would have localized, short- and long-term, minor, adverse effects on wetlands.

### *Cumulative Impacts*

The continued development of the complex and stable, vegetated dune system on the island has created conditions that have allowed for the development of the existing high-quality wetlands. Dune development has been the primary factor contributing to the presence of wetlands on the island, and this will continue to be the case in the future. A small number of wetlands have been filled as a result of past construction projects, and some wetlands are expected to be filled in the future.

Wetlands on the island are of the highest quality. However, the effects of past and future filling of these habitats for construction projects have and will affect a small portion of wetlands on the island. The adverse impacts associated with the trail have a negligible contribution to the cumulative effects of other past, ongoing, and future actions. Alternative B would contribute an imperceptible, adverse increment to the cumulative effects of long-term, major, beneficial impacts to wetlands.

### *Conclusion*

Because a high degree of avoidance and minimization was achieved in the planning stage, and because limited vehicles would be used on the trail, construction and operation of the proposed action would have localized, short- and long-term, minor, adverse effects on wetlands.

Alternative B would contribute an imperceptible, adverse increment to the cumulative effects of long-term, major, beneficial impacts to wetlands.

There would be no impairment of wetland functions and values resulting from park actions taken under Alternative B.

### ***Impacts of Alternative C, the Preferred Alternative***

Under this alternative, impacts to wetlands would be completely avoided along the entire 3¼ mile trail corridor. The proposed action therefore meets the requirements for avoidance as specified under the Section 404 (b)(1) guidelines (USEPA 2005). This has been achieved through early identification of wetlands along the corridor and shifting the alignment to avoid adverse impacts on wetlands.

Trail construction activities and best management practices would be employed to maximally protect wetlands in and within 30 feet of the construction corridor, as described in Chapter 2.

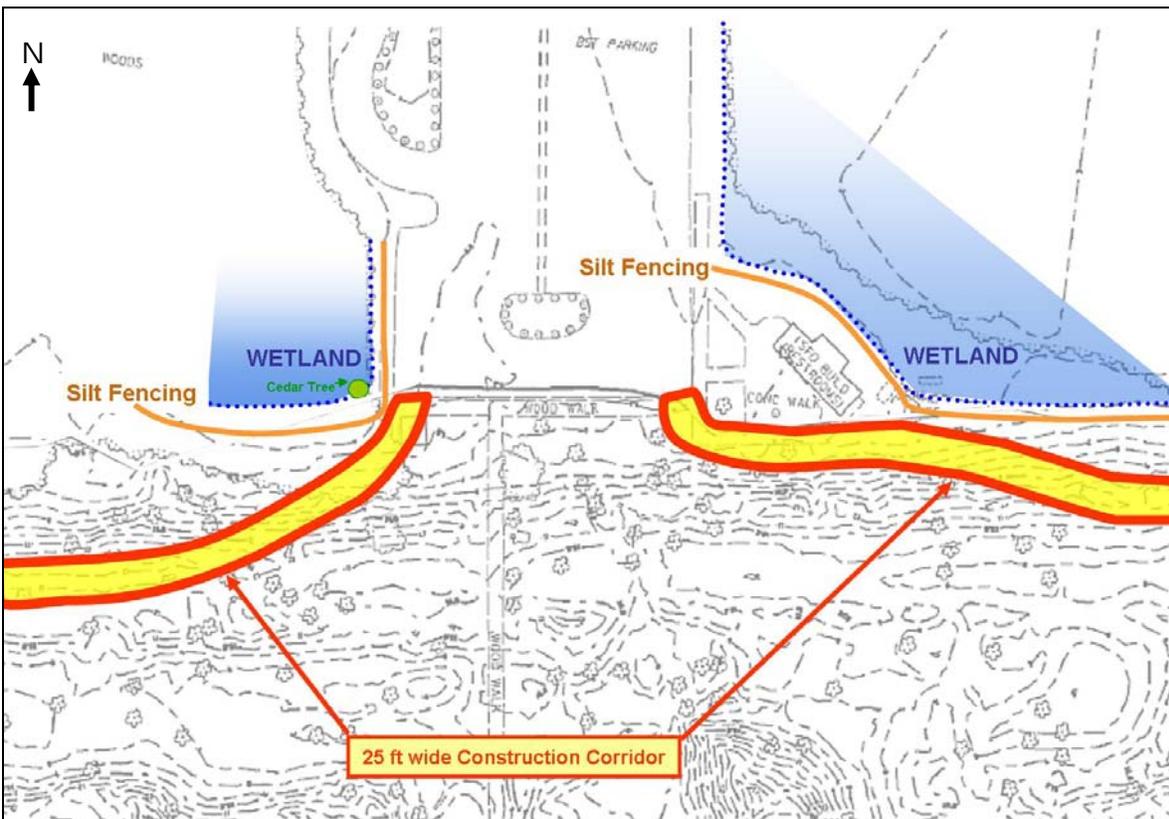
During operation of the proposed trail, the creation of 5.5 acres of paved area along the corridor would produce stormwater runoff that would have a potential to affect adjacent wetlands by causing erosion or by introduction of contaminants. The potential effects of erosion would be minimized by installation of 2 foot-wide pervious shoulders on either side of the asphalt portion of the trail. The shoulders allow stormwater to infiltrate directly into the sand on either side of the trail, minimizing potential effects on adjacent wetlands. Effects of contaminated stormwater runoff on adjacent wetlands would be expected to be negligible because the only motorized vehicles permitted on the trail would be maintenance equipment and emergency response vehicles, thereby limiting runoff of grease, oil and trace metals normally associated with motorized traffic.

Since a high degree of avoidance have been achieved in the planning stage and there would limited motorized vehicles would be used on the trail, the construction and operation of proposed action would have a localized, negligible impact on wetlands.

### *Cumulative Impacts*

The continued development of the complex and stable, vegetated dune system on the island has created conditions that have allowed for the development of the existing high-quality wetlands. Dune development has been the primary factor contributing to the presence of wetlands on the island, and this will continue to be the case in the future. A small number of wetlands have been filled as a result of past construction projects, and some wetlands are expected to be filled in the future.

Wetlands on the island are of the highest quality. However, the effects of past and future filling of these habitats for construction projects have and will affect a small portion of wetlands on the island. The adverse impacts associated with the trail have a negligible contribution to the cumulative effects of other



**FIGURE 9. AVOIDANCE OF HIGH-QUALITY ESTUARINE SHRUB/SCRUB WETLANDS ADJACENT TO DAY USE AREA**

past, ongoing, and future actions. When the beneficial and adverse effects of other past, ongoing, and future plans, projects and activities affecting wetlands are combined with actions under Alternative B, the resulting cumulative effects would be localized, long-term, major, and beneficial.

### *Conclusion*

Because a high degree of avoidance was achieved in the planning stage, and because limited vehicles would be used on the trail, construction and operation of the proposed action would have a negligible impact on wetlands.

The minor adverse effects of the proposed action would not measurably detract from the major, long-term, benefits generated by other projects and plans on the island. Overall cumulative effects would be localized, long-term, major, and beneficial.

There would be no impairment of wetland functions and values resulting from park actions taken under Alternative B.

## VEGETATION

### Affected Environment

This section provides a description of the major types of terrestrial vegetation that occur along the project corridor. The discussion is based on the results of a NPS survey along the project corridor, information presented in the seven bridges replacement environmental assessment, and other publications (NPS 2007; NCDOT 2007; NBS 1995).

The terrestrial vegetation on Ocracoke Island is typical for a barrier island in northeastern North Carolina. The vegetation occurs along gradients across the island from the ocean beach to the sound (Figure 7). Gradients are produced by a variety of factors, including slope, salt spray deposition, topography, soils, and degree of stabilization by dune vegetation (NBS 1995). A primary barrier dune system populated primarily by grass occurs immediately inside the beach. A line of secondary and tertiary dunes occurs landward of the primary dune. The backdune area is a gently sloping (less than 5%) transitional area of vegetated sand flats located behind the secondary and tertiary dunes. The backdune is vegetated by a mix of grasses, herbs, and patches of stunted woody shrubs. Closer to the inland, smaller dunes are populated by wooded areas if protected from salt spray and by grasses if not protected from salt spray. Salt marshes and lower energy beach habitats occur with mixed marsh and grass species between the small dunes and the sound. The proposed action area consists almost completely of the grassland flat vegetation community, which includes a mixed gradient of dune grasses, herbs, and woody species in shrub thickets encroaching towards the dunes. The NPS survey conducted in 2007 showed that the dominant plant species in the grassland flat is the sea oat (*Uniola paniculata*). Other grasses and herbaceous plants include those listed in Table 8.

The proposed action corridor also transitions through areas with stunted red cedar (*Juniperus virginiana*), wax myrtle (*Myrica cerifera*), yaupon (*Ilex vomitoria*) and false willow (*Baccharis angustifolia*). In wooded thickets, the rare bayberry (*Myrica pennsylvanica*) and southern buckthorn (*Bumelia tenax*) (NPS 2007). These areas would correspond to the maritime dry grassland and maritime shrub communities as defined in Schafale and Weakley (1990).

The NC DOT environmental assessment on the recent seven bridges project on Ocracoke Island (NCDOT 2007) defines maritime dry grasslands as a:

...dynamic barrier island community that occurs on overwash terraces behind or between dunes. They are subject to saltwater flooding during extreme storms, but are otherwise excessively drained at the surface. With dune stabilization and enhancement associated with development, this community may be invaded with shrub species and gradually succeed to a maritime shrub or forest community.

Vegetation is generally a moderate to dense cover of herbaceous species dominated by saltmeadow cordgrass. Other dominants include croton, salt marsh pink, and firewheel. Scattered woody vegetation typically includes yaupon, wax myrtle, earleaf, greenbrier and yucca. The maritime shrub community occurs on stabilized sand dunes, dune swales, and sand flats protected from salt water flooding. The sandy soils of these areas are generally poorly drained to excessively drained and may have a high water table. This community is characterized by its lower stature (canopy height is less than 16 feet) and being

more exposed to the effects of salt spray (NCDOT 2007). In these areas, vegetation is dominated by woody shrubs including wax myrtle, yaupon, groundsel-tree, Eastern red cedar, Southern red cedar, and stunted specimens of live oak. Other vegetation includes poison ivy, greenbrier species, Virginia creeper and wild grapes (NCDOT 2007).

The grassland and shrub vegetation trap and bind sand particles, stabilizing the dune system. This helps build the dunes and minimize erosion during storm events. During major storms in which overwash occurs. However, no dune in the project area would be fully protected from the effects of erosion and overwash.

**TABLE 8. GRASSES AND HERBACEOUS PLANTS WITH  
THE POTENTIAL TO OCCUR IN THE PROJECT AREA  
(NPS 2007)**

Common Name	Scientific Name
<b>Grasses</b>	
Bushy broomsedge	<i>Andropogon glomeratus</i>
Fingergrass	<i>Eustachys petraea</i>
Pink muhly	<i>Muhlenbergia filipes</i>
Seaside panicum	<i>Panicum amarum</i>
Saltmeadow cordgrass	<i>Spartina patens</i>
<b>Herbaceous Plants</b>	
Saltmarsh aster	<i>Aster subulatus</i>
Subulate-bracted aster	<i>Aster pilosus</i>
American searocket	<i>Cakile edentula</i>
Hedge bindweed	<i>Calystegia sepium</i>
Yellow thistle	<i>Cirsium horridulum</i>
Cottony golden aster	<i>Chrysopsis gossypina</i>
Beach tea	<i>Croton punctatus</i>
Fire wheel	<i>Gaillardia pulchella</i>
Bitterweed	<i>Helenium amarum</i>
Seaside pennywort	<i>Hydrocotyle bonariensis</i>
Tall goldenrod	<i>Solidago semipervirens</i>
Earleaf greenbrier	<i>Smilax auriculata</i>
Horse mint	<i>Teucrium canadense</i>
Poison ivy	<i>Toxicodendron radicans</i>
Dune bluecurl	<i>Trichostema</i> sp.

## Environmental Consequences

### *Methods*

The methods used for estimating the effects of construction on terrestrial vegetation are based upon acreages of potential effects (refer to summary table in the “Coastal Processes” analysis). The dunes in

the project corridor support two types of terrestrial vegetation - dune grasses and maritime shrub habitat. For the impact assessment, these two types were combined into a single classification – upland terrestrial vegetation - for making an approximate estimate of effects based on the length and width of the project corridor, and whether an area was paved or boardwalk.

Effects of maintenance/operation were assessed by qualitatively estimating the effects of stormwater runoff that might enter upland vegetation adjacent to the project corridor. Stormwater runoff has the potential to cause erosion in these areas, and also has the potential to introduce chemicals from asphalt or treated lumber.

The intensity of potential effects on vegetation was evaluated using the following system of impact thresholds:

**Negligible:** Individual native plants may occasionally be affected, but measurable or perceptible changes in plant community size, integrity, or continuity would not occur.

**Minor:** Effects on native plants would be measurable or perceptible. The natural function and character of the plant community would not be affected and, if left alone, would recover.

**Moderate:** A change would occur in the natural function and character of the plant community in terms of basic properties (e.g., growth, abundance, reproduction, distribution, structure, or diversity) but not to the extent that the basic properties of the plant community change.

**Major:** Effects on native plant communities would be readily apparent and would substantially and permanently change the natural function and character of the plant types.

Impact duration is described as either short- or long-term. Short-term impacts would be recognized for less than one year, and recovery would occur within one year. Long-term impacts would be recognized for more than one year, and recovery would take more than one year.

### ***Impacts of Alternative A, the No Action Alternative***

Under Alternative A, terrestrial vegetation on Ocracoke Island would continue to exist in its present state.

#### ***Cumulative Impacts***

The other projects and plans that have affected and will affect vegetation in the vicinity of the project are those identified in Table 6 (“Coastal Processes” cumulative analysis). The terrestrial vegetation on Ocracoke Island has developed on the man-made dune system, and will continue to be allowed to develop in the future. New planting programs will be implemented to further stabilize the man-made dunes. These activities would result in the continued growth of high quality upland terrestrial vegetation. This would have a moderate, long-term beneficial effect. A small amount of terrestrial vegetation has been eliminated in the past and would be eliminated in the future as a result of the various other proposed paving projects, but this would be a minor effect on vegetation when compared with the effects of dune creation and stabilization projects. The cumulative effects of past, ongoing and reasonable foreseeable future actions on terrestrial vegetation are estimated to be long-term, moderate, and beneficial. This artificial, man-made system is being perpetuated through the use of terrestrial vegetation that binds and stabilizes the artificial dune system.

Continued current management under Alternative A would make no contribution to the effects of these other projects and plans. Therefore, overall cumulative effects to vegetation would be localized, long-term, moderate, and beneficial.

#### ***Conclusion***

Under Alternative A, terrestrial vegetation on Ocracoke Island would continue to exist in its present state.

Continued current management under Alternative A would make no contribution to the effects of these other projects and plans. Therefore, overall cumulative effects to vegetation would be localized, long-term, moderate, and beneficial.

There would be no impairment of terrestrial vegetation resulting from park actions taken under Alternative A.

### ***Impacts of Alternative B***

A total of 9.8 acres of terrestrial dune vegetation in the corridor would be temporarily disturbed by construction. Vegetation within the 25-foot construction corridor would be crushed or eliminated by machinery during clearing of the area needed for the proposed trail. The trail would be constructed in the most protected part of the island that is stabilized by terrestrial vegetation. Because the majority of construction would occur in the gently sloping area (less than 5% slope) landward of the 7-foot contour, the potential for destabilization of the dunes and associated adverse effects on terrestrial vegetation would be minimized. This would occur primarily in the vegetated sand flats (8.13 acres) and minimally (0.76 acres) in the backdune or wetlands (0.06 acres). Establishment of the ½ mile-long segment of trail from the Village of Ocracoke to Ramp 70 would result in the removal of 0.85 acre of mown grassy swale parallel to the northbound lane NC-12.

Of the 9.8 acres temporarily disturbed, 4.3 acres would be allowed to recover and 5.5 acres would be altered in the long-term due to the installation of the trail. Of the 5.5 acres altered due to the trail, 5.04 acres would be paved and inhibit regrowth of vegetation and the remaining 0.46 acres would be boardwalk. Revegetation may occur naturally beneath the boardwalk segments. The area surrounding the trail would be planted with native vegetation and would recover from temporary construction effects.

After installation, terrestrial vegetation could be affected by erosion associated with increased stormwater runoff from the paved trail. These effects would be minimized by the use of pervious shoulders on either side of the trail. The shoulders would that capture stormwater before it runs off into adjacent areas. Even with pervious trail shoulders, some stormwater from the trail could reach adjacent dune vegetation, depending on the size of the rain event. Asphalt also has a potential to release contaminants into adjacent vegetated dunes despite the pavers. The only motorized vehicles permitted on the trail would be Park maintenance and emergency service; therefore, grease, oil, and trace metals normally associated with highway/vehicle related runoff would not be introduced to these habitats as a result of the proposed action.

In view of the relatively limited effects of construction and operation, the overall impact of the proposed action on terrestrial vegetation would be localized, short- and long-term, minor, and adverse.

### ***Cumulative Impacts***

Because of past and potential future dune construction and stabilization activities, natural dune processes have been and will continue to be altered on Ocracoke Island. Terrestrial vegetation has grown over a long period of time on this dune system, and will continue to be maintained, providing high habitat value. Therefore, the cumulative effects of other past, ongoing, and future plans, projects and activities on terrestrial vegetation are therefore estimated to be moderate, long-term and beneficial.

When the long-term, minor, adverse effects of Alternative B are considered with the effects of other projects and plans, overall cumulative impacts would be localized, long-term, moderate, and beneficial.

### ***Conclusion***

The proposed action would be constructed in the most protected part of the island that is stabilized by high quality terrestrial vegetation. It would affect a total of 5.5 acres over the long-term, or 0.09% of the

total area of the island. The overall effects of construction and maintenance of the proposed action on terrestrial vegetation are therefore estimated to be localized, minor, long- and short-term, and adverse.

Terrestrial plant communities on the island will continue to be developed and maintained under the dune construction and stabilization programs, thereby perpetuating the artificial dunes and associated terrestrial plant communities, resulting in long-term, moderate benefits to vegetation. In combination with the localized, minor, adverse effects of Alternative B, the resulting overall cumulative effects of Alternative B would be localized, long-term, moderate, and beneficial.

There would be no impairment of terrestrial vegetation resulting from park actions taken under Alternative B.

### ***Impacts of Alternative C, the Preferred Alternative***

A total of 9.8 acres of terrestrial dune vegetation in the corridor would be temporarily disturbed by construction. Vegetation within the 25-foot construction corridor would be crushed or eliminated by machinery during clearing of the area needed for the proposed trail. The trail would be constructed in the most protected part of the island that is stabilized by terrestrial vegetation. Because the majority of construction would occur in the gently sloping area (less than 5% slope) landward of the 7-foot contour, the potential for destabilization of the dunes and associated adverse effects on terrestrial vegetation would be minimized. This would occur primarily in the vegetated sand flats (5.95 acres) and minimally (3 acres) in the backdune. Establishment of the ½ mile-long segment of trail from the Village of Ocracoke to Ramp 70 would result in the removal of 0.85 acre of mown grassy swale parallel to the northbound lane NC-12. There would be no clearing of the wetland near the southwest corner of the NPS Day Use Area parking lot.

Of the 9.8 acres temporarily disturbed, 4.3 acres would be allowed to recover and 5.5 acres would be altered in the long-term due to the installation of the trail. Of the 5.5 acres altered due to the trail, 5.04 acres would be paved and inhibit regrowth of vegetation and the remaining 0.46 acres would be boardwalk. Revegetation may occur naturally beneath the boardwalk segments. The area surrounding the trail would be planted with native vegetation and would recover from temporary construction effects.

After installation, terrestrial vegetation could be affected by erosion associated with increased stormwater runoff from the paved trail. These effects would be minimized by the use of pervious shoulders on either side of the trail. The shoulders would capture stormwater before it runs off into adjacent areas. Even with pervious trail shoulders, some stormwater from the trail could reach adjacent dune vegetation, depending on the size of the rain event. Asphalt also has a potential to release contaminants into adjacent vegetated dunes despite the pavers. The only motorized vehicles permitted on the trail would be Park maintenance and emergency service; therefore, grease, oil, and trace metals normally associated with highway/vehicle related runoff would not be introduced to these habitats as a result of the proposed action.

In view of the relatively limited effects of construction and operation, the overall impact of the proposed action on terrestrial vegetation would be localized, short- and long-term, minor, and adverse.

### ***Cumulative Impacts***

Because of past and potential future dune construction and stabilization activities, natural dune processes have been and will continue to be altered on Ocracoke Island. Terrestrial vegetation has grown over a long period of time on this dune system, and will continue to be maintained, providing high habitat value. Therefore, the cumulative effects of other past, ongoing, and future plans, projects and activities on terrestrial vegetation are therefore estimated to be localized, moderate, long-term and beneficial.

When the long-term, minor, adverse effects of Alternative C are considered with the effects of other projects and plans, overall cumulative impacts would be localized, long-term, moderate, and beneficial.

## *Conclusion*

The proposed action would be constructed in the most protected part of the island that is stabilized by high quality terrestrial vegetation. It would affect a total of 5.5 acres over the long-term, or 0.09% of the total area of the island. The overall effects of construction and maintenance of the proposed action on terrestrial vegetation are therefore estimated to be localized, short- or long-term, minor, and adverse.

Terrestrial plant communities on the island will continue to be developed and maintained under the dune construction and stabilization programs, thereby perpetuating the artificial dunes and associated terrestrial plant communities, resulting in long-term, moderate benefits to vegetation. Alternative C would contribute a noticeable, adverse increment to the overall cumulative long-term, moderate, and beneficial impacts.

There would be no impairment of terrestrial vegetation resulting from park actions taken under Alternative C.

## **WILDLIFE**

### **Affected Environment**

Existing wildlife resources reflect the presence of several vegetative zones throughout the corridor. This variety of vegetative communities provides habitat for many faunal species, some dependent on specific vegetative types and other benefiting from an ability to use multiple communities.

The most conspicuous animals present are birds, which can be seen and heard in all habitats during all seasons of the year. Migratory bird species are abundant, and species richness and abundance fluctuates throughout the year (NPS 1981). The marshes on the sound side of Ocracoke Island, provide a wintering home for significant numbers of waterfowl and shorebirds. Inlet areas, recently overwashed beaches, and estuarine islands are important nesting sites for terns (*Sterna* spp.) and skimmers (*Rhynchops* spp.).

About one-half of the mammal species found in North Carolina's lower coastal plain are found on the Seashore (NPS 1981). Species typically associated with mixed shrubs and grassland interface would include the Virginia opossums (*Didelphis virginiana*), eastern cottontail (*Sylvilagus floridanus*), rats (*Rattus* spp.), mice (*Peromyscus* spp.), meadow vole (*Microtus pennsylvanius*), raccoon (*Procyon lotor*), and white-tailed deer (*Odocoileus virginianus*). Aquatic mammals such as muskrat (*Ondatra zibethica*), mink (*Mustela* spp.), nutria (*Myocastor coypus*), and otter (*Lutra* spp.) may be observed around the ponds and marshes.

Avian species likely to occur throughout the corridor and surrounding area include the rufous-sided towhee (*Pipilo erythrophthalmus*), northern cardinal (*Cardinalis cardinalis*), American and fish crows (*Corvus brachyrhynchos* and *Corvus ossifragus*, respectively), and various sparrow species (Emberizidae family). During spring and fall migration, these areas may support many migrant warbler species that use the shrubs for foraging, resting, and security cover. The yellow-rumped warbler is commonly observed in this area.

Reptiles likely to occur in the project area include the black racer (*Coluber constrictor*), six-lined racerunner (*Cnemidophorus sexilineatus*), and eastern glass lizard (*Ophisaurus ventralis*).

Many species of commercially important invertebrates and fish are supported by the food chain of the seashore's salt marshes. The marshes and tidal creeks serve as nursery grounds for fish, clams and scallops, and crab and shrimp (NPS 1981). Although present north of NC-12, none of these aquatic features are associated with the trail corridor. There are no open-water ponds or lakes or emergent wetlands or marshes present in the corridor between NC-12.

## Environmental Consequences

### *Methods*

Factors used to assess impacts to wildlife resources included estimating the potential to cause population level effects and to disturb or displace wildlife from the trail area because of human presence and activities. Population level effects considered the extent to which a change in habitat quantity or quality, reproductive success, habitat fragmentation, or direct or indirect mortality would be likely to occur. Human-caused disturbance effects considered whether the use of all or part the trail would cause displacement of individual wildlife species or prevent or discourage their use of habitats near the trail corridor. The following threshold definitions were used:

**Negligible:** Native wildlife species, their habitats, and the natural processes sustaining them would not be affected or the effects would be at or below the level of detection. Effects would not be of any measurable or perceptible consequence to wildlife populations. Habitats would retain adequate ecological integrity to support a full complement of native fish and wildlife species.

**Minor:** An action would result in detectable effects to species and/or their habitats, but changes would not be expected to result in substantial population fluctuations, their habitats, or the natural processes (e.g., competition, dispersal). Occasional responses to disturbance by some individuals could be expected but without interference to feeding, reproduction, or other factors affecting population levels.

**Moderate:** An action would result in detectable effects on native wildlife, their habitats, or the natural processes sustaining them. Key processes such as dispersal, competition, reproduction and/or predation may experience disruptions that would alter population size and/or distribution, but would return to natural conditions after initial disturbance. Sufficient habitat would remain functional to maintain viable native fish and wildlife populations.

**Major:** An action would result in detectable effects on native wildlife, their habitats, or the natural processes sustaining them. Key processes such as dispersal, competition, reproduction and/or predation would be altered permanently. Adverse responses to disturbance by some individuals would be expected, with negative impacts on feeding, reproduction, or other factors, resulting in a long-term decrease in population numbers and genetic variability. Habitats may not remain functional for maintaining viable fish and wildlife populations.

Impact duration is described as either short- or long-term. Short-term impacts would be recognized for less than one year, and recovery would occur within one year. Long-term impacts would be recognized for more than one year, and recovery would take longer than one year.

### *Impacts of Alternative A, the No Action Alternative*

Alternative A would result in no change to existing wildlife resources or habitats because no development or site alteration activities would occur in the area considered for the trail corridor. Existing conditions would be retained.

### *Cumulative Impacts*

The long-term enhancement of dunes on Ocracoke Island has altered natural wildlife habitat conditions by increasing vegetative cover and supporting creation of high-quality wetland habitats. In general, these changes have benefitted wildlife species by increasing forage and diversity of habitats. Although effects on individual species vary, the overall effects of these changes in habitat would generally be localized, long-term, minor to moderate, and beneficial.

Alternative A would make no contribution to these effects, resulting in overall localized, long-term, minor to moderate, beneficial cumulative effects on wildlife.

### *Conclusion*

Alternative A would result in no change to existing wildlife resources or habitats because no development or site alteration activities would occur in the area considered for the trail corridor. Existing conditions would be retained.

Cumulative effects would be localized, long-term, minor to moderate, and beneficial.

There would be no impairment of wildlife resources or values at Cape Hatteras National Seashore under Alternative A.

### ***Impacts of Alternative B***

Construction of the new trail would temporarily disturb 9.8 acres of terrestrial vegetation during construction and result in a long-term loss of 5.5 acres terrestrial vegetation.

Approximately 0.85 acre of the temporary trail disturbance would be along the mown grassy swale of NC-12, between the Village of Ocracoke and Ramp 70. Approximately 9.3 acres of the temporary trail disturbance would occur in the vegetated sand flat, backdune, and wetland. These areas are likely used to some extent by wildlife species that move between the dunes and the shrub thickets to meet portions of their life requirements. The degree of direct habitat impact of this trail to any particular wildlife species would be directly proportional to the mobility characteristics of the individual animals and the species that use the area. It is likely that small mammals and ground nesting birds with relatively limited home ranges would be affected the most. However, the affected area would be too small and construction limited in scope to substantially affect a population. Therefore, direct habitat loss effects would be considered a long-term, minor, adverse impact on wildlife in the project corridor. Short-term construction phase effects would occur over a slightly larger area, but these effects would also be considered a minor, adverse impact. Post-construction revegetation and site recovery process would minimize the localized, long-term, adverse impacts of establishing the new trail.

Park visitor use of the trail would introduce varying amounts of new human presence and activities along the trail to the corridor between the dunes and shrub thicket that is currently free of human disturbance. The zone of human-presence disturbance as a result of trail establishment and long-term use would occupy a total area of approximately 55 acres (¾ miles x 150 feet wide). Individual animals sensitive to human presence would avoid the corridor. The extent of the displacement would be proportional to individual animal tolerances and the behavioral characteristics of the exposed species. Consequently, some otherwise suitable habitat areas along the trail might receive less wildlife use than expected. The habitat displacement effect would be a minor, adverse long-term impact because even though some individual animals could be affected, it is unlikely that displacement effects would be of sufficient intensity to cause population-level changes. Some degree of habituation to human presence would be expected over time, which would reduce the adverse effects somewhat.

### *Cumulative Impacts*

As described for Alternative A, the long-term construction and stabilization of dunes on Ocracoke Island has produced localized, long-term, minor to moderate benefits to wildlife habitats. In combination with the localized, long-term, minor, adverse effects of Alternative B, the overall cumulative effects to wildlife would be localized, long-term, minor, and beneficial.

### *Conclusion*

There would be localized, short- and long-term, minor, adverse effects to wildlife and habitats due to construction and maintenance of the multi-use trail under Alternative B.

Overall cumulative effects would be localized, long-term, minor, and beneficial.

There would be no impairment of wildlife resources or values at Cape Hatteras National Seashore under Alternative B.

### ***Impacts of Alternative C, the Preferred Alternative***

Impacts to wildlife under this alternative would be the same as under Alternative B.

### ***Cumulative Impacts***

As described for Alternative A, the long-term construction and stabilization of dunes on Ocracoke Island has produced localized, long-term, minor to moderate benefits to wildlife habitats. In combination with the localized, long-term, minor, adverse effects of Alternative C, the overall cumulative effects to wildlife would be localized, long-term, minor, and beneficial.

### ***Conclusion***

There would be localized, long-term, minor, adverse effects to wildlife and habitats due to construction and maintenance of the multi-use trail under Alternative C.

Overall cumulative effects would be localized, long-term, minor, and beneficial.

There would be no impairment of wildlife resources or values at Cape Hatteras National Seashore under Alternative C.

## **SPECIAL-STATUS SPECIES**

### **Affected Environment**

Some populations of fauna and flora have been, or are, in decline due to either natural forces or their inability to coexist with humans. Federal law (under the provisions of Section 7 of the Endangered Species Act [ESA] of 1973, as amended) requires that any federal action likely to adversely affect a species listed as federally-protected be subject to review by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. Prohibited actions which may affect any species protected under the ESA are outlined in Section 9 of the Act. Other species may receive additional federal protection under separate laws such as the Lacey Act Amendments of 1981, the Migratory Bird Treaty of 1999, the Marine Mammal Protection Act of 1972, or the Eagle Protection Act of 1940.

Species that are listed, or are proposed for listing, as endangered or threatened are recorded in Section 4 of the ESA. As defined by the Act, an endangered species is any plant or animal which is in danger of extinction throughout all or a significant portion of its range within the foreseeable future. A threatened species is any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Federal species of concern (FSC) is a species that may or may not be listed in the future (it is under consideration for listing but there is insufficient information to support listing) and has no protection status under the Endangered Species Act.

Species identified as endangered, threatened, or special concern (SC) by the North Carolina Natural Heritage Program list of rare plant and animal species are afforded state protection under the State Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979.

### ***Federally Protected Species***

Table 9 lists the species identified by the U.S. Fish and Wildlife Service as potentially occurring in Hyde County (USFWS 2007). A description of habitat requirements is provided in the following sections.

Federally-listed plant and animal species are protected under the Endangered Species Act of 1973, which mandates federal agencies to ensure that any actions authorized, funded, or carried out by that agency do not jeopardize the “continued existence” of listed species, or result in the destruction or adverse modification of designated critical habitat. Proposed species are offered “limited protection” under Section 7(A)(C) of the Endangered Species Act, as amended. Federally-listed endangered, threatened, proposed, and special-concern species were identified from the U.S. Fish and Wildlife Service web site for Hyde County ([http://www.fws.gov/nc-es/es/ctyspplist\\_entire\\_12202007.pdf](http://www.fws.gov/nc-es/es/ctyspplist_entire_12202007.pdf)).

**State-Protected Species**

Table 9 includes animals and plants with state designations of endangered, threatened, or special concern. These species are protected by the State Endangered Species Act and the State of North Carolina Plant Protection and Conservation Act of 1979. These acts are administered and enforced by the North Carolina Wildlife Resources Commission and the North Carolina Department of Agriculture, respectively. State-listed species were obtained from the North Carolina Natural Heritage Program (vascular plant species) and from the North Carolina Wildlife Resources Commission (fish and wildlife species).

The State Endangered Species Act provides for the conservation, management, enhancement, and protection of rare animal species in North Carolina. This law makes it unlawful to possess or disturb, for any reason not approved by the North Carolina Wildlife Resources Commission, any animal species on the protected list.

For state-listed plant species addressed by the State of North Carolina Plant Protection and Conservation Act of 1979, it is illegal to:

- Dig, otherwise disturb, or remove any protect species without written permission of the landowner; or
- Sell, barter, or trade for any purpose any plant on the protected list, unless approved and permitted by the North Carolina Department of Agriculture.

**TABLE 9. SPECIAL-STATUS SPECIES WITH THE POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED MULTI-USE TRAIL**

Scientific Name	Common Name	Federal Status <sup>1</sup>	State Status <sup>2</sup>	Habitat Present <sup>3</sup>
<b>Mammals</b>				
<i>Trichechus manatus</i>	West Indian manatee	Endangered	Endangered	No/No
<i>Canis rufus</i>	Red wolf	Endangered, Experimental Population	Significantly Rare	No/No
<b>Birds</b>				
<i>Charadrius melodus</i>	Piping plover	Threatened; proposed critical habitat seaward of dune line	Threatened	Yes/No
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered	Endangered	No/No
<i>Laterallus jamaicensis</i>	Black rail	Federal Species of Concern	---	Yes/No

**TABLE 9. SPECIAL-STATUS SPECIES WITH THE POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED MULTI-USE TRAIL**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Federal Status <sup>1</sup></b>	<b>State Status <sup>2</sup></b>	<b>Habitat Present <sup>3</sup></b>
<i>Dendroica virens waynei</i>	Black-throated green warbler	Federal Species of Concern	---	No/No
<i>Haliaeetus leucocephalus</i>	Bald eagle	Delisted; protected by Bald Eagle Protection Act and Migratory Bird Treaty Act	Threatened	Yes/No
<i>Falco peregrinus</i>	American peregrine falcon	Delisted; protected by Migratory Bird Treaty Act	Endangered	Yes/No
<i>Haematopus palliatus</i>	American oystercatcher	Not listed; protected by NPS <sup>4</sup>	---	Yes/No
<i>Sterna nilotica</i>	Gull-billed tern	Not listed; protected by NPS	Threatened	Yes/No
<i>Sterna hirundo</i>	Common tern	Not listed; protected by NPS	---	Yes/No
<i>Sterna antillarum</i>	Least tern	Not listed; protected by NPS	Special Concern	Yes/No
<i>Rynchops niger</i>	Black skimmer	Not listed; protected by NPS	Special Concern	Yes/No
<i>Charadrius wilsonia</i>	Wilson's plover	Not listed; protected by NPS	---	Yes/No
<i>Calidris canutus</i>	Red knot	Not listed; protected by NPS	---	Yes/No
<b>Reptiles</b>				
<i>Alligator mississippiensis</i>	American Alligator	Threatened	Threatened; Similar Appearance	No/No
<i>Caretta caretta</i>	Loggerhead turtle sea turtle	Threatened	Threatened	No/No
<i>Chelonia mydas</i>	Green sea turtle	Threatened	Threatened	No/No
<i>Dermochelys coriacea</i>	Leatherback turtle sea turtle	Endangered	Endangered	No/No
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	Endangered	Endangered	No/No
<i>Lepidochelys kempii</i>	Kemp's Ridley sea turtle	Endangered	Endangered	No/No
<b>Fish</b>				
<i>Acipenser brevirostrum</i>	Shortnose sturgeon	Endangered	Endangered	No/No

**TABLE 9. SPECIAL-STATUS SPECIES WITH THE POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED MULTI-USE TRAIL**

Scientific Name	Common Name	Federal Status <sup>1</sup>	State Status <sup>2</sup>	Habitat Present <sup>3</sup>
<i>Anguilla rostrata</i>	American eel	Federal Species of Concern	---	No/No
<b>Vascular Plants</b>				
<i>Amaranthus pumilus</i>	Seabeach amaranth	Threatened	Threatened	Yes/No
<i>Aeschynomene virginica</i>	Sensitive jointvetch	Threatened	Endangered	No/No
<i>Trichostema</i> sp.	Dune bluecurls	Federal Species of Concern	Significantly Rare	Unknown/Possible
<i>Sagittaria weatherbiana</i>	Grassleaf arrowhead	Federal Species of Concern	Significantly Rare	Unknown/No
<i>Thalictrum macrostylum</i>	Small-leaved meadow-rue	Federal Species of Concern	Significantly Rare	No/No

<sup>1</sup> - Source: U.S. Fish and Wildlife Service. 2007. The U.S. Fish and Wildlife Service's County Species List for North Carolina. December 20, 2007. 76 pp. Accessed online on 03/06/08 at [http://www.fws.gov/nc-es/es/ctysplist\\_entire\\_12202007.pdf](http://www.fws.gov/nc-es/es/ctysplist_entire_12202007.pdf)

<sup>2</sup> - Source: North Carolina Wildlife Resources Commission. No date. State and Federally Listed Endangered and Threatened Wildlife Species of North Carolina. 9 pp. Accessed online on 3/6/08 at [http://www.ncwildlife.org/pg07\\_wildlifespeciescon/protected\\_species.pdf](http://www.ncwildlife.org/pg07_wildlifespeciescon/protected_species.pdf)

<sup>3</sup> - Habitat present in the vicinity/habitat present in the proposed trail corridor

<sup>4</sup> - Protected by the NPS at Cape Hatteras National Seashore

The project area or area of potential affect does not include marine habitats or the Atlantic coast area of the foredunes. No open freshwater or pineland forests are found in the vicinity of the project area. Therefore the discussion of potential effects of listed species is focused on those species with the potential to occur in habitats near the project area. Therefore, the manatee, the red wolf, red-cockaded woodpecker, all sea turtle species, the American alligator, and fishes are dismissed from further consideration (see Table 9 for habitat occurrence determination).

Information regarding habitat preferences of listed federal threatened, endangered, and federal special concern species is provided in the following sections. Habitat preference information was the primary basis for assessing potential impacts of the alternatives on each species.

### *Piping Plover*

This small shore bird is approximately 7 inches long, has a 15-inch wide wingspread, and weighs 1.5 to 2 ounces. During breeding season the plumage is white underneath and beige on the back with a black upper tail edged with white. Piping plovers migrate northward to breeding grounds between February and April and southward to wintering grounds between July and September. Large numbers of migrating plovers have been observed along North Carolina's barrier islands, including the Ocracoke Inlet and Portsmouth Flats area (USFWS 1996a).

Piping plovers arrive on breeding grounds in the early spring and establish nest sites in sandy substrates above the high tide line on coastal beaches, sandflats at the ends of sandspits and barrier islands, gently

sloping foredunes, and on blowout or washover areas behind and between dunes (USFWS 1996a). Eggs may be laid from mid-April to late July with only a single brood fledging per season. The pear-shaped eggs are a buff to greenish color with black or brown spots. Plovers eat invertebrates such as marine worms, fly larvae, beetles, crustaceans, and mollusks. Foraging occurs on intertidal portions of ocean beaches, washover areas, mud and sandflats, wrack lines, and coastal marsh shorelines. Feeding may occur during all hours of the day and night and all stages of the tidal cycle (USFWS 1996b).

In June 2007 the U.S. Fish and Wildlife Service issued a request for public comment on designating portion of Hyde and Dare counties as critical habitat for wintering populations of piping plover (<http://www.fws.gov/nc-es/piplch/piplch.html>). Two proposed locations were proposed for Hyde County, one of which is about 500 acres of Ocracoke Island, Cape Hatteras National Seashore.

The affected locations are described as follows. This unit is within Cape Hatteras National Seashore and includes the western portion of Ocracoke Island beginning at the beach access point at the edge of Ramp 72 (South Point Road), extending west approximately 2.1 miles to Ocracoke Inlet, and then back east on the Pamlico Sound side to a point where stable, densely vegetated dune habitat meets the water. This unit includes lands from the mean low water line on the Atlantic Ocean shoreline to the line of stable, densely vegetated dune habitat (which is not used by the piping plover and where primary constituent elements do not occur) and from the mean low water line on the Pamlico Sound side to the line of stable, densely vegetated habitat, or (where a line of stable, densely vegetated dune habitat does not exist) lands from mean low water line on the Atlantic Ocean shoreline to the mean low water line on the Pamlico Sound side. All emergent sandbars within Ocracoke Inlet are also included. This unit does not include any portion of the maintained South Point Road, NC-12, or any of their ancillary facilities.

Primary constituent elements are physical and biological features of the designated critical habitat essential to the conservation of the species. Essential components (primary constituent elements) of wintering piping plover habitat include sand and/or mud flats with no or very sparse emergent vegetation. In some cases, these flats may be covered or partially covered by a mat of blue-green algae. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also essential, especially for roosting piping plovers. Such sites may have debris, detritus (decaying organic matter), or micro-topographic relief (less than 20 inches above substrate surface) offering refuge from high winds and cold weather. Essential components of the beach/dune ecosystem include surf-cast algae for feeding of prey, sparsely vegetated backbeach (beach area above mean high tide seaward of the dune line, or in cases where no dunes exist, seaward of a delineating feature such as a vegetation line, structure, or road) for roosting and refuge during storms, spits (a small point of land, especially sand, running into water) for feeding and roosting, salterns (bare sand flats in the center of mangrove ecosystems that are found above mean high water and are only irregularly flushed with sea water) and washover areas for feeding and roosting. Washover areas are broad, unvegetated zones with little or no topographic relief that are formed and maintained by the action of hurricanes, storm surge, or other extreme wave action. Several of these components (sparse vegetation, little or no topographic relief) are mimicked in artificial habitat types used less commonly by piping plovers, but that are considered critical habitat (e.g., dredge spoil sites).

### *Seabeach Amaranth*

The seabeach amaranth is an annual plant with fleshy reddish or pink-red stems and small (less than 1 inch in diameter) rounded leaves that cluster toward the tip of the trailing stems. Leaves are somewhat shiny and spinach-green colored, and have a small notch at the rounded tip (USFWS 1996b). Seabeach amaranth is native to Atlantic coast barrier island beaches and occupies dynamic portions of the landscape. Primary habitat consists of overwash flats at accreting ends of islands, lower foredunes and upper strands of stable beaches, and occasionally on sound-side beaches, foredune blowouts, and dredge spoil (USFWS 1996b).

### *Sensitive Jointvetch*

Sensitive joint-vetch is an annual plant that can grow from 3 to 7 feet tall. The single stems have peltately attached stipules and may branch near the top. They have stiff or bristly hairs and small, even-pinnate leaves that are 1 to 5 inches long. Leaves are sensitive to the touch and may have from 30 to 80 linear oblong leaflets less than 1 inch long and 0.2 inches wide (USFWS 1995). Leaf margins are entire and the rachis and peduncles are dotted with glands. The elongated irregularly shaped flowers are yellowish with red streaks, about 0.5 inches across, and grow in racemes (Radford 1968). Flowering occurs from July to early October, with fruits forming after the first blooms in July. Sensitive joint-vetch is found in estuarine meander zones and marshes of tidal rivers, accreting point bars, and inland marshes where the sandy, muddy, peaty, or gravelly substrates are otherwise sparsely vegetated. In North Carolina, known populations occur in coastal roadside and agricultural ditches where soil saturation results from tidal flooding. This plant is often confused with other members of the genus, especially *A. indica* and *A. rudis* (USFWS 1995).

### *Dune Bluecurl*

Dune bluecurls is a species that occurs in maritime grasslands behind foredunes, between vegetated and stable secondary dunes, roadsides, thin woods and pinelands, fields, and openings in maritime scrub.

The following species are not afforded legal protection under the Endangered Species Act, but are protected by Cape Hatteras National Seashore. A brief discussion of each species and its habitat is provided.

### *Black Rail*

The black rail is associated with salt and brackish marshes dominated by rushes (*Juncus* spp.) and cordgrass (*Spartina* spp.), freshwater marshes, and meadows.

### *American Oystercatcher*

This large shorebird is found in coastal salt marshes and sandy beaches along the Atlantic coast. Its breeding season occurs between March and August in relatively high, open, sandy areas with sparse to no vegetation (NPS 2006b). Although one of the threats to the shorebird is vehicular traffic on the beach, the proposed action construction would occur outside of its nesting season and limited vehicle access would occur on the trail for maintenance activity.

### *Gull-Billed Tern*

The *Sterna nilotica aranea* subspecies of this medium-sized migratory waterbird is found along the Atlantic and Gulf coasts of the United States. Its breeding season occurs May through August on open, sandy-shell beaches on large barrier islands, dredge spoil sites, and large overwash fans. They also often nest on elevated shell ridges along the edges of marsh islands (NPS 2006b).

### *Common Tern*

This medium-sized migratory waterbird is found in the following North American areas: Atlantic coast, St. Lawrence River and most of the Great Lakes. Its breeding season occurs May through August on open, sandy shell beaches on ocean coastal islands and inland island sites on freshwater lakes. The common tern can also be found nesting in salt marshes, particularly where significant human disturbance has occurred (NPS 2006b).

### *Least Tern*

The least tern is a small migratory waterbird that is found along the Atlantic and Gulf coasts of the United States. Nesting occurs between May and August, and habitat is typically the barest sand- and shell-covered substrate on coastal, riverine, or dredge spoil islands, as well as pea gravel rooftops. On barrier islands, the least tern will often nest near inlets and large overwash areas (NPS 2006b).

### *Black Skimmer*

This migratory waterbird feeds by skimming the water surface with its lower jaw. The black skimmer is found along the Atlantic coast of the United States, with nesting occurring between May and August on open, sandy substrates on barrier or dredge spoil islands and on the tips of barrier islands, typically with other tern species (NPS 2006b).

### *Wilson's Plover*

This shorebird is a medium-sized plover that is found along the Atlantic coast from Virginia to Florida, and along the Gulf coast from Florida to Texas. Breeding begins in April, with nests in coastal areas with high salinity and sparse vegetation, including salt flats, coastal lagoons, sand dunes, predunes, and overwash areas above the high tide line (NPS 2006b).

### *Red Knot*

This shorebird breeds in the Canadian Arctic and only visits the Atlantic coast of the United States as a migrant and occasional winter resident. Within the national seashore, the red knot is typically found on low-angle ocean-side beaches near larger intertidal zones, including the west and east ocean sides and soundside areas of Ocracoke Island.

## **Environmental Consequences**

### ***Methods***

Special-status species impacts were evaluated as described in the “Methods for Analyzing Impacts” section. Factors used to assess impacts to threatened, endangered, and other special-status species are different than the factors used to assess general wildlife effects. For the purposes of National Environmental Policy Act analysis, a “no effect” determination is equated with a “negligible” impact threshold. The Endangered Species Consultation Handbook (USFWS and NMFS 1998) indicates a “not likely to adversely affect” determination is appropriate when the effects on listed species are expected to be discountable, insignificant, or completely beneficial. It further defines discountable effects as those that cannot be meaningfully measured. Information regarding habitat preferences of listed federal threatened, endangered, and federal special concern species and the availability of the required habitat in the trail corridor was the primary basis for assessing potential impacts of the alternatives on each species.

**Negligible:** No federal-listed species would be affected, or the action would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence to the protected individual or its population. Negligible effect would equate with a “no effect” U.S. Fish and Wildlife Service determination.

**Minor:** The action would result in detectable impacts to an individual (or individuals) of a federal-listed species or its critical habitat, but would not be expected to result in substantial population fluctuations and would not be expected to have any measurable long-term effects on species, habitats, or natural processes sustaining them. Minor effects would equate with a “may affect/not likely to adversely affect” U.S. Fish and Wildlife Service determination.

**Moderate:** An action would result in detectable impacts on individuals or population of a federal-listed species, critical habitat, or the natural processes sustaining them. Key ecosystem processes may experience disruptions that may result in population or habitat condition fluctuations that would be outside the range of natural variation (but would return to natural conditions). Moderate level adverse effects would equate with a “may affect/likely to adversely affect / adversely modify critical habitat” U.S. Fish and Wildlife Service determination.

**Major:** Individuals or population of a federal-listed species, critical habitat, or the natural processes sustaining them would be measurably affected. Key ecosystem processes might be permanently altered resulting in changes in population numbers that could affect the vitality of the population and permanently modifying critical habitat. Major adverse effects would equate with a “may affect / likely to adversely affect/adversely modify critical habitat” U.S. Fish and Wildlife Service determination.

Impact duration is described as either short- or long-term. Short-term impacts would be recognized for less than one year, and recovery would occur within one year. Long-term impacts would be recognized for more than one year, and recovery would take longer than one year.

The geographic area considered when evaluating the effects of the proposed action on special-status species consisted of the trail corridor and the immediate disturbance vicinity.

### ***Impacts of Alternative A, the No Action Alternative***

Alternative A would result in no change to special-status species or their habitats because no development or site alteration activities would occur in the area considered for the trail corridor. There would be no effects to special-status species and their supporting habitats. There would be no effect to federal proposed, threatened, or endangered species or any designated critical habitats. There would be no effects to state-listed special-status species.

### ***Cumulative Impacts***

As described for wildlife and habitats, the ongoing dune enhancement on Ocracoke Island has produced long-term, minor to moderate, benefits for local special-status species and their habitats. Alternative A would make no contribution to these effects, yielding localized, long-term, minor to moderate impacts to special-status species. For federally-listed species, the equivalent Section 7 finding would be “may affect, not likely to adversely affect.”

### ***Conclusion***

Alternative A would have no effect on special-status species.

The overall cumulative effects would be localized, long-term, minor to moderate, and beneficial (may affect, not likely to adversely affect).

There would be no impairment of special-status species or their habitats under Alternative A.

### ***Impacts of Alternative B***

Installation of the new trail would involve the temporary disturbance of a total of 9.8 acres (3¼ miles x 25 feet) acres of upland terrestrial vegetation during construction and a long-term loss of about 5.2 acres (3¼ miles x 14 feet) acres of upland terrestrial vegetation to accommodate the trail footprint.

The trail alignment and its construction would not affect any marine or open fresh waters; salt, brackish, or freshwater marshes; maritime woodlands, foredunes, or beach settings because these communities do not occur in the proposed trail alignment corridor or immediate vicinity. All trail construction would occur on uplands at the base of the backdune. Where the trail crosses into the backdune area, the area would be boardwalk.

There are no known occurrences or historical reports of federally-listed endangered, threatened, or proposed species in this area. There are no known nesting or breeding colonies of shorebirds, terns, gulls, or heron rookeries in or near the proposed trail corridor for this alternative.

The proposed critical winter habitat for the federally-listed piping plover does not extend inland past the unvegetated dunes. It does not include the existing NC-12 corridor. Therefore, trail construction activities and visitor use would not affect proposed critical habitat for the piping plover, resulting in a no effect to proposed critical habitat for this species.

Trail construction and use would occur behind the primary and secondary dunes, thereby avoiding any potential conflicts or effects to listed piping plover, least tern, and other species that could be associated with the beach segment between the NPS Campground and Village of Ocracoke.

For these reasons, Alternative B would have no effect on any federally-listed threatened, endangered animals. This equates to a U.S. Fish and Wildlife Service “no effect” determination. There would be no effect on the proposed critical habitat for the piping plover. This finding is based on one or more of the following factors:

- Absence of special-status species in the proposed trail corridor
- Absence of suitable habitat for listed special-status species in or near the proposed trail corridor
- Construction and trail use activities would not affect known areas of special-status species occurrence and/or habitat use.

The single possible exception to the “no effect” finding could be the to the dune bluecurl, which is a federal plant species of concern in Hyde County. Information on the habitat requirements of the dune bluecurls is very limited. It has been reported to occur in vegetated areas in stable secondary dunes and openings in maritime scrub communities. These conditions exist in the proposed trail corridor.

In 2006, the park performed a survey for the dune bluecurls in the proposed action area. The results indicate that several individual specimens are present in the vicinity (Carfioli personal communication 2007). According to the survey, it is found in abundance – greater than 50 specimens – outside the immediate project area, and is rare within the project area – less than 6 specimens.

To minimize potential effects to this species during project construction, the trail would be placed to avoid areas of concentrated dune bluecurls occurrence, construction zones would be adjusted to avoid damage to individual specimens, and planting and recovery would be implemented once construction were complete. Because individuals could be damaged or habitat disturbed, Alternative B would produce localized, minor, short- and long-term adverse effects on the dune bluecurl. This equates to a “may affect but not likely to adversely affect” finding in accordance with Section 7 of the Endangered Species Act.

### *Cumulative Impacts*

As described for Alternative A, other projects and plans have produced long-term, minor to moderate, benefits for local special-status species and habitats. There would be no effects to special-status animal species under Alternative B. The potential minor, long-term, adverse effects to the dune bluecurls would not measurably offset the benefits that have accrued from other projects and plans. Thus, the overall cumulative effects of Alternative B on special-status species would be localized, long-term, minor to moderate, and beneficial (may affect, not likely to adversely affect).

### *Conclusion*

Because no special-status animal species or critical habitats would occur in the trail corridor, Alternative B would have no effect on listed animal species. However, localized, long-term, minor, adverse effect to the dune bluecurls could occur (may affect, not likely to adversely affect).

Cumulative effects would be localized, long-term, minor to moderate, and beneficial (may affect, not likely to adversely affect).

There would be no impairment of special-status species or their habitats under Alternative B.

### ***Impacts of Alternative C, the Preferred Alternative***

Alternative C would have the same impact on species of concern as under Alternative B.

#### *Cumulative Impacts*

As described for Alternative A, other projects and plans have produced long-term, minor to moderate, benefits for local special-status species and habitats. There would be no effects to special-status animal species under Alternative C. The potential minor, long-term, adverse effects to the dune bluecurls would not measurably offset the benefits that have accrued from other projects and plans. Thus, the overall cumulative effects of Alternative B on special-status species would be localized, long-term, minor to moderate, and beneficial (may affect, not likely to adversely affect).

#### *Conclusion*

Because no special-status animal species or critical habitats would occur in the trail corridor, Alternative C would have no effect on listed animal species. However, localized, long-term minor, adverse effect to the dune bluecurls could occur (may affect, not likely to adversely affect).

Cumulative effects would be localized, long-term, minor to moderate, and beneficial (may affect, not likely to adversely affect).

There would be no impairment of special-status species or their habitats under Alternative C.

## CHAPTER 4: CONSULTATION AND COORDINATION

### SCOPING AND AGENCY COORDINATION

The National Park Service conducted scoping with appropriate NPS staff members, as well as other federal, state and local agencies, and the public. The proposed multi-use trail was first identified as a desirable addition to Cape Hatteras National Seashore in the park's *General Management Plan* (NPS 1984). Since that time, collaborative transportation planning efforts for Ocracoke Island have taken place between multiple stakeholders through various communications and meetings over a period of several years. These stakeholders have included, but are not limited to, the National Park Service, the North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation, the North Carolina Division of Coastal Zone Management, Hyde County, the Ocracoke Scenic Byways Committee, the Ocracoke Transportation Committee, and the Ocracoke Civic Association. The project is listed in Division 1 of the *North Carolina Fiscal Year 2007-2013 State Transportation Improvement Program* (NCDOT 2007).

The National Park Service is coordinating with Hyde County Transit, Inc. for the planning, design, operation, and evaluation of public transportation systems on Ocracoke Island including Cape Hatteras National Seashore. Numerous letters of support for a trail have been received, including a resolution and letters from the following: the Hyde County Board of Commissioners (April of 2005) supporting the proposal of a bicycle path from the Village of Ocracoke to the Hatteras Inlet ferry landing; the Hyde County Community Development Corporation (May of 2005); and Ocracoke Scenic Byway Committee (May 2005).

A project kickoff meeting and project corridor site visit was conducted in November 2007. The meeting was attended by several park division staff including resource management, maintenance, interpretation, enforcement, and administration and provided an opportunity for internal scoping and further refinement of the alternatives. Representatives from the North Carolina Department of Transportation (NC DOT) and the North Carolina Division of Coastal Management were also present for a project corridor site visit. Subsequent to this meeting, a site visit for the purpose of wetlands assessment was conducted by the U.S. Army Corps of Engineers and a NPS Southeast Regional Wetlands Ecologist. A site visit by NPS, US Public Health Service engineer, and NC DOT engineers was held in March 2008. The results of these site visits and assessments provided the information necessary to refine the proposed trail design.

A coordination letter was prepared for the US Fish and Wildlife Service requesting a current list of Federally-listed threatened and endangered species in the project area and to initiate informal consultation pursuant to the requirements of the 1973 Endangered Species Act, as amended and NPS *Management Policies*. The NPS' letter to US Fish and Wildlife, as well as the US Fish and Wildlife's response are included in Appendix A.

A coordination letter was prepared for the purpose of outlining the proposed action and requesting agency concerns/comments related to the proposed action. A copy of this letter is included in Appendix A. This letter was submitted to the North Carolina Department of Administration's State Environmental Review Clearinghouse on December 13, 2007. The State Environmental Review Clearinghouse assists state and federal government agencies in meeting their coordination requirements under the National Environmental Policy Act and serves as a means to notify potentially affected state/local agencies and the public of proposed development activities in their jurisdiction. The process is intended to provide decision makers with the information that would enable them to make an informed decision of the environmental consequences of a proposed action. The North Carolina Department of Environment and Natural Resources, Division of Coastal Management response to the coordination letter is included in

Appendix A. The U.S. Fish and Wildlife Service responded to a request for information regarding threatened and endangered species, this email correspondence is also included in Appendix A.

Public scoping for the proposed action was facilitated through the NPS Planning, Environment, and Public Comment (PEPC) website. A brief project synopsis, including the purpose and need of the proposed action and alternatives descriptions, were posted on the website along with instructions for providing comments. The comment period extended from October 13, 2007 through November 13, 2007. Seven comments were received through the PEPC website. Most commenters expressed support of the trail and concerns over safety. Some comments related to parking and need for additional parking. However, due to wetland resource considerations, a parking lot was considered as part of this project, but eliminated to avoid adverse wetland impacts.

The comment period was also announced via a newspaper article published in the *Coastland Times* on October 14, 2007. Public scoping has also been an informal component of previous planning efforts conducted with project stakeholders. For example, the concept of a multi-use trail has been discussed at Ocracoke Civic Association meetings, which are open to the public.

## **PLANNING TEAM PARTICIPANTS**

### *National Park Service*

#### *Outer Banks Group*

*(Cape Hatteras NS/ Fort Raleigh NHS/ Wright Brothers NMem)*

Mike Murray	Superintendent
Darrell Echols	Deputy Superintendent
Steve Thompson	Special Park Uses and Lands
Thayer Broili	Chief of Resource Management
Meghan Carfioli	Natural Resource Manager
Doug McGee	Biological Science Technician - Wildlife
Abra Zobel	Biological Science Technician - GIS
Doug Stover	Cultural Resource Manager
Charles Sellars	Chief of Maintenance and Facility Operations
Greg Robinson	P.E./Public Health Specialist
Mary Doll	Chief of Interpretation
Ellen Hand	Administrative Officer
Norah Martinez	Chief Ranger, Protection and Visitor Services
Kenny Balance	Ocracoke District Law Enforcement Ranger, Protection and Visitor Services

#### *Southeast Region*

Bennie Keel	Acting Director, Southeast Archeological Center
Rich Sussman	Chief of Planning
Anita Barnett	Planning and Compliance Specialist
Linda York	Acting Coastal Geology Coordinator
Cherry Green	Wetland Ecologist

### *U.S. Army Corps of Engineers*

Tom Steffens	Washington District Field Representative
--------------	--

*North Carolina Department of Transportation*

*Division of Bicycle and Pedestrian Transportation*

Tom Norman	Director
Bob Mosher	Planning Program Manager
Kumar Trivedi	Senior Facility Engineer

*Division of Highways*

Jason Smith	Division 1 Locating Engineer
Benjamin Henegar	Division 1 Transportation Engineer

*North Carolina Department of Environment and Natural Resources*

*Division of Coastal Management*

Terry Moore, Washington District Manager

**List of Preparers**

Darrell Echols	NPS – Outer Banks Group, Deputy Superintendent
Meghan Carfioli	NPS – Outer Banks Group, Natural Resource Manager
Doug McGee	NPS – Outer Banks Group, Biological Science Technician - Wildlife
Abra Zobel	NPS – Outer Banks Group, Biological Science Technician - GIS
Antia Barnett	NPS – Southeast Regional Office, Planning and Compliance Specialist
Alyse Getty	Parsons, Project Manager
Angie Cook	Parsons, Project Manager
Jacklyn Bryant	Parsons, Technical Review
Steve Bach	Parsons, Principal Scientist
John Hoesterey	Parsons, Planner
Bruce Snyder	Parsons, Principal Scientist

## **LIST OF RECIPIENTS**

### **Congressional Delegates**

Elizabeth Dole, Senator  
Richard Burr, Senator  
Walter B. Jones, 3rd District Representative

### **State Representatives**

Marc Basnight, State Senator  
Richard Burr, Senator  
Walter B. Jones, 3rd District Representative

### **Federal Agencies**

Advisory Council on Historic Preservation, if adverse effects on objects on or eligible for listing on the  
National Register of Historic Places are identified  
Federal Highways Administration  
National Marine Fisheries Service  
U.S. Army Corps of Engineers  
U.S. Coast Guard  
U.S. Fish and Wildlife Service, Ecological Services, Raleigh Field Office  
U.S. Geological Survey, Biological Resources Division

### **State and Local Government**

Dare County Board of Commissioners and Planning Department  
Hyde County Board of Commissioners and Planning Department  
Hyde County Transit  
North Carolina Department of Administration  
North Carolina Department of Environment and Natural Resources  
    Coastal Resources Commission  
    Division of Coastal Management  
    Division of Marine Fisheries  
    Division of Parks and Recreation  
    Division of Water Resources  
    Division of Water Quality  
    Wildlife Resources Commission  
    North Carolina Natural Heritage Program  
North Carolina Department of Transportation  
    Division of Aviation  
    Division of Bicycle and Pedestrian Transportation  
    Division of Highways  
    Ferry Division  
North Carolina Highway Patrol  
North Carolina State Historic Preservation Office

### **Organizations/Other**

Defenders of Wildlife  
Environmental Defense  
Hyde County Chamber of Commerce  
League of Conservation Voters  
National Parks Conservation Association

Network for Endangered Sea Turtles  
North Carolina Audubon  
Natural Resources Defense Council  
North Carolina Center for the Advancement of Teaching  
North Carolina Coastal Federation  
Ocracoke Civic & Business Association  
Ocracoke Island Emergency Medical Services  
Outer Banks Association of Realtors  
Outer Banks Chamber of Commerce  
Outer Banks Scenic Byway Committee  
Outer Banks Preservation Association  
Outer Banks Surf Fishing Schools  
Outer Banks Task Force  
Outer Banks Visitor Bureau  
Sierra Club, North Carolina Chapter  
Southern Environmental Law Center  
The Wilderness Society

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## **APPENDIX A: CONSULTATION CORRESPONDENCE**

L7615 (CAHA)

DEC 19 2007

Mr. Pete Benjamin, Field Supervisor  
US Fish and Wildlife Service  
Raleigh Field Office  
P.O. Box 33726  
Raleigh, NC 27636-3726

Dear Mr. Benjamin:

Reference: Ocracoke Island Multi-Use Trail and Parking Lot EA

Subject: Current List of Federally Listed Threatened and Endangered Species

The National Park Service (NPS) is initiating planning for the establishment of a paved multi-use trail and parking lot between the Village of Ocracoke and the NPS Ocracoke campground. The entire project will be located on federal lands within the Cape Hatteras National Seashore (CAHA). At present, two preliminary action alternatives have been identified and will be evaluated. The enclosed project summary documents and site map provide greater detail about the project area, preliminary alternatives, and the trail and parking lot locations.

As part of the NPS environmental review of the proposed action, we are requesting a current list of federally listed threatened or endangered species, species of concern, or any other special status species that might occur in the localities mentioned above, and designated critical habitats, if any, for these species.

This letter will serve as a record that the NPS is initiating informal consultation with your agency pursuant to the requirements of the 1973 Endangered Species Act, as amended and 2006 NPS Management Policies.

To meet the project schedule, we would appreciate your response within 30 days of the date of this letter. If you have any questions or comments, please contact Meghan Carfioli, Natural Resource Manager, at 252-473-2111, extension 135.

We appreciate your continuing assistance with NPS projects.

Sincerely,

/s/ Michael B. Murray

Michael B. Murray  
Superintendent

Enclosure

MCarfioli:mfr/12/19/07

## **OCRACOKE ISLAND MULTI-USE TRAIL AND PARKING LOT**

### **PROJECT BACKGROUND**

The National Park Service (NPS) is initiating planning for the establishment of a multi-use trail and parking area between the Village of Ocracoke limits and the NPS Ocracoke campground (hereafter referred to as the “project area”) at Cape Hatteras National Seashore.

Mixed use and congestion on NC12 creates potentially unsafe conditions for motorists, bicyclists, and pedestrians in the project area. Bicyclists and pedestrians currently use the 4-foot wide road shoulder of NC12. The posted vehicular speed limit for this area is 55 mph until the final 0.25 miles before the Village, where it is reduced to 25 mph. Establishment of a wider or separate corridor for non-motorized visitors will improve safety on NC12 for pedestrians, bicyclists, and motorists within the project area.

Mixed use and congestion of NC12 within the Village of Ocracoke also creates potentially unsafe conditions for motorists, bicyclists, and pedestrians. The NPS, North Carolina Department of Transportation (NCDOT), and Hyde County are working cooperatively to provide and promote safe and enjoyable experiences of Ocracoke Island by all. We have identified that an alternate transportation system using trams or trolleys may help to alleviate congestion in the Village, while facilitating a satisfying visitor experience of attractions within the National Seashore and Village of Ocracoke. The NPS has agreed to identify potential parking lot locations that would support a tram/trolley operation and evaluate impacts associated with its establishment on park land.

### **GOALS OF THE PROGRAM**

While addressing the project’s purpose and need, and ensuring that resources within CAHA are unimpaired for the enjoyment of future generations, the following goals will be fulfilled:

- Ensure that proposed management actions are consistent with laws, regulations, and executive mandates, and NPS policies.
- Protect the Park’s natural, cultural, scenic, and aesthetic values.
- Develop alternatives that minimize areas of disturbance during construction and operations and the potential for other long-term, adverse impacts to park resources.
- Allow for a satisfying experience that is consistent with the purposes for which the park was established.
- Cooperatively work with NCDOT to reduce conflicts between motorists, bicyclists, and pedestrians.

### **DEVELOPMENT OF ALTERNATIVES**

Internal NPS, interagency, and public scoping have been held for this project during recent years. After careful and extensive consideration of the concerns and suggestions on this project, two action alternatives for the trail alignment have been developed and are shown on the attached map. In Alternative B, NCDOT would widen both road shoulders of NC12 to a constant width of five feet from the NPS Campground to Village of Ocracoke boundary, a distance of 3.08 miles. In Alternative C, NCDOT would construct a new, 8-12 foot wide trail that is located on the Atlantic Ocean-side, between the secondary dune and shrub thicket between the NPS Campground and Ocracoke Airstrip/Ramp 70 (2.74 miles); the new trail would be constructed along the road shoulder from the Ocracoke Airstrip/Ramp 70 to the Village of Ocracoke boundary (0.50 miles). The “No Action” alternative will also be presented in the EA.

Numerous sites for a parking lot were initially considered but were dismissed due to the presence of U.S. Army of Corps of Engineers jurisdictional wetland and NPS wetland, anticipated complications

associated with long-term maintenance, and relocating mixed use and congested area traffic. Based on field surveys and discussions with the agencies, only one of the areas considered as a potential parking lot location would allow for the minimization of adverse impacts to wetlands, long-term maintenance, and resolution of mixed use and traffic congestion (shown on the attached map). Existing parking areas would continue to be used.

**RESOURCE ISSUES/CONCERNS**

Preliminary issues identified by an internal scoping process include:

- Vegetation and Wildlife
- T&E Species
- Wetlands and Floodplains
- Coastal Processes
- Stormwater Management
- Transportation
- Public Health and Safety
- Cultural Resources
- Park Operations
- Visitor Use and Experience

Please provide any written comments to:

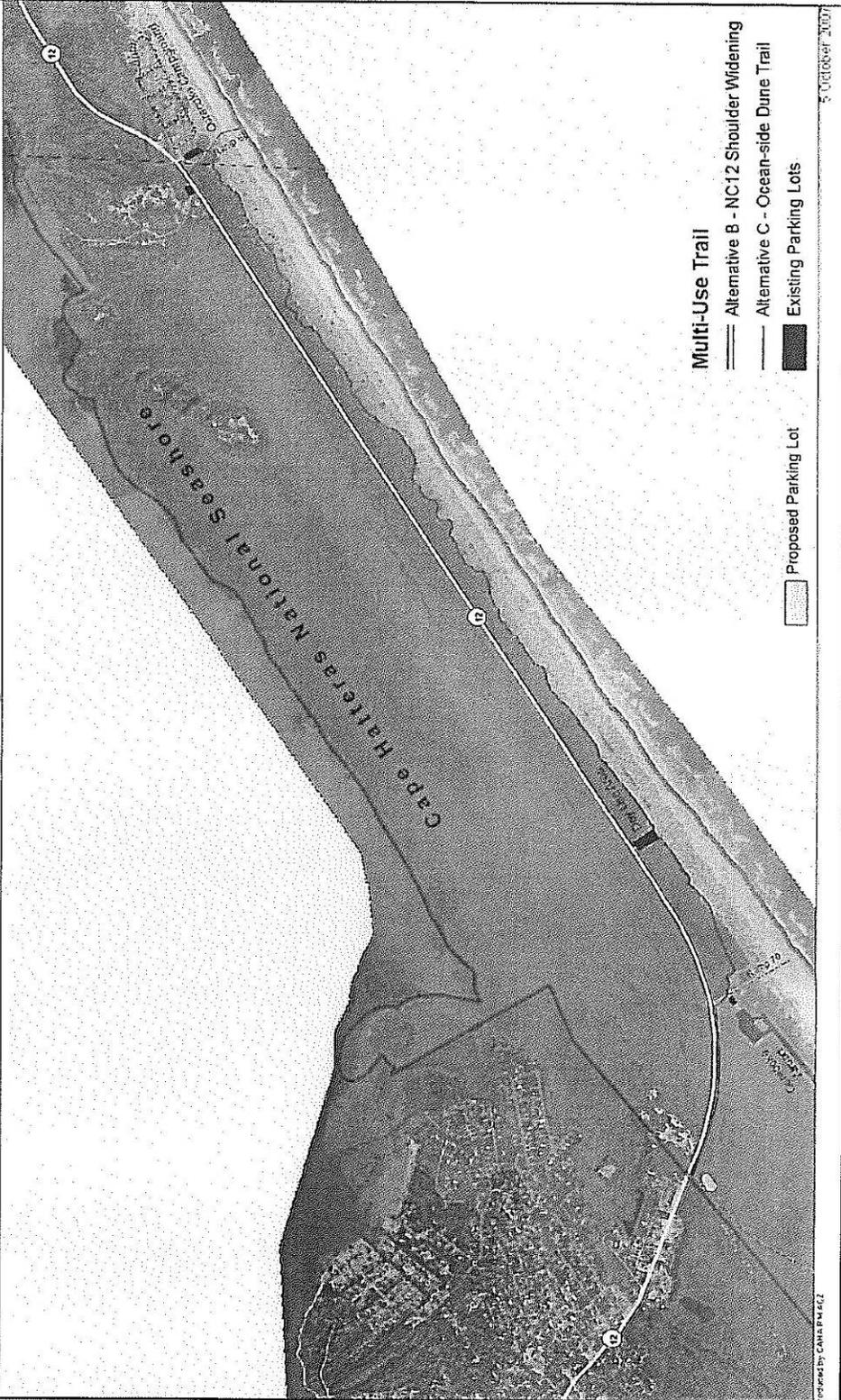
ATTN: Meghan Carfioli, Natural Resource Manager  
NPS - Outer Banks Group  
1401 National Park Drive  
Manteo, NC 27954

# Outer Banks Group



National Park Service  
U.S. Department of the Interior  
Cape Hatteras National Seashore  
Fort Raleigh National Historic Site  
Wright Brothers National Memorial

## Ocracoke Island Multi-Use Trail and Parking Lot





United States Department of the Interior  
NATIONAL PARK SERVICE  
OUTER BANKS GROUP



Fort Raleigh National Historic Site      Wright Brothers National Memorial  
Cape Hatteras National Seashore  
1401 National Park Drive  
Manteo, North Carolina 27954

L7615 (CAHA)

DEC 13 2007

Ms. Chrys Baggett  
NC State Clearinghouse  
1301 Mail Service Center  
Raleigh, NC 27699-1301

Dear Ms. Baggett:

**SUBJECT:      OCRACOKE ISLAND MULTI-USE TRAIL AND PARKING LOT**

This letter constitutes a request from Cape Hatteras National Seashore (CAHA) for scoping input from interested agencies on the proposed action. A description of the proposed action and a map are enclosed. Please circulate this request to all agencies that may have an interest via the standard process utilized by the NC State Clearinghouse. A 30-day response from time of receipt is requested.

**PROJECT BACKGROUND**

The National Park Service (NPS) is initiating planning for the establishment of a multi-use trail and parking area between the Village of Ocracoke limits and the NPS Ocracoke campground (hereafter referred to as the "project area").

Mixed use and congestion on NC12 creates potentially unsafe conditions for motorists, bicyclists, and pedestrians in the project area. Bicyclists and pedestrians currently use the 4-foot wide road shoulder of NC12. The posted vehicular speed limit for this area is 55 mph until the final 0.25 miles before the Village, where it is reduced to 25 mph. Establishment of a wider or separate corridor for non-motorized visitors will improve safety on NC12 for pedestrians, bicyclists, and motorists within the project area.

Mixed use and congestion of NC12 within the Village of Ocracoke also creates potentially unsafe conditions for motorists, bicyclists, and pedestrians. The NPS, North Carolina Department of Transportation (NCDOT), and Hyde County are working cooperatively to provide and promote safe and enjoyable experiences of Ocracoke Island by all. We have identified that an alternate transportation system using trams or trolleys may help to alleviate congestion in the Village, while facilitating a satisfying visitor experience of attractions within the National Seashore and Village of Ocracoke. The NPS has agreed to identify potential parking lot locations that would support a tram/trolley operation and evaluate impacts associated with its establishment on park land.

**GOALS OF THE PROGRAM**

While addressing the project's purpose and need, and ensuring that resources within CAHA are unimpaired for the enjoyment of future generations, the following goals will be fulfilled:

- Ensure that proposed management actions are consistent with laws, regulations, and executive mandates, and NPS policies.
- Protect the Park's natural, cultural, scenic, and aesthetic values.



- Develop alternatives that minimize areas of disturbance during construction and operations and the potential for other long-term, adverse impacts to park resources.
- Allow for a satisfying experience that is consistent with the purposes for which the park was established.
- Cooperatively work with NCDOT to reduce conflicts between motorists, bicyclists, and pedestrians.

**DEVELOPMENT OF ALTERNATIVES**

Internal NPS, interagency, and public scoping have been held for this project during recent years. After careful and extensive consideration of the concerns and suggestions on this project, two action alternatives for the trail alignment have been developed and are shown on the attached map. In Alternative B, NCDOT would widen both road shoulders of NC12 to a constant width of five feet from the NPS Campground to Village of Ocracoke boundary, a distance of 3.08 miles. In Alternative C, NCDOT would construct a new, 8-12 foot wide trail that is located on the Atlantic Ocean-side, between the secondary dune and shrub thicket between the NPS Campground and Ocracoke Airstrip/Ramp 70 (2.74 miles); the new trail would be constructed along the road shoulder from the Ocracoke Airstrip/Ramp 70 to the Village of Ocracoke boundary (0.50 miles). The "No Action" alternative will also be presented in the EA.

Numerous sites for a parking lot were initially considered but were dismissed due to the presence of U.S. Army of Corps of Engineers jurisdictional wetland and NPS wetland, anticipated complications associated with long-term maintenance, and relocating mixed use and congested area traffic. Based on field surveys and discussions with the agencies, only one of the areas considered as a potential parking lot location would allow for the minimization of adverse impacts to wetlands, long-term maintenance, and resolution of mixed use and traffic congestion (shown on the attached map). Existing parking areas would continue to be used.

**RESOURCE ISSUES/CONCERNS**

Preliminary issues identified by an internal scoping process include:

- |                            |                            |                              |
|----------------------------|----------------------------|------------------------------|
| • Vegetation and Wildlife  | • Stormwater Management    | • Park Operations            |
| • T&E Species              | • Transportation           | • Visitor Use and Experience |
| • Wetlands and Floodplains | • Public Health and Safety |                              |
| • Coastal Processes        | • Cultural Resources       |                              |

Please provide any written comments to:  
 ATTN: Meghan Carfioli, Natural Resource Manager  
 NPS - Outer Banks Group  
 1401 National Park Drive  
 Manteo, NC 27954

Sincerely,

*Michael B. Murray*  
 Michael B. Murray  
 Superintendent

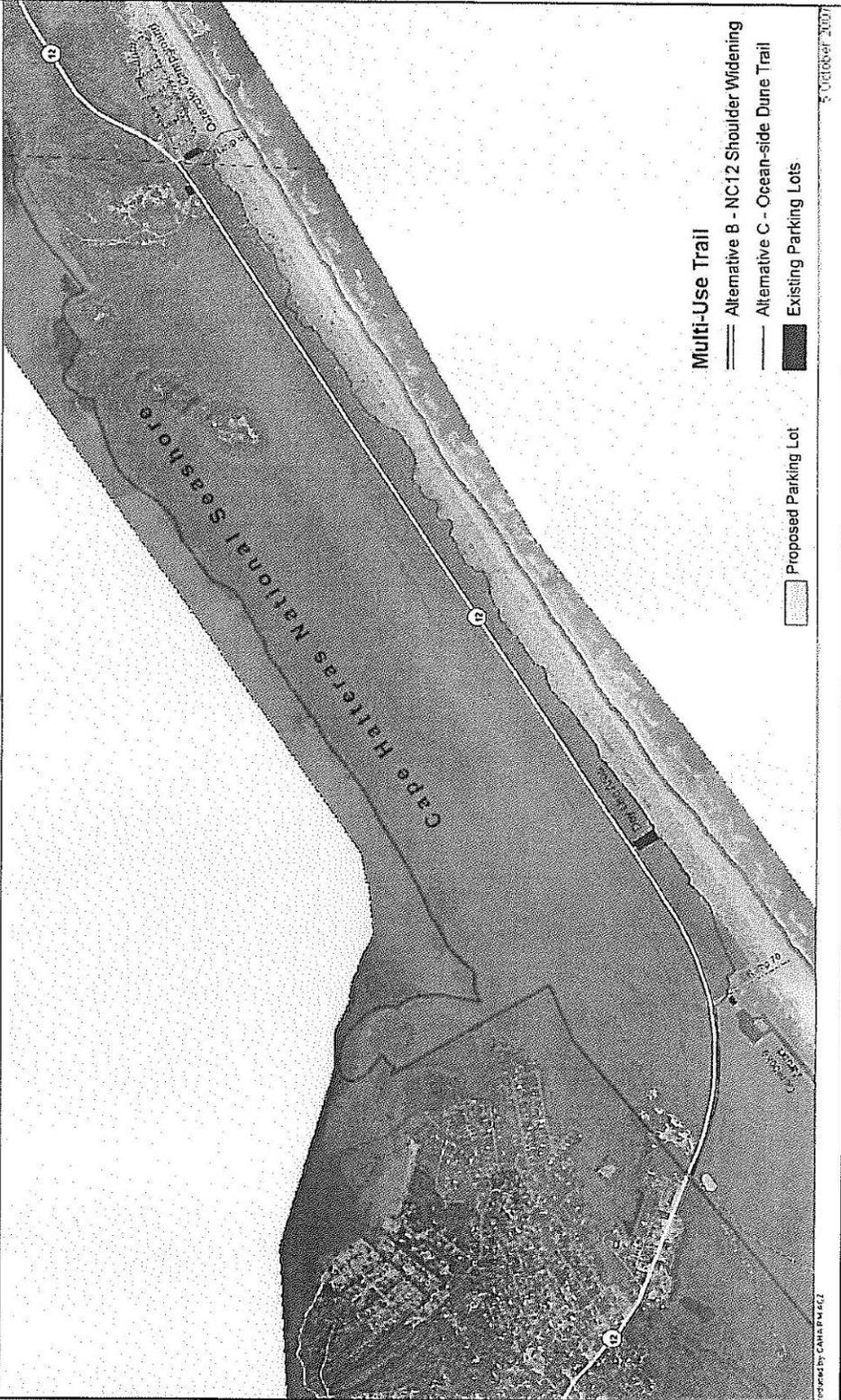
Enclosure

# Outer Banks Group



National Park Service  
U.S. Department of the Interior  
Cape Hatteras National Seashore  
Fort Raleigh National Historic Site  
Wright Brothers National Memorial

## Ocracoke Island Multi-Use Trail and Parking Lot





North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

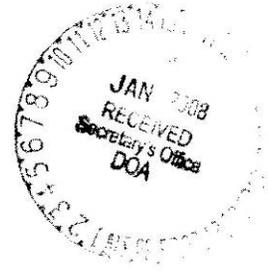
MEMORANDUM

TO: Chrys Baggett  
State Clearinghouse

FROM: Meiba McGee *Meiba McGee*  
Project Review Coordinator

RE: 08-0175 Scoping, Ocracoke Island Multi-Use Trail and Parking  
Lot, Cape Hatteras National Seashore in Hyde County

DATE: January 15, 2008



The Department of Environment and Natural Resources has reviewed the proposed project. The attached comments are a result of this review. More specific comments will be provided during the environmental review process.

Thank you for the opportunity to respond. If during the preparation of the environmental document, additional information is needed, the applicant is encouraged to notify our respective divisions.

Attachment

1601 Mail Service Center, Raleigh, North Carolina 27699-1601  
Phone: 919-733-4984 | FAX: 919-715-3060 | Internet: [www.enr.state.nc.us/ENR/](http://www.enr.state.nc.us/ENR/)

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One  
North Carolina  
*Naturally*



North Carolina  
Department of Administration

Michael F. Easley, Governor

Britt Cobb, Secretary

January 17, 2008

Ms. Meghan Carfiolo  
Natural Resource Manager  
NPS – Outer Banks Group  
1401 National Park Drive  
Manteo, NC 27954

Dear Ms. Carfioli:

Re: SCH File # 08-F-0000-0175: Scoping: Proposal to establish a multi-use trail and parking area between the Village of Ocracoke limits & the National Park Service Ocracoke campground

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

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

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

Sincerely,

Ms. Chrys Baggett  
Environmental Policy Act Coordinator

Attachments

cc: Region R  
Michael Murray, U.S. Dept. of the Interior

Mailing Address:  
1301 Mail Service Center  
Raleigh, NC 27699-1301

Telephone: (919) 807-2425  
(919) 919-3528 (TDD)  
State Contract #512-018  
E-mail: [chrys.baggett@nc.gov](mailto:chrys.baggett@nc.gov)

Location Address:  
111 West Jones Street  
Raleigh, NC 27601

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North Carolina Department of Environment and Natural Resources  
Division of Coastal Management

Michael R. Easley, Governor

James H. Gregson, Director

William G. Ross Jr., Secretary

January 4, 2008

Melba McGee  
Environmental Coordinator  
Office of Legislative & Intergovernmental Affairs  
Department of Environment and Natural Resources  
1601 Main Service Center  
Raleigh, NC 27699-0001

SUBJECT: Ocracoke Island Multi-Use Trail and Parking Lot, Cape Hatteras National Seashore,  
Hyde County, North Carolina (SCH#08-0175, and DCM#20070133)

Dear Ms. McGee:

Thank you for the opportunity to review the letter from the Cape Hatteras National Seashore (CAHA) requesting comments on a proposed environmental assessment (EA) evaluating the potential environmental impacts resulting from construction of a parking lot and multi-use trail. CAHA proposes to construct a new parking lot (within the park) adjacent to SR12 (where it leaves the park) near Ocracoke in Hyde County North Carolina. The multi-use trail would parallel SR12 on the Atlantic side from the parking lot to the Ocracoke Campground. Below are the comments by the Division of Coastal Management (DCM).

- The proposed project will require consistency review and concurrence by DCM before the project may be constructed.
- To maximize the visitor experience, we recommend that the proposed pedestrian/bicycle trail be constructed away from SR12. Additionally, if feasible, a berm could be placed between the trail and SR12 to minimize road noise for those using the trail. However, this may present a problem since it could deprive motorists of ocean views.
- We recommend that the parking lot and trail use porous materials.
- Both the parking lot and trail are likely to be subject to storm events. As such, these structures should be built with the expectation that they will have to be periodically reconstructed. Based on the expectation that the trail and parking lot will be periodically damaged resulting in a wide distribution of debris, DCM recommends that the materials used in constructing the trail and parking lot be compatible with the natural environment.
- We recommend that the trail have a connection with the airport. The CAHA letter requesting comments was unclear on this.
- While the scoping letter states that numerous sites were initially considered but were dismissed due to wetland issues, unstated is whether a parking lot alternative was considered in Ocracoke itself. The CAHA scoping letter notes the potential use of an alternate

400 Commerce Avenue, Morehead City, North Carolina 28557-3421  
Phone: 252-808-2808 | FAX: 252-247-3330 | Internet: [www.nccoastalmanagement.net](http://www.nccoastalmanagement.net)

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transportation system using trams or trolleys to alleviate congestion. We suggest exploring an alternative where the parking lot would be constructed in a central urbanized area of Ocracoke. Establishing a parking lot<sup>1</sup> and/or trailhead in a central urban location could potentially reduce the necessity to travel by automobile to the currently proposed location of the parking lot. Additionally, are there existing parking lots (in a central location) that could be expanded to accommodate recreational demand for the trail?

- A recreational potential for the trail is its use for special events that would involve a large number of people. We recommend that the EA evaluate this potential to assure that the trail is appropriately designed.
- The proposed project will be occurring within the Ocean Hazard AEC. As such, the proposed project will need to comply with the requirements of 15A NCAC 07H .0300. The "*General Use Standards for Ocean Hazards*" for proposed projects in the Ocean Hazard AEC are found in 15A NCAC 07H .0306. "*Specific Use Standards*" are found in 15A NCAC 07H .0308. These relevant enforceable policies of the State's coastal management program can be found at: <http://www.ncecostalmanagement.net/Rules/current.htm>. Please be aware that other relevant enforceable policies also exist, such as 15A NCAC 07M .0300, 15A NCAC 07M .0700, and 15A NCAC 07M .0800. Since this is only a partial list, DCM recommends that the State's coastal management program be reviewed for other relevant enforceable policies.
- We recommend that a biological review of the resources to be impacted by the proposed trail/parking lot be conducted.
- Following construction, DCM recommends that disturbed areas be planted with native species, specifically those that would help hold sand in place.
- As part of the consistency review process, the proposed EA will need to evaluate the proposed project with the Hyde County Land-Use Plan.

Thank you for your consideration of the North Carolina Coastal Management Program.

Sincerely,



Stephen Rynas, AICP  
Federal Consistency Coordinator

cc: Doug Huggen, Division of Coastal Management  
Steve Frowell, Division of Coastal Management  
John Cecil, Division of Coastal Management

---

<sup>1</sup>Constructing a parking lot and/or trailhead in a central location may initially be more expensive, but the cost may be recovered over the long term with a more transportation system where not necessary.

**Getty, Alyse**

---

**To:** Getty, Alyse  
**Subject:** T&E Species

-----Original Message-----

From: Margaret\_Carfioli@nps.gov [mailto:Margaret\_Carfioli@nps.gov]  
Sent: Tuesday, January 15, 2008 10:31 AM  
To: Anita\_Barnett@nps.gov; Cook, Angle; Bach, Steven  
Subject: Fw: Ocracoke Island Multi-use Trail and Parking Lot EA

FYI

----- Forwarded by Margaret Carfioli/CAHA/NPS on 01/15/2008 10:29 AM -----

David\_Rabon@fws.gov  
ov  
01/15/2008 09:24  
AM EST

To: margaret\_carfioli@nps.gov  
cc:  
Subject: Ocracoke Island Multi-use Trail  
and Parking Lot EA

Dear Meghan:

The U.S. Fish and Wildlife Service (USFWS) has received your letter, dated December 19, 2007, requesting a current list of federally-protected endangered and threatened species, species of concern, or any other special status species, and/or designated critical habitat that might occur in the vicinity of the proposed multi-use trail and parking lot on Ocracoke Island, Cape Hatteras National Seashore, Hyde County, North Carolina. Our comments are submitted pursuant to, and in accordance with, provisions of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA).

Section 7(a)(2) of the Endangered Species Act requires that all federal action agencies (or their designated non-federal representatives), in consultation with the USFWS, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any federally-listed threatened or endangered species. A biological assessment/evaluation may be prepared to fulfill the section 7(a)(2) requirement and will expedite the consultation process. To assist you, a complete listing of federally-protected species known to occur in Hyde County and information on their life histories and habitats, as well as information necessary to conduct an effect determination and complete an initiation package, can be found on our web page at < <http://nc-es.fws.gov/es>>. We recommend that you consider this information carefully in preparing a complete initiation package.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a federally-protected species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects (i.e., a complete initiation package), before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on federally-listed species, then you are not required to contact our office for concurrence.

The term "federal species of concern" refers to those species which the Service believes might be in need of concentrated conservation actions.

Federal species of concern receive no legal protection and their designation does not necessarily imply that the species will eventually be proposed for listing as a federally endangered or threatened species. However, we recommend that all practicable measures be taken to avoid or minimize adverse impacts to federal species of concern.

In addition, please be aware that we recommend that associated lighting with the parking lot and or trail be constructed in a manner to reduce the potential for lighting to adversely affect nesting and hatchling sea turtles on the ocean beach. A technical report, entitled "Understanding, Assessing, and Resolving Light-Pollution Problems on Sea Turtle Nesting Beaches," explores this issue in detail, and includes diagrams of common lighting fixtures and mounting positions. The report can be found on the internet at [http://research.myfwc.com/features/view\\_article.asp?id=2156](http://research.myfwc.com/features/view_article.asp?id=2156).

Thank you for your cooperation in protecting federally-listed species. If you have any questions or comments, please contact me.

Sincerely,

David R. Rabon, Jr.  
U.S. Fish and Wildlife Service  
Post Office Box 33726  
Raleigh, North Carolina 27636-3726

telephone: 919.856.4520 x 16  
telefax: 919.856.4556  
email: david\_rabon@fws.gov

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Anita Barnett  
02/21/2008 12:34 PM  
EST

To: Bennie Keel/SEAC/NPS@NPS  
cc: Doug Stover/CAHA/NPS@NPS, George S Smith/SEAC/NPS@NPS,  
"Getty, Alyse" <Alyse.Getty@parsons.com>, Margaret  
Carfioli/CAHA/NPS@NPS  
Subject: Re: CAHA Trail 

Thank you Bennie!

Bennie Keel

Bennie Keel  
02/21/2008 11:44 AM  
EST

To: Anita Barnett/Atlanta/NPS@NPS  
cc: Doug Stover/CAHA/NPS@NPS, George S Smith/SEAC/NPS@NPS  
Subject: CAHA Trail

After speaking with you this morning I checked in with George Smith to reassure myself about this project.

Given our understanding of the current location and route of the proposed trail construction we do not believe that an archeological survey is necessary nor given the very low probability that important archeological resources are present that it necessary to have an archeological monitor on site during construction. We are certain in the most unlikely event of an unanticipated discovery SEAC will be contacted immediately by the Park's CR manager, Doug Stover.

Bennie C. Keel, PhD, RPA  
Acting Director

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## **APPENDIX B: NORTH CAROLINA COASTAL ZONE ANALYSIS**

## State of North Carolina Division of Coastal Management Requirements

The State of North Carolina Division of Coastal Management also has requirements for construction and operation of projects in state-designated "Areas of Concern" on barrier islands. Areas of Environmental Concern are the foundation of the North Carolina Coastal Resources Commission's permitting program for coastal development. Areas of Concern are defined as areas of natural importance that may be easily destroyed by erosion or flooding; or that may have environmental, social, economic or aesthetic values that make it valuable to the state (NCDCM 2008, CAMA 2008, Hyde County 2006). The Coastal Resources Commission designates Areas of Concern to protect them from uncontrolled development that has the potential to cause irreversible damage to property, public health, or the environment, or that could diminish their value to the entire state. The program for Ocracoke Island is implemented through a plan prepared by Hyde County (Hyde County 2006). The state has set up the following four types of Areas of Concern:

1. **The Estuarine and Ocean System** - Brackish sounds, marshes and surrounding shores. The project is not located in this system. The project is bordered on the west side of NC-12 by Pamlico Sound, which is part of the Estuarine and Ocean System Area of Concern. The sound side of Ocracoke Islands is classified as a "Public Trust Area", within the Estuarine and Ocean Area of Concern (Hyde County 2006). However, all construction of the proposed action would occur on the east side of NC-12 behind the secondary and tertiary dunes. No construction would occur in the Estuarine and Ocean System Area of Concern and operation of the proposed trail would not affect the Estuarine and Ocean System Area of Concern on the sound side of Ocracoke Island.
2. **The Ocean Hazard System**- Oceanfront lands and the inlets that connect the ocean to the sounds (barrier islands). This system is further subdivided into the Ocean Erodible Area of Concern, the High Hazard Flood Area of Concern and the Inlet Hazard Area of Concern.
3. **Public Water Supplies.** The project is located in a public water supply Area of Concern and will have no effect on public water supplies.
4. **Natural and Cultural Resource Areas.** There are only two specially designated Natural and Cultural Resource Areas of Concern in North Carolina – Permuda Island and Jockey's Ridge (CAMA 2008). Both are located outside the park and neither would be affected by the proposed action.

The project area is located within the Ocean Hazard Area of Concern. Ocean Hazard Areas of Concern receive the full force of any storm, which can quickly change shorelines, create or fill inlets, flatten nearby dunes and erode beaches. No oceanfront development can be absolutely safe from destructive natural forces, but development in ocean hazard areas can be carefully designed and located to minimize the risk to life and property. Oceanfront beaches and dunes help protect structures and environments by absorbing the force of wind and waves, while the dense root networks of dune plants trap and anchor sand (CAMA 2008).

The following is a discussion of the types of Ocean Hazard Areas of Concern that have been established in North Carolina (CAMA 2008) and which ones apply to the proposed action:

The **Ocean Erodible Area of Concern** covers North Carolina's beaches and any other oceanfront lands that are subject to long-term erosion and significant shoreline changes. The seaward boundary of this Area of Concern is the mean low water line. The landward limit is measured from the first line of stable natural vegetation and is determined by adding a distance equal to a specified factor times the long-term, average annual erosion rate for that stretch of shoreline to the distance of erosion expected during a major storm. In North Carolina, the width of this Area of Concern varies from about 145 feet to more than 700 feet.

Projects also are required to incorporate all reasonable means and methods to avoid damage to the natural environment or public beach accessways (CAMA 2008). Reasonable means and methods include limiting the scale of the project and the damage it causes; restoring a damaged site; or providing substitute resources to compensate for damage. The following is a summary of the selected applicable requirements, and a statement regarding how the proposed action will meet these requirements:

- The project should be set as far back from the ocean as possible. At minimum, all building must be located behind the crest of the primary dune, the landward toe of the frontal dune or the erosion setback line - whichever is the farthest from the first line of stable natural vegetation. The state defines a primary dune as the first mound of sand (measured from the ocean) that is six feet taller than the mean flood level for the area. Frontal dunes are the first mounds of sand that have enough vegetation, height and continuity to offer protection.

Under the state regulations, a project is required to meet regulations for setbacks for development established by the State of North Carolina (15A NCAC 7H .0306). These setbacks are based on the potential for the island to erode at different rates along the length of the island (Appendix C). Setback distance is calculated from annual erosion rates and a setback factor. Different setback factors have been established for buildings versus roads, parking lots and other public infrastructure such as utilities. Development such as roads, parking lots, and other public infrastructure have specified setback factor of 30 if total area greater than 5,000 square feet and a setback factor of 60 if total area 5,000 square feet or greater) (CAMA 2008). Erosion rates for the project areas have been mapped by the state. The entire project corridor is located within the 2.0 feet/year setback factor zone.

The setback factor is multiplied by the erosion rate factor to arrive at the required distance a project must be located from the first line of natural stable vegetation. The proposed action would be approximately 3¼ miles in length (17,160 feet) and would have a permanent width of 14 feet of constructed surface. The permanent paved area of the proposed action would be 240,240 square feet (5.5 acres). The proposed action would require a setback factor of 60 and would require 120 feet setback from the first line of natural stable vegetation. The project is located well beyond this setback, and therefore meets this requirement.

- The project must not remove or relocate sands or vegetation from primary or frontal dunes. These dunes help protect structures from erosion, flooding and storm waves, and they help maintain North Carolina's barrier islands and beaches. The proposed action would be located behind the secondary and/or tertiary dunes, and would therefore meet this requirement.
- The project must meet all local minimum lot-size and setback requirements. Counties and towns often require a setback from roads, property lines or dunes. The proposed action would meet the setback requirements for a road, summarized previously.
- The project must comply with the local Coastal Area Management Act land use plan. A land use plan contains a community's goals, management policies and a map classifying land according to the types of development allowed. A draft plan for Hyde County, which includes Ocracoke Island, has been prepared (Hyde County 2006). The plan includes an Environmental Composite Map for Hyde County that is used in conjunction with a referenced Land Suitability Analysis to provide a guide to the County for the most appropriate use of land. The Environmental Composite Map presented in the plan breaks down land masses within the County into three different categories based on natural features and environmental conditions. The categories utilized are as follows:
  - Class I. Land that contains only minimal hazards and limitations that can be addressed by commonly accepted land planning and development practices. Class I land will generally support the more intensive types of land uses and development.

- Class II. Land that has hazards and limitations for development that can be addressed by restrictions on land uses, special site planning, or the provision of public services, such as water and sewer. Land in this class will generally support only the less intensive uses, such as low density residential, without significant investment in services.
- Class III. Land that has serious hazards and limitations. Land in this class will generally support very low intensity uses, such as conservation and open space. An overlay analysis was performed, breaking the County into one-acre cells utilizing only map layers determined to be environmental factors. The layers used, and their assigned classes, are outlined in Figure 10.

Layer	Class I	Class II	Class III
Coastal Wetlands			✓
Exceptional or Substantial Non-Coastal Wetlands			✓
Beneficial Non-Coastal Wetlands		✓	
Estuarine Waters			✓
Soils with Slight or Moderate Septic Limitations	✓		
Soils with Severe Septic Limitations			✓
Flood Zones		✓	
Storm Surge Areas		✓	
HQW/ORW Watersheds		✓	
Water Supply Watersheds		✓	
Significant Natural Heritage Areas		✓	
Protected Lands			✓

**FIGURE 10. ENVIRONMENTAL COMPOSITE LAYERS FOR HYDE COUNTY, NORTH CAROLINA**

According to this method, the project area would fall under the Class II category, since the entire project corridor is located within the flood zone and storm surge area, and is a significant natural area. The plan therefore defines Ocracoke Island as the "least suitable" for overall development activities. However, the proposed trails project would meet the requirements for development within a Class II area because it would provide a public service that would improve safety, and it would also be classified as a less intensive use, as compared with buildings. The proposed would still, however, be subject to periodic effects of storms, flooding and overwash.

- The project may not interfere with or block the public's ability to reach, use and enjoy the resources that belong to all the people of the state. These resources include the wet sand beaches and waters. No development is allowed seaward of the vegetation line, because the public has a right to use the sandy beach. Development also may not block established pathways to the beach.

The proposed action would increase access to the dune area and provide connectivity between the Village of Ocracoke and the NPS Campground. The project would not block visitor's access to the beach since existing access points would not be blocked. The project actually increases visitor access to the beach areas by providing a north/south transportation corridor for visitors.

- The project must not cause major or irreversible damage to valuable archaeological or historic resources. Information on the location of these sites is available from the N.C. Division of Archives and History in the Department of Cultural Resources. A cultural resources assessments was conducted by the SE Archeology Center of the NPS and it was determined that the proposed action would not affect cultural resources.

- The construction of publicly funded projects, such as sewers, water lines, roads, bridges and erosion control works, will be permitted only if they:
  - Greatly benefit the public, nation or state. The proposed action would greatly improve safety of visitors along NC-12 between the Village of Ocracoke and the NPS Campground by providing an alternate route through the area behind the secondary and tertiary dunes.
  - Don't promote additional development in ocean hazard Areas of Concern. The proposed action would not cause growth to be induced in the project area. It would only provide a safe alternative foot and bicycle path for visitors between the Village of Ocracoke and the NPS Campground.
  - Won't damage natural buffers to erosion, wave wash and flooding. The proposed action would be constructed in the area behind the second and tertiary dunes on the east side of NC-12. This is an area that has is less prone, but not immune, to erosion, wave wash and flooding. Some disturbance of the secondary and tertiary dune system would result from construction of the proposed action as a result.
  - Won't otherwise increase existing hazards. The proposed action would be constructed in the area behind the second and tertiary dunes on the east side of NC-12. This is an area that has is less prone, but not immune, to erosion, wave wash and flooding.

The **High Hazard Flood Area of Concern** covers lands subject to flooding, high waves and heavy water currents during a major storm (CAMA 2008). These are the lands identified as coastal flood with velocity hazard, or "V zones," on flood insurance rate maps prepared by the Federal Insurance Administration. "V zones" are determined by an engineering analysis of expected flood levels during a storm, expected wave and current patterns, and the existing topography of the land.

Between the NPS Campground and the NPS Airstrip / Ramp 70, the proposed trail would be located within the "VE" flood zone, the coastal flood zone where there is a velocity hazard and the base flood elevation is 8 feet above sea level. Between the NPS Airstrip / Ramp 70 and the NPS / Village of Ocracoke boundary, the proposed trail would be located in the "AE" flood zone where base flood elevations are between 6 and 7 feet above sea level.

The **Inlet Hazard Area of Concern** covers the lands next to ocean inlets. This Area of Concern does not occur in the project corridor (CAMA 2008). Inlet Hazard Areas of Concern do occur at the north and south ends of Ocracoke Island, however.

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**APPENDIX C: STATEMENT OF FINDINGS FOR FLOODPLAINS**

*Statement of Findings for Floodplains*

*for the Proposed  
Ocracoke Island Multi-Use Trail*

Cape Hatteras National Seashore  
Nags Head, Buxton, and Ocracoke, North Carolina

Recommended: \_\_\_\_\_  
Superintendent, Cape Hatteras National Seashore                      Date

Concurred: \_\_\_\_\_  
Chief, Water Resources Division    Date

Approved: \_\_\_\_\_  
Southeast Regional Director    Date

## Introduction

The Cape Hatteras National Seashore (CAHA) has prepared and made available an Environmental Assessment (EA) for a proposed multi-use trail between the NPS Campground and Village of Ocracoke on Ocracoke Island, NC. The purpose of the proposed action is to construct a new trail corridor that would help to:

- Improve safety on NC-12 for pedestrians, bicyclists, and motorists;
- Improve visitor access in the project corridor;
- Increase opportunities for utilization of alternative modes of transportation, such as walking and bicycling; and
- Reduce traffic congestion within the park and near the Village limit.

The trail would separate visitors from NC-12, where the posted speed limit for vehicular traffic is 55mph from the NPS Campground to the final ¼ mile approaching the Village limit. The new multi-use trail would be approximately 3¼ miles long and would be accessible by bicyclists, pedestrians, and visitors with mobility restrictions.

Executive Order 11988 (Floodplain Management) requires the NPS and other federal agencies to evaluate the likely impacts of actions in floodplains. The objectives of the Executive Order is to avoid, as much as possible, the short- and long-term adverse impacts associated with occupancy, modification, or destruction of floodplains and to avoid indirect support of development and new construction in such areas where there is a practicable alternative. DO #77-2: *Floodplain Management* provides NPS procedures for complying with E.O. 11988. This Statement of Findings (SOF) has been prepared in accordance with the guidelines in NPS DO #77-2. The purpose of this SOF is to present the rationale for the location of the proposed plan in the floodplain area and to document the anticipated effects on these resources.

## Proposed Action

The Preferred Alternative, Alternative C, (Figure C1) would involve construction of a multi-use trail between the NPS Campground and the Village of Ocracoke. The entire trail length would be asphalt-paved. The multi-use trail would be constructed using hard surface materials. The maximum width of the hard surface would be 10-feet wide, and an additional 2-feet wide of pervious shoulders on either side of the trail would be constructed, resulting in a total path width of 14 feet. The entire trail would comply with accessibility requirements under the Architectural Barriers Act (1968) and the Americans with Disabilities Act (1990) to provide full and equal access for all visitors, regardless of mobility limitations.

The trail would be aligned to avoid adverse impacts to wetlands in the project corridor. The removal of shrub vegetation would be minimized.

Along the ½ mile of NC-12 between Village of Ocracoke and the NPS Ocracoke Airstrip/Ramp 70 area, the trail would be located within the existing NC-12 right-of-way, in the mown grassy swale between the existing paved road surface and wetlands. The trail would be constructed parallel to the NC-12 road corridor, but separated from the road by a distance of approximately 8-10 feet.

The remaining 2¾ miles of the trail from the NPS Ocracoke Airstrip/Ramp 70 area to the NPS Campground would be located south of NC-12, between the secondary dune and shrub thicket. The trail would be located on the backdune for a ½ mile-long segment immediately north of the NPS Day Use Area parking lot, and a ½ mile-long segment from the NPS Day Use Area parking lot south to Ramp 70 (Figure 6). Constructing the trail on the backdune in these sections would allow for avoidance of wetlands, minimization of vegetation clearing, and simplification of construction and maintenance of a continuous, asphalt-paved trail. The trail would intersect with the existing Day Use Area parking lot, to

allow visitors to access the trail from an existing parking area equipped with sweet-smelling toilets and shower facilities.

The proposed development of a trail in a high hazard area is classified as a Class III Action, in accordance with DO #77-2. The trail corridor would require a 25-foot-wide construction footprint located between the secondary dune and shrub thicket. The area of temporary disturbance of the 100-year floodplain in the project area would be 9.8 acres. The asphalt-paved trail would be 14 feet-wide upon completion; therefore the permanent loss of 100-year floodplain in the project area would be 5.5 acres.

### **Site Description**

Elevations in the immediate vicinity of the project corridor range from sea level to 22 feet above sea level. The primary dune elevation in the project corridor is as much as 22 feet above sea level, while the secondary dune ranges in elevation from eight to 14 feet above sea level. The proposed trail alignment, located behind the secondary dune, ranges in elevation from four to six feet in elevation.

Due to the low topography, the entire project area on Ocracoke Island is located within the 100-year flood zone, is subject to inundation during extreme storm events, and where base flood elevations range between 6 and 8 feet. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps show that the project area is within 100-year-flood floodplain (Figures C2-C6). Between the NPS Campground and the NPS Airstrip / Ramp 70, the proposed trail would be located within the “VE” flood zone, the coastal flood zone where there is a velocity hazard and the base flood elevation is 8 feet above sea level (Figures 3, 4, and 6). Between the NPS Airstrip / Ramp 70 and the NPS / Village of Ocracoke boundary, the proposed trail would be located in the “AE” flood zone where base flood elevations are between 6 and 7 feet above sea level (Figures C4-C6).

### **Justification for the Use of Floodplains**

The purpose of this project is to improve safety on NC Hwy 12 for pedestrians, bicyclists, and motors; improve visitor access in the project corridor; create increased opportunities for use of alternative modes of transportation; and help reduce traffic congestion in the vicinity of the project. The proposed development of a trail in a high hazard area is classified as a Class III Action, according to DO #77-2. Avoidance of impacts to floodplains is not possible on Ocracoke Island because the entire project area is within the 100-year floodplain.

### **Investigation of Alternate Sites**

Since the entire project area is located within the 100-year floodplain, there is no alternative site for establishment of a multi-use trail.

The No Action Alternative, Alternative A, is the only viable alternative to the Preferred Alternative of Alternative C. Alternative A would result in no change or alteration to the 100-year floodplain in the project area because there would be no improvement of existing road shoulders or establishment of a new trail corridor.

### **Mitigative Actions**

Mitigation would be provided by incorporating methods for protecting life and minimizing damage through appropriate procedures. Mitigation would include sustainable design principles, design consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60), best management practices during and after construction, and use of non-structural method such as flood warning and evacuation procedures, which are described in the park’s annually updated All Risk Management Plan (NPS 2007).

## **Compliance**

### *National Environmental Policy Act*

The Environmental Assessment, Section 106 Compliance Review, this Statement of Findings for Executive Orders 11990 and 11988, and the Finding of No Significant Impact would complete the requirements for the National Environmental Policy Act for this project.

### *Coastal Zone 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 (e.g., State and Federal offshore oil and gas development). CZMA provisions help States develop coastal management programs to manage and balance competing uses of the coastal zone.

### *North Carolina Coastal Area Management Act*

The North Carolina Coastal Area Management Act (CAMA) of 1974 establishes a cooperative program of coastal area management between local and State governments. Local government shall have the initiative for planning. State government shall establish areas of environmental concern.

### *2008 Hurricane Action Plan*

The Outer Banks Group of National Parks (Cape Hatteras National Seashore, Fort Raleigh National Historic Site, and Wright Brothers National Memorial) operates under a single hurricane action plan in the event of a high energy weather event. Evacuation of visitors and protection of park staff, contractors, and visitors is compliant with this plan. Evacuation of people and protection of resources in the vicinity of a high energy weather event would be consistent with the hurricane action plan.

This environmental assessment, SOF for Executive Order 11988 and Procedural Manual #77-2, and the Finding of No Significant Impact (FONSI), when signed, would complete the requirements for the National Environmental Policy Act for this project.

## **Conclusion**

The protection of people, property, and resources is of high priority to the Cape Hatteras National Seashore and North Carolina Department of Transportation. The proposed multi-use trail would be constructed on NPS land. The NPS concludes that there is no other practicable alternative for the development proposed. The proposed trail was designed to improve the safety of park visitors on foot, bicycles, and motor vehicles. To accomplish this, the temporary disturbance of 9.8 acres of 100-year floodplains would be incurred and mitigated. Of these 9.8 acres temporarily disturbed, 5.5 acres of the 100-year floodplain would be permanently lost. Mitigation would include good design through sustainable design principles, appropriate siting, best management practices during and after construction, as well as implementation of non-structural methods through flood warning and evacuation procedures.

The NPS finds the proposal to be consistent with Executive Order 11988. The NPS finds that this proposed action is consistent with the policies and procedures of NPS Special Directive 93-4 (Floodplain Management Guidelines).

## **References**

National Park Service, U.S. Department of Interior. 1993. *Special Directive 93-4: Floodplain Management Guideline*. Washington, D.C.

National Park Service. U.S. Department of Interior. 2007. *2007 All Risk Management Plan, National Park Service, Outer Banks Group*. Manteo, NC.



Figure C1. Project area map showing Alternative C, the Preferred Alternative, for the multi-use trail alignment



Figure C2. FEMA Flood Insurance Maps (Panels 3720951100J, 3720951000J, and 372095000J) for the project area on Ocracoke Island, NC. The project area is shown as a green striped polygon.

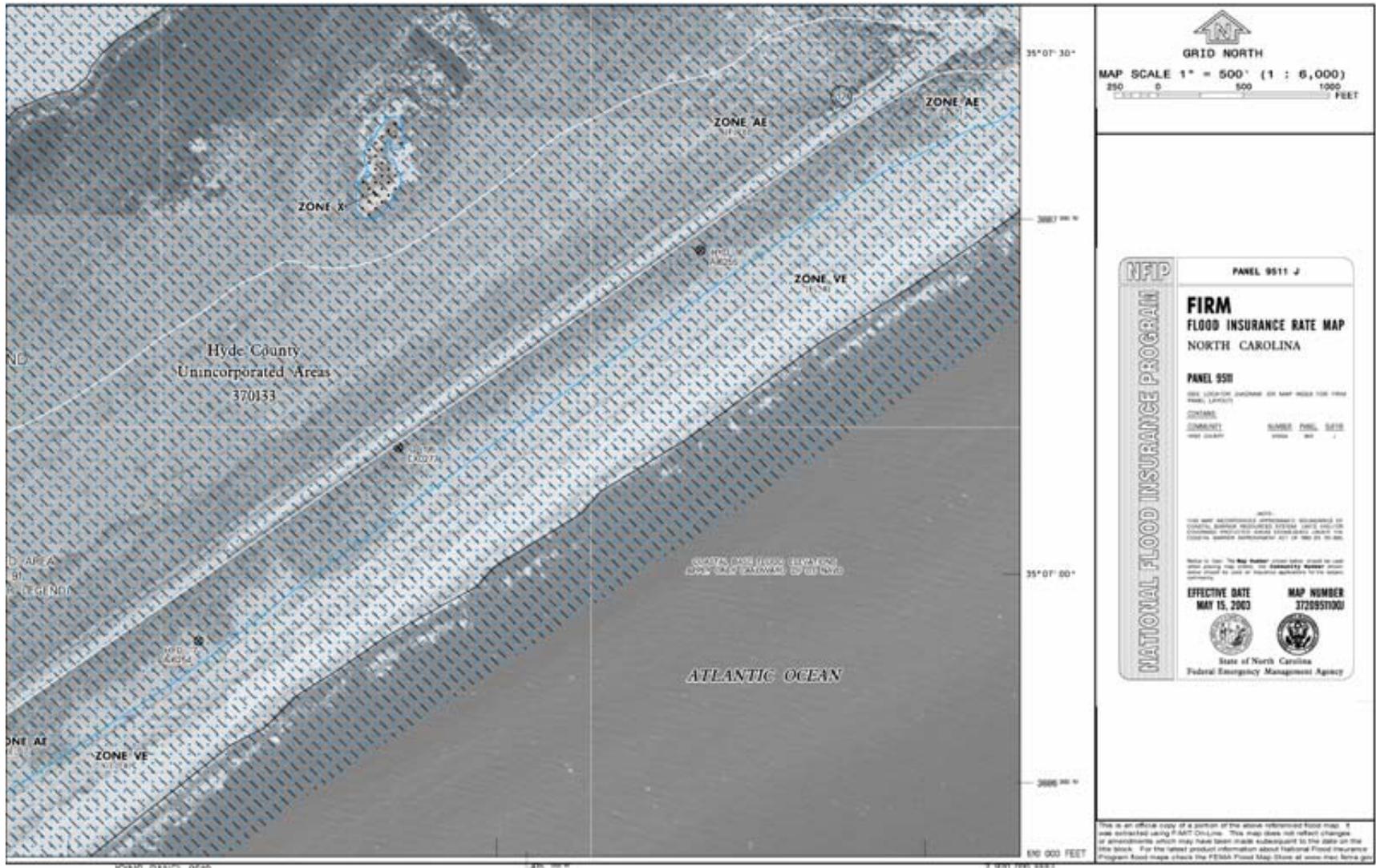


Figure C3. FEMA Flood Insurance Map, Panel 3720951100J, for the project area on Ocracoke Island, NC

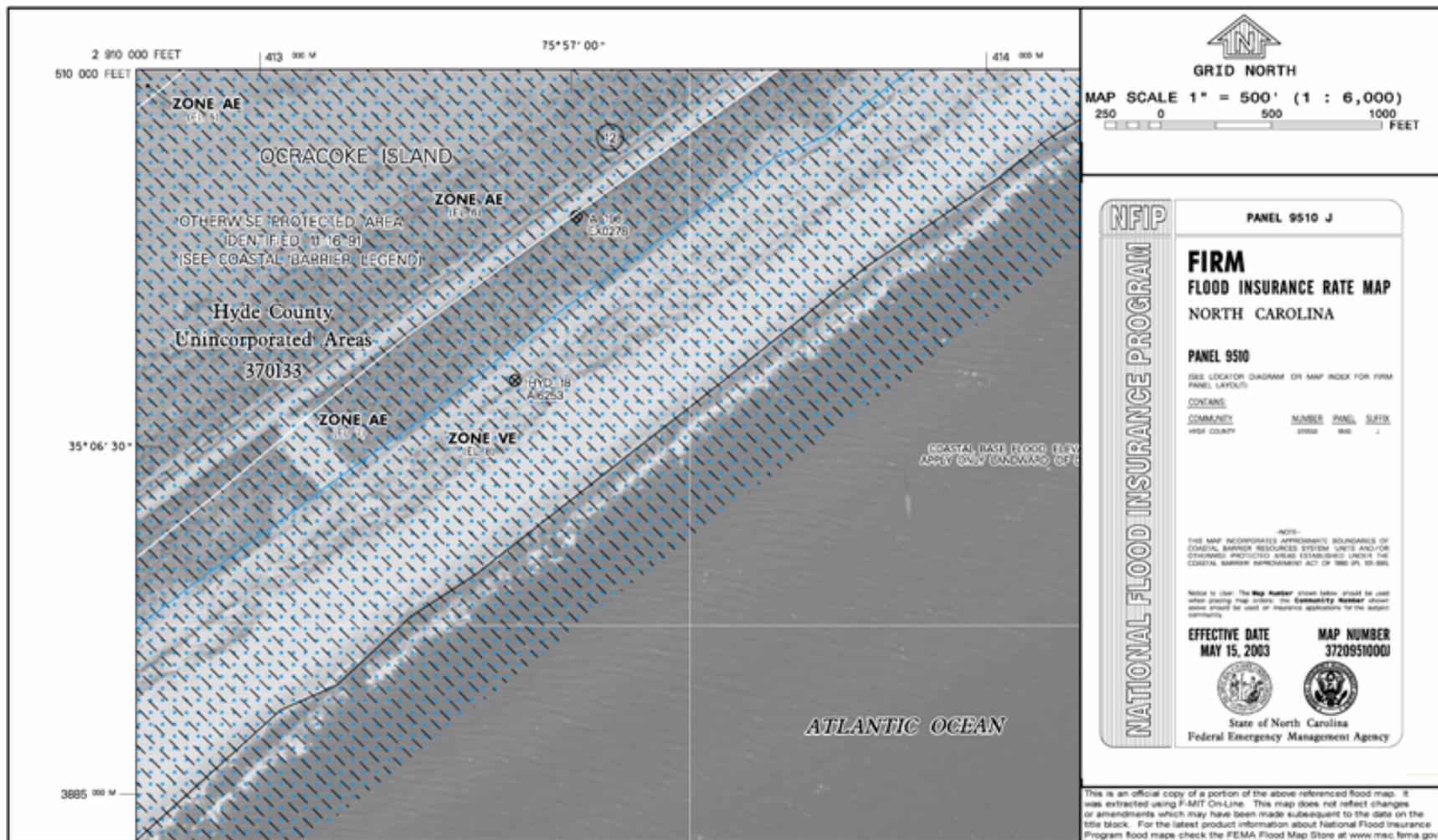
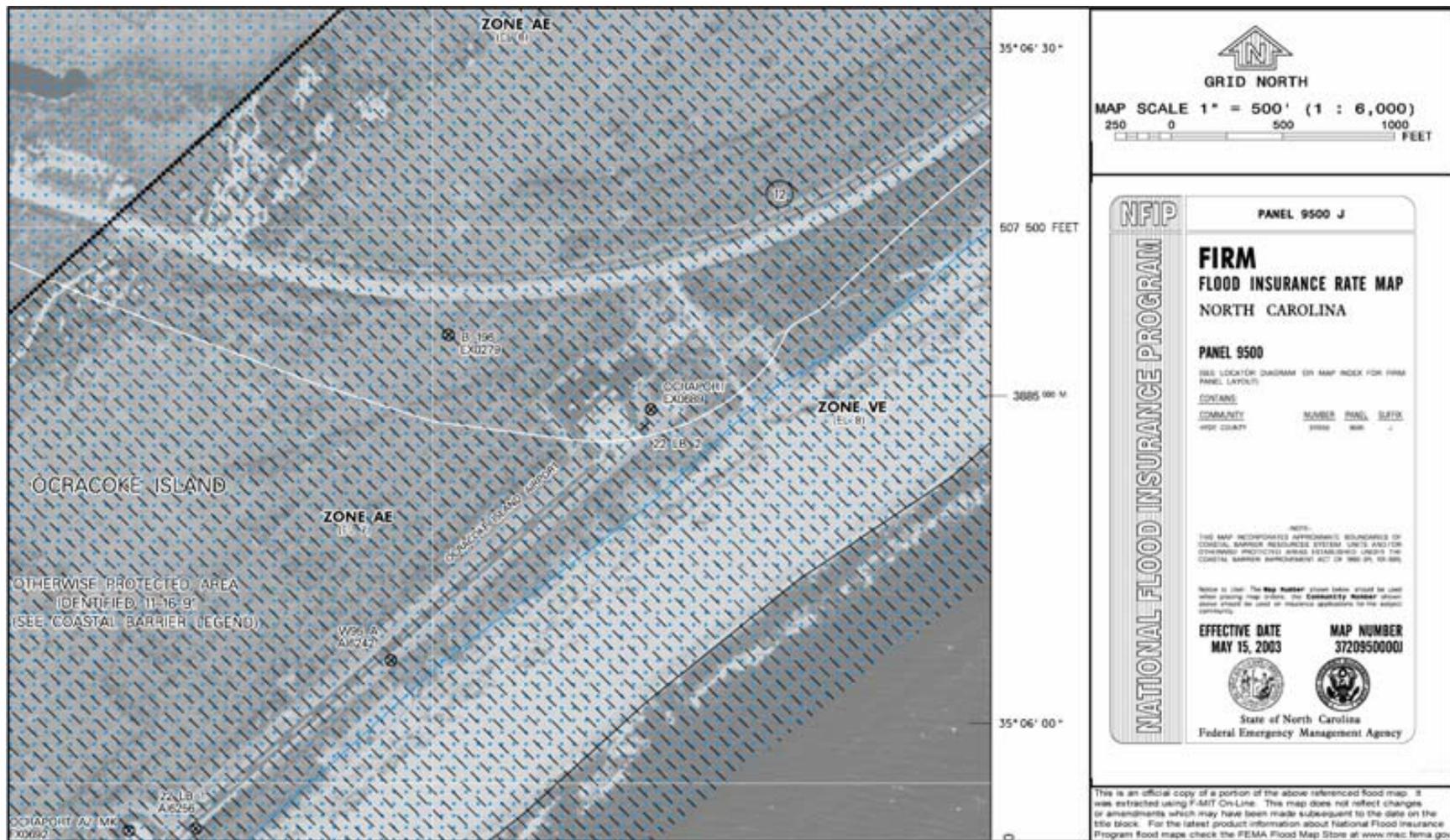


Figure C4. FEMA Flood Insurance Map, Panel 3720951000J, for the project area on Ocracoke Island, NC



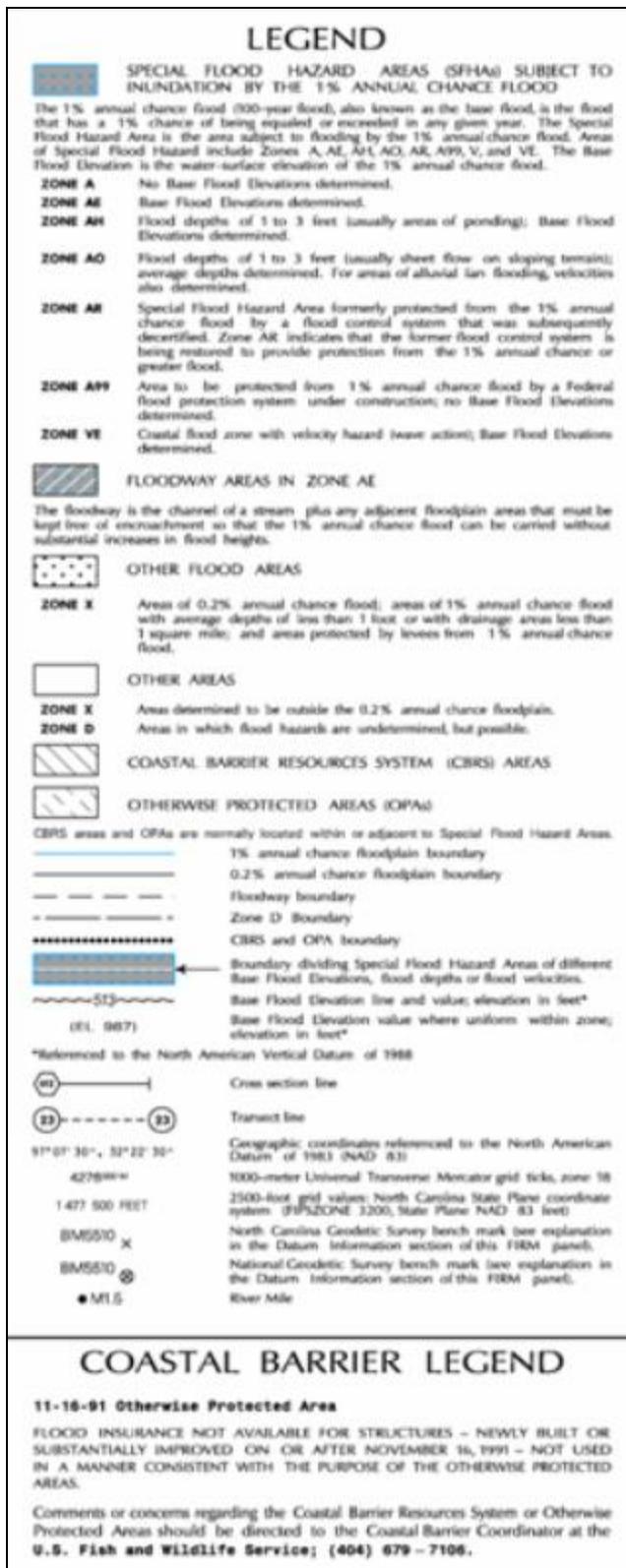


Figure C6. FEMA Flood Insurance Map legend



As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.