National Park Service

U.S. Department of the Interior

Cape Hatteras National Seashore

Environmental Assessment/Assessment of Effect

Review and Adjustment of Wildlife Protection Buffers

April 2015

Department of the Interior
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North Carolina
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Summary

The National Park Service (NPS) proposes to modify wildlife protection buffers established under the Cape Hatteras National Seashore Final Off-Road Vehicle Management Plan and Environmental Impact Statement of 2010 (ORV FEIS). This proposed action results from a review of the buffers, as mandated by Section 3057 of the Defense Authorization Act of Fiscal Year 2015, Public Law 113-291 (2014 Act). The 2014 Act directs the NPS "to ensure that the buffers are of the shortest duration and cover the smallest area necessary to protect a species, as determined in accordance with peer-reviewed scientific data."

This environmental assessment (EA) deals solely with review and modification, as appropriate, of wildlife protection buffers and the designation of pedestrian and vehicle corridors around buffers. All other aspects of the ORV FEIS remain unchanged.

This EA analyzes potential impacts to the human environment resulting from two alternative courses of action. These alternatives are: alternative A (no action, i.e., continue current management under the ORV FEIS), and alternative B (modify buffers and provide additional access corridors) (the NPS preferred alternative). As more fully described in the EA, the proposed modifications to buffers and corridors in alternative B are as follows:

- For **American oystercatcher**: There would be an ORV corridor at the waterline during nesting, but only when (a) no alternate route is available, and (b) the nest is at least 25 meters from the vehicle corridor. Buffers for nests and unfledged chicks would stay the same as they are now.
- For **piping plover**: The buffer during nesting would be reduced from 75 meters to 50 meters for both pedestrians and ORVs. For unfledged chicks, the buffer would be reduced from 300 meters to 100 meters (pedestrians) and from 1,000 meters to 500 meters (ORVs). Where the standard 500 meter buffer blocks ORV access, the buffer may be reduced to no less than 200 meters to allow an access corridor along the shoreline.
- For **Wilson's plover**: The buffer during nesting would be reduced from 75 meters to 50 meters for pedestrians and ORVs. The pedestrian buffer for unfledged chicks would be reduced from 200 meters to 100 meters, the same as for piping plovers. The ORV buffer for unfledged chicks would increase from 200 meters to a standard 500 meters. However, where an ORV corridor does not exist, the buffer may be reduced to no less than 200

meters to allow an access corridor along the shoreline.

- For **least tern**: The buffer for unfledged chicks would be reduced from 200 meters to 100 meters for both pedestrians and ORVs. The buffer for nests would stay the same.
- For **common tern**, **gull-billed tern**, and **black skimmer**: The buffer for these species during nesting would be reduced from 200 meters to 180 meters for both pedestrians and ORVs. For unfledged chicks, the buffer would be reduced from 200 meters to 180 meters for both pedestrians and ORVs.
- For **sea turtles**: The expansion buffer would be reduced to 30 meters (15 meters on either side), and, when light filtering fencing is installed, 5 meters minimum behind the nest. This buffer would be the same for vehicle-free areas, village areas, and ORV routes. Visitors would be able to walk behind the buffer or in front of a nest, walking as close as practicable to the surf line. For ORVs, visitors would use an existing corridor around a nest, if available. In the absence of an existing corridor, the shorter buffer behind the nest would allow ORVs to travel behind a nest where sufficient beach width exists. Where a turtle nest blocks access from one ORV area to another and no way around the nest exists, visitors could drive in front of the nest if NPS resources exist to monitor the nest and remove ruts.

  For nests laid prior to June 1, the Seashore would retain the option of not expanding the buffer until day 60, unless signs of hatching prior to day 60 were detected. For nests laid after August 20, the Seashore would retain the option of not expanding the buffer for nests that block access to ORV passage. Nests laid after August 20 would be monitored daily for signs of hatching and managed appropriately to avoid impacts if signs of hatching are observed. Where signs of hatching are observed (e.g., depression), buffers would be expanded as outlined for nests laid prior to August 20.

The buffers and corridors proposed in alternative B are contingent on NPS having the resources (funding and staff) to do intensive or increased monitoring to protect species. In cases where resource management personnel document adverse impacts to resources greater than those described in this EA, the Seashore would retain the discretion to revert to the resource protection measures in the ORV FEIS.

Both alternatives would carefully manage visitor access at Cape Hatteras National Seashore while protecting sensitive natural resources. Alternative A is the environmentally preferred alternative. Alternative B is the NPS preferred alternative. The impacts from alternatives A and B are generally adverse and range from minor to moderate.

Note to Reviewers and Respondents

Comments on this EA must be delivered or postmarked no later than **May 14, 2015**. If you wish to comment on this EA, electronic comments are preferred. The National Park Service's Planning, Environment, and Public Comment (PEPC) web site is available for this purpose:

PEPC: http://parkplanning.nps.gov/caha

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Important Notice Before including your address, telephone number, e-mail address, or other personal identifying information in your comments, you should be aware that your entire comment (including your personal identifying information) may be made publically 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.

Contents

Introduction

This Environmental Assessment (EA) documents the potential environmental impacts from proposed modifications to existing wildlife protection buffers and access corridors at Cape Hatteras National Seashore (CAHA or the Seashore). These buffers and corridors were established pursuant to the *Cape Hatteras National Seashore Final Off-Road Vehicle Management Plan and Environmental Impact Statement* (ORV FEIS) (NPS 2010).

This EA has been prepared in compliance with:

- The National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for major Federal Actions having the potential to impact the quality of the environment;

- Council on Environmental Quality Regulations at 40 Code of Federal Regulations (CFR) 1500-1508, which implement the requirements of NEPA;

- National Park Service *Conservation Planning, Environmental Impact Analysis, and Decision Making*; Director's Order (DO) #12 and Handbook.

The ORV FEIS evaluated six alternatives for managing off-road motorized vehicle access and use at the Seashore, including two no-action alternatives. The Record of Decision (ROD), which selected alternative F, was signed on December 20, 2010, and a notice of the decision was published in the Federal Register on December 28, 2010.

Under the NPS general regulations, the operation of motor vehicles off roads within areas of the National Park System is prohibited unless authorized by special regulation. In January 2012, the NPS published the "Special Regulations, Areas of the National Park System, Cape Hatteras National Seashore Off-Road Vehicle Management Final Rule," 36 CFR 7.58 (c) (the "Final Rule"). The Final Rule was developed in order to implement portions of the ORV FEIS. The Final Rule designates off-road vehicle (ORV) routes and authorizes limited ORV use within the Seashore in a manner that will protect and preserve natural and cultural resources, provide a variety of safe visitor experiences, and minimize conflicts among various users. The Final Rule became effective on February 15, 2012.

On December 19, 2014, the President signed the National Defense Authorization Act for Fiscal Year 2015, Public Law 113-291 (the "2014 Act"). Section 3057 of the 2014 Act directs the Department of the Interior, acting through the NPS and the United States Fish and Wildlife Service (USFWS), to review and modify existing wildlife protection buffers set pursuant to the ORV FEIS, as follows:

> (1) In General.– Not later than 180 days after the date of enactment of this Act, the Secretary [of the Interior] shall review and modify wildlife buffers in the National Seashore in accordance with this subsection and any other applicable law.
>
> (2) Buffer Modifications.– In modifying the wildlife buffers under paragraph (1), the Secretary shall, using adaptive management practices –
>
> (A) Ensure that the buffers are of the shortest duration and cover the smallest area

necessary to protect a species, as determined in accordance with peer-reviewed scientific data; and

(B) Designate pedestrian and vehicle corridors around areas of the National Seashore closed because of wildlife buffers, to allow access to areas that are open.

(3) Coordination with State.– The Secretary, after coordinating with the State [of North Carolina], shall determine appropriate buffer protections for species that are not listed under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), but that are identified for protection under State law.

(c) Modifications to Final Rule.– The Secretary shall undertake a public process to consider, consistent with management requirements at the National Seashore, … changes to the Final Rule ….

It should be noted that the consideration of modifications to the Final Rule is not part of the process described in this EA. This EA focuses only on the review and modification of wildlife protection buffers because the 2014 Act allowed for 180 days for that work to be completed. Consideration of modifications to the Final Rule ("phase 2") will commence expeditiously after completion of the buffer and corridors review called for by the 2014 Act.

In undertaking the buffer and corridors review called for by the 2014 Act, and described in this EA, the NPS and USFWS have consulted closely with the North Carolina Department of Environment and Natural Resources, Wildlife Resources Commission.

1. PURPOSE AND NEED OF PROPOSED ACTION

This "Purpose of and Need for Action" section explains what the proposed action intends to accomplish and why the NPS is taking action at this time. This EA presents one action alternative for modifying buffers and access corridors at the Seashore, and assesses the impacts that could result both from this alternative and from continuing current management (the no-action alternative). Upon conclusion of this EA and decision-making process, the alternative selected for implementation will govern the establishment and management buffers and corridors at the Seashore.

Purpose of the Proposed Action

The purpose of the proposed action is to review and modify, as appropriate, wildlife buffers necessary to protect a species, and to designate pedestrian and vehicle corridors around areas of the Seashore closed because of wildlife buffers, as required by the 2014 Act.

For purposes of this document, the term "buffer" means a defined area around a sensitive species intended to shield that species from unacceptable adverse impacts. The term "corridor" means a way around wildlife protection buffers to enable pedestrians and ORVs to obtain access to other, open areas of the Seashore.

Need for Action

This action is needed to comply with Section 3057 of the 2014 Act, which directs the NPS to review and modify wildlife buffers at the Seashore in such a way as to ensure that they are of the shortest duration and cover the smallest area necessary to protect affected species.

The Seashore is home to important habitats created by the Seashore's dynamic environmental processes, including habitats for several federally listed species including the piping plover and four species of sea turtles. These habitats are also home to numerous other protected species, as well as other wildlife. The NPS is required to conserve and protect all of these species, as well as the other resources and values of the Seashore. Under the "Organic Act" by which Congress created the NPS, it is the mission of the NPS to "conserve the scenery and natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." The Seashore's enabling legislation is in accord, stating that

> [e]xcept for certain portions of [the Seashore], deemed to be especially adaptable for recreation uses, particularly swimming, boating, sailing, fishing, and other recreational activities of similar nature, which shall be developed for such uses as needed, the said area shall be permanently reserved as a primitive wilderness and no development of the project…for the convenience of visitors shall be undertaken which would be incompatible with the preservation of the unique flora and fauna…now prevailing in this area… (16 U.S.C. 459a-2).

The Seashore has been designated a Globally Important Bird Area by the American Bird Conservancy (American Bird Conservancy 2005). This designation recognizes those areas with populations and habitat important at the global level. Recreational activities, including the use of ORVs, must therefore be regulated in a manner that is consistent with applicable law, and in a way that appropriately addresses resource protection (including protected, threatened, or endangered species), potential conflicts among the various Seashore users, and visitor safety.

The Seashore serves as a popular recreation destination with over 2 million visits annually. The Seashore provides a variety of visitor experiences. It is a long, essentially linear park, visitation is high, and parking spaces near roads are limited. Some popular beach sites, particularly those near the inlets and Cape Point, are a distance from established or possible parking spaces. Some visitors who come for some popular recreational activities such as surf fishing and picnicking are accustomed to using large amounts and types of recreational equipment that cannot practically be hauled over these distances by most visitors without some form of motorized access. For many visitors, the time needed and the physical challenge of hiking to the distant sites, or for some, even to close sites, can discourage or preclude access by non-motorized means. As a result, ORVs have long served as a primary form of access for many portions of the beach within the Seashore, and continue to be the preferred available means of access and parking for many visitors.

Therefore, the NPS strives to establish buffers and corridors that appropriately address resource protection (including protected, threatened, or endangered species), while ensuring that they are not restrictive in a way that unnecessarily limits otherwise appropriate access to the Seashore and its resources.

Background Information

Background information relevant to the proposed action is set forth at length in the ORV FEIS (NPS 2010). For the sake of brevity, that information is not repeated in this EA, but can be reviewed in a copy of the document posted at http://parkplanning.nps.gov/projectHome.cfm?projectID=10641. Please refer to the ORV FEIS for specific information on the following topics:

- Park enabling legislation, purpose, and significance, pp. 3-6.
- Park administrative background, pp. 11-27.
- Required Management of the Seashore, pp. 38-48.
- Desired Future Conditions for Threatened, Endangered, State-Listed, and Special Status Species, pp. 7-10.
- Relationship to other Cape Hatteras National Seashore planning documents, policies and actions, pp. 48-49.
- Relationship to other federal planning documents and actions, pp. 49-50.
- Relationship to other state and local planning documents, policies, actions, laws, and regulations, pp. 50-54.

It is important to make clear that the action analyzed in this EA (review and modification of wildlife protection buffers) relates back to the ORV FEIS rather than the Final Rule. The ORV FEIS covers anything related to pedestrian access, species buffers, prenesting closures, pets, and the like. In contrast, the Final Rule designates the areas that are open or closed to ORVs and sets forth requirements related to the protection of resources from ORV impacts, such as the dates that ORV routes are open/closed, restrictions on night driving, designated speed limits, and required equipment. Thus, even though the ORV FEIS specifically discusses ORV routes, hours of operation, and vehicle-free areas, those elements are now controlled by special regulation, i.e., the Final Rule. As noted above, consideration of modifications to the Final Rule ("phase 2") will not commence until after completion of the review and modification of buffers called for by the 2014 Act. Again, the present EA deals solely with review and modification, as appropriate, of wildlife protection buffers and the designation of pedestrian and vehicle corridors around buffers.

Scoping

Scoping is the process under NEPA whereby the NPS determines important issues, identifies relationships to other planning efforts, and defines agency objectives and a range of alternatives.

Internal scoping was initiated in early 2015 with a series of meetings involving NPS staff and staff from the USFWS and the North Carolina Wildlife Resources Commission (NCWRC). This interdisciplinary process was utilized to identify potential actions to address the need, determine what the likely issues and impact topics would be, and identify the relationship of the proposed action to other planning efforts at the Seashore. At the same time, staff from the Seashore, the NPS Southeast Regional Office in Atlanta, and the Gulf Coast Cooperative Ecosystem Studies Unit at Texas A&M University began a thorough review of the relevant scientific literature published since 2010 and also reviewed scientific literature published prior to that date. The purpose of this review was to update the findings of the ORV FEIS regarding the impact of ORV and pedestrian use on shorebirds and sea turtles.

Public outreach for the proposed action entailed issuance of a press release on February 5, 2015 that outlined the process for preparing this EA. This release was accompanied by a new webpage on the park's website that provided an overview of the process, answers to frequently asked questions, and links to relevant documents. The Seashore superintendent also met with a variety of individuals and groups (including ORV user groups and conservation organizations) to brief them on the process.

As required by the 2014 Act, the Seashore coordinated with the State of North Carolina to determine appropriate buffer protections for species that are not listed under the Endangered Species Act of 1973. The NCWRC provided information and recommendations to the Seashore by letter dated April 15, 2015. That letter is reprinted in Appendix C of this EA.

Objectives in Taking Action

NEPA requires that any decision made with respect to a proposed action be based on analysis of alternatives that are likely to meet project objectives. Objectives, in turn, are "what must be achieved to a large degree for the action to be considered a success" (NPS 2001 (DO-12 Handbook)). All alternatives selected for detailed analysis must meet these objectives to a large degree, as well as fulfill the project purpose and need for action. Objectives must be grounded in the Seashore's enabling legislation, purpose, significance, and mission goals, and must be compatible with direction and guidance provided by the Seashore's general management plan, strategic plan, and/or other management guidance. The following are objectives identified by Seashore staff for developing the proposed action.

Seashore Management and Operations

- Identify modified buffers and corridors necessary to protect a species that can be implemented in a sustainable manner, given budget and staffing constraints.
- Provide consistent written guidelines, according to site conditions, for beach access, buffers, and signage.

Natural Physical Resources

- Minimize impacts that providing beach access has on soils and topographic features, for example, dunes, ocean beach, wetlands, tidal flats, and other features.

Threatened, Endangered, and other Protected Species

- Provide protection for threatened, endangered and other protected species (e.g., state-listed species) and their habitats, and minimize impacts related to beach access and other uses as required by laws and policies, such as the *Endangered Species Act*, the *Migratory Bird Treaty Act*, and NPS laws and management policies.

Vegetation

- Minimize impacts to native plant species related to beach access.

Other Wildlife and Wildlife Habitat

- Minimize impacts to wildlife species and their habitats related to beach access.

Visitor Use and Experience

- Manage beach access to allow for a variety of visitor use experiences and greater access to Seashore resources.

Issues

Based on the results of internal scoping, the major issues raised by the proposed action are as follows:

Issue 1. ***Impacts to Natural Resources.***
The proposed action may have environmental impacts on wildlife and wildlife habitat at the Seashore. Resources affected would include threatened and endangered species, state-listed-special status species, and wildlife habitat generally.

Issue 2. ***Impacts to Visitor Use and Experience***
The proposed action may have impacts to visitor access to resources and favored locations at the Seashore.

Issue 3. ***Impacts to Park Operations.***
The proposed action may have impacts to a number of the Seashore management functions, budget, maintenance, interpretation, resource management, and visitor and resource protection.

Identifying Resources and Concerns

Based in part on the issues raised during internal scoping, the interdisciplinary team identified a number of resources and values that potentially could be affected by implementation of the proposed action. These resources and values generated "impact topics" for further analysis, selected from the universe of impact topics set forth in Table 1.1. Candidate impact topics were identified based on legislative requirements, executive orders, topics specified in Director's Order #12 and Handbook (NPS 2001), *Management Policies 2006* (NPS 2006a), guidance from the National Park Service, input from other agencies, public concerns, and resource information specific to Cape Hatteras National Seashore.

Issues not further investigated

Issues associated with modifying buffers and designating corridors around closures at Cape Hatteras National Seashore were initially identified by Seashore staff during internal scoping for the ORV FEIS and were further refined through public scoping. The identified issues (see above) in turn generated the impact topics to be analyzed in detail in chapters 3 and 4 of this EA.

NEPA and the Council on Environmental Quality (CEQ) regulations direct agencies to "avoid useless bulk…and concentrate effort and attention on important issues" (40 CFR 1502.15). Furthermore, agencies are directed to discuss issues that are other than significant only in enough detail to show why more study is not warranted (40 CFR 1502.2). The issues (also referred to as impact topics) that have been dismissed from detailed analysis in this EA are listed below in Table 1.1. In those cases where impacts are either not anticipated or are expected to be minor or less, the impact topics were dismissed from detailed analysis. The specific reasons for dismissing

each impact topic can be found on pages 28-38 of the ORV FEIS, which is available at http://parkplanning.nps.gov/projectHome.cfm?projectID=10641.The specific dismissals found in the ORV FEIS are hereby incorporated by reference into this EA

Note that this EA differs from the ORV FEIS in that it dismisses "Floodplains and Wetlands," "Wildlife and Wildlife Habitat," "Soundscapes," and "Socioeconomics" as impact topics to be addressed in detail, even though these topics were analyzed in the ORV FEIS. "Floodplains and Wetlands, "Wildlife and Wildlife Habitat," and "Soundscapes" have been dismissed from analysis because any changes to the buffers or corridors would have negligible impacts to these resources over and above what is occurring now, and were assessed in the ORV FEIS. (Habitat for threatened, endangered, and other protected species is treated in this EA under the impact discussions for threatened, endangered, and other special status species.) "Socioeconomics" is dismissed herein because it is assumed that to the extent the proposed action facilitated visitor access and led to increased visitation to the Seashore, impacts to the socioeconomic environment would generally be beneficial.

Although "Threatened, Endangered, and other Protected Species" has been retained as an impact topic, potential impacts to seabeach amaranth populations and habitat at the Seashore are not evaluated in this EA. At the Seashore, seabeach amaranth populations have fluctuated greatly since surveys began in 1985; however, no plants have been found since 2005. Therefore, the proposed action is not expected to affect seabeach amaranth.

Table 1.1: Topics and Impacts Retained or Dismissed

Impact Topic	Retained or Dismissed from Further Evaluation
Floodplains and Wetlands	Dismissed
Wildlife and Wildlife Habitat (other than habitat for threatened endangered, and other protected species)	Dismissed
Soundscapes	Dismissed
Socioeconomics	Dismissed
Geologic Resources	Dismissed
Geohazards	Dismissed
Vegetation	Dismissed
Unique Ecosystems, Biosphere Reserves, World Heritage Sites	Dismissed
Water Quality/Marine and Estuarine Resources	Dismissed
Mammals	Dismissed
Air Quality	Dismissed
Prime Farmlands	Dismissed
Streamflow Characteristics	Dismissed
Introduce or Promote Non-native	Dismissed

Species	
Cultural Resources, including: Archeological Resources Cultural Landscapes Historic Structures and Districts Ethnographic Resources Museum Collections	Dismissed
Indian Trust Resources	Dismissed
Sacred Sites	Dismissed
Environmental Justice	Dismissed
Energy Resources	Dismissed
Green House Gas Emissions and Climate Change	Dismissed
Urban Quality, Gateway Communities	Dismissed
Paleontological Resources	Dismissed
Health and Safety	Dismissed
Topography and Soils	Dismissed

ASSESSMENT OF EFFECT ON HISTORIC PROPERTIES

As noted above, this topic has been dismissed from further consideration because impacts are anticipated to be minor or less. The National Park Service concludes that implementation of the proposed action (Modify Buffers and Provide Additional Access Corridors) would have *no effect* on any historic property listed or eligible for listing in the National Register of Historic Places.

2. ALTERNATIVES

NEPA requires federal agencies to explore alternatives that address the purpose of and need for the action. The alternatives under consideration must include the "no-action" alternative as prescribed by 40 CFR 1502.14. In the present instance, the no-action alternative (alternative A) would constitute a continuation of current management, i.e., implementation of alternative F from the ORV FEIS.

Alternative B is the action alternative analyzed in this document. In accordance with NEPA, the action alternative is the result of internal scoping. The action alternative meets the management objectives of the Seashore, while also meeting the overall purpose of and need for the proposed action. Alternative elements that were considered but were not technically or economically feasible, did not meet the purpose of and need for the project, created unnecessary or excessive adverse impacts to resources, and/or conflicted with the overall management of the Seashore or its resources were dismissed from further analysis. Dismissed alternative elements are discussed later in this chapter.

Elements Common to Both Alternatives

This EA tiers off the ORV FEIS of November 2010. The no-action alternative in this EA (continue current management) is based on alternative F (the preferred alternative) in that document. (Alternative F from the ORV FEIS was identified as the selected alternative in the Record of Decision dated December 20, 2010.) It should be noted that a final decision regarding ORV management at the Seashore has already been made in the EIS that this document tiers off of; this EA only re-examines one small part of that decision. Specifically, alternatives A and B in this document deal solely and specifically with wildlife protection buffers and visitor access corridors at the Seashore.

The following elements are common to both alternatives considered in this EA:

1. Under both alternatives, prenesting closures would continue as described in the ORV FEIS. These closures would apply to both pedestrians and ORVs. Prenesting closures are defined as a kind of resource closure in which an area of suitable habitat is proactively closed at the start of the shorebird breeding season to provide undisturbed habitat for breeding activities to occur (NPS 2012). Currently, by March 1, Seashore staff evaluates all potential breeding habitat for piping plover, Wilson's plover, and American oystercatcher and recommends prenesting closures for those species based on that evaluation. Colonial waterbird breeding habitat is evaluated by April 1. Areas of newly created habitat are also evaluated during the annual habitat assessment. These activities would continue under both alternatives. As at present, areas of suitable habitat that have had (a) individual piping plover, Wilson's plover, or American oystercatcher nests, (b) concentrations of more than 10 colonial waterbird nests in more than one of the past five years, or (c) new habitat that is particularly suitable for shorebird nesting, such as the new habitat at new inlets or overwash areas, would be posted as prenesting closures using symbolic fencing or with closure signs. Closures would be marked by March 15 at sites involving piping plover, Wilson's plover, and/or American oystercatcher and by April 15 for those sites involving colonial waterbirds. Because colonial waterbirds may shift from year to year, ORV ramps and pedestrian access points that have had colonies in more than one of the past 5 years would remain open until nesting or scraping is observed.

Prenesting closures would be removed if no breeding activity is seen in the area by July 31 or by August 15 if black skimmers are present or two weeks after all chicks have fledged, whichever comes later.

2. North Carolina is the only state along the Atlantic Coast to support both breeding and wintering populations of piping plovers. Neither alternative proposes changes that would affect designated critical habitat units for wintering piping plovers. The proposed changes in resource protection buffers in alternative B apply only to breeding piping plovers at the Seashore.
3. To facilitate access to ORV routes, both alternatives would continue to implement the ramp construction, ramp relocation, and interdunal road projects described in the ORV FEIS and *Proposal to Facilitate Additional Public Beach Access Environmental Assessment* of June 2013 (2013 EA) (NPS 2013). Likewise, both alternatives would continue the addition of new parking areas with associated foot trails or boardwalks to facilitate pedestrian access at a number of locations, as described in the ORV FEIS and the 2013 EA.
4. Under both alternatives, in cases where resource management personnel documented adverse impacts to resources greater than those described herein, the Seashore would retain the discretion to implement more restrictive measures to ensure resource protection.
5. Determining the degree to which human use affects the success of beach nesting wildlife can be challenging due to the many other external factors affecting these species, such as weather and storm events. To help refine monitoring and research of these species in a manner that guides adaptive management of the Seashore, the NPS would implement under either alternative a series of public science workshops to ensure that current research and monitoring activities are appropriate to help understand the impacts of human use of beaches on nesting wildlife. The workshops will evaluate desired future conditions, trends in wildlife nesting success, factors affecting success and use of habitat, and put forward a plan with recommendations for future monitoring and research. These workshops would lead to an improved understanding of the impacts of recreation and seashore management on wildlife in order to implement an effective adaptive management program. A work plan growing out of the workshops, including actionable management recommendations, will be completed within two years of a final decision on the alternatives considered in this EA.

ALTERNATIVE A: NO ACTION—CONTINUE CURRENT MANAGEMENT

Under alternative A, the specific species management strategies described in Table 10-1 of the ORV FEIS ("Species Management Strategies for Alternative F") would provide for species protection during both the breeding and nonbreeding seasons. In particular, buffers and access corridors around buffers would be established for protection of birds and turtles.

A single set of standard buffers would be used. For sea turtles, a 10m x 10m buffer is initially placed around all newly-laid nests. To protect hatchlings, the buffer is expanded down to the

waterline between day 50 and 55 after a nest is laid. This period of time when the buffer size is increased is referred to as "expansion."

The standard buffers are described below in Table 2.1a and Table 2.1b. Note that in the "Behavior" column of Table 2.1a, the term "Nesting" includes Courtship, Mating, and Scrapes (and not just actual nests) and would result in buffers being installed, per Table 10-1 of the ORV FEIS.

Table 2.1a: Buffer Provisions under Alternative A: Birds.

Species	Behavior	Disturbance	Buffer	Duration	Reference
American oystercatcher	Nesting	Pedestrian	150meters (m)	Prenesting-Mar 15 (based on more than 1 year of previous 5 years)	Sabine 2006 (as cited in USGS protocol for AMOY)
		ORV	150m		
	Unfledged chicks	Pedestrian	200m	Removed after Jul 31 (no activity) or 2 weeks after chicks have fledged (pedestrians allowed during last 2 weeks)	Sabine 2006 (as cited in USGS protocol for AMOY)
		ORV	200m		
Piping plover	Nesting	Pedestrian	75m	Prenesting-Mar 15 (based on more than 1 year of previous 5 years)	Cohen 2006, USFWS Revised Recovery Plan
		ORV	75m		
	Unfledged chicks	Pedestrian	300m	Removed after Jul 31 or 2 weeks after all breeding activity has ceased or all chicks have fledged.	
		ORV	1000m	Same as for pedestrians.	USFWS Revised Recovery Plan, Appendix G [guidelines for avoiding take under section 9 of the Endangered Species Act (ESA), states that "Some land managers have threatened and endangered species protection obligations under Section 7 of the ESA or under Executive Orders 11644 and 11989 that go beyond adherence to these guidelines.]

Species	Behavior	Disturbance	Buffer	Duration	Reference
Wilson's plover	Nesting	Pedestrian	75m	Prenesting-Mar 15 (based on more than 1 year of previous 5 years)	Rodgers and Schwikert 2002
		ORV	75m		
	Unfledged chicks	Pedestrian	200m	Removed after Jul 31 or 2 weeks after all breeding activity has ceased or all chicks have fledged.	
		ORV	200m		
Least tern	Nesting	Pedestrian	100m	Prenesting-Apr 15 (based on more than 1 year of previous 5 years)	Erwin 1989, USGS Protocol Options B-C
		ORV	100m		
	Unfledged chicks	Pedestrian	200m	Removed after Jul 31 or 2 weeks after all breeding activity has ceased or all chicks have fledged.	Erwin 1989, USGS Protocol Options B-C (NPS adopted the 200m buffer for unfledged chicks to remain consistent with other colonial waterbirds since most colonies are mixed species)
		ORV	200m		
Common tern, gull-billed tern, & Black skimmer	Nesting	Pedestrian	200m	Prenesting-Apr 15 (based on more than 1 year of previous 5 years). Removed after July 31 (Aug 15 if BLSK present) or 2 weeks after breeding activity has ceased or chicks have fledged.	Erwin 1989, USGS Protocol Options B-C
		ORV	200m		
	Unfledged chicks	Pedestrian	200m	Same as above.	
		ORV	200m		

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Table 2.1b: Buffer Provisions under Alternative A: Sea Turtles.

Expansion (Day 50-55)	Disturbance	Buffer	Comments	Reference
Vehicle free areas: expansion	Pedestrian	25m (12.5 m either side)		Interim Prot. Sp. Management Strategy/EA 2006
Villages: expansion	Pedestrian	50m (25m either side)		
ORV routes: expansion*	ORV	105m (52.5m either side) 10-15m closed behind nest		

* Once the night driving restrictions are lifted, a 0.5 mile buffer is established for nests during the expansion period to protect hatchlings from light pollution.

ALTERNATIVE B: MODIFY BUFFERS AND PROVIDE ADDITIONAL ACCESS CORRIDORS (PREFERRED ALTERNATIVE)

Alternative B would modify the ORV FEIS by modifying the size of existing wildlife protection buffers and designating additional access corridors around temporary resource protection closures.

Apart from buffers and corridors, all other elements of alternative F from the ORV FEIS would remain unchanged under this alternative, as would the Final Rule. Thus, vehicle-free areas, seasonal closures, pre-season habitat assessments, prenesting closures, and surveys would continue as in accordance with current practice. However, this alternative would provide species protection buffers that are of the shortest duration and cover the smallest area necessary to protect a species (as determined in accordance with peer-reviewed scientific data[1]), as required by the 2014 Act. It would also designate additional pedestrian and vehicle corridors around areas of the Seashore closed because of wildlife buffers, to allow access to areas that are open.

Under alternative B, the guiding concept is to provide access in such a way as to minimize the amount of beach made inaccessible by closures established for nesting birds or sea turtles, while at the same time protecting park resources. In some instances, a corridor is provided only when no alternate route is available. An "alternate route" is defined as a route involving the use of an interdunal road, bypass road, Highway 12 plus ramp to the north or south, etc.

[1] Peer reviewed data was not available for all of the species subject to the buffer review mandated by the 2014 Act. Where peer reviewed data was not available, the best available data and scientific analysis was used to inform new proposed buffers and corridors. A summary of the literature search used to identify the best available science is provided below in the section entitled "Alternative Elements Considered but Dismissed from further Consideration."

(It should be noted that the Seashore is considering additional ramps and interdunal road segments at targeted areas where such infrastructure may make it possible to access more designated pedestrian areas and ORV routes. These ramps and road segments would be in addition to those identified in the 2013 EA. The additional ramps and interdunal road segments are not described in this EA because although they would make possible additional "corridors around [closures]," allowing "access to areas that are open," the regulatory compliance needed to assess the impacts of these facilities (e.g., wetland and floodplain Statements of Findings) could not be completed in the time allotted by the 2014 Act. Those facilities will be considered and their impacts assessed as part of the phase 2 work required by the 2014 Act, i.e., the phase requiring consideration of modifications to the Final Rule.)

The modified buffers and additional corridors proposed under alternative B are described below. These buffers and corridors are summarized in Tables 2.2a and b. Tables 2.2a and b also include the scientific references used in developing the modified buffers and additional corridors.

Modified Buffers and Additional Corridors:

1. New corridor for **American oystercatcher**: alternative B would allow an ORV corridor at the waterline during *nesting*,[2] but only when (a) no alternate route is available, and (b) the nest is at least 25 meters from the vehicle corridor. That is, where there is less than 25 meters from a nest to the high tide line (i.e., water and/or wet sand), no corridor would be provided. The buffers for nests and unfledged chicks would stay the same as under alternative A.

2. New buffers for **piping plover**: The buffer for piping plover during nesting would be reduced from 75 meters to 50 meters for both pedestrians and ORVs, consistent with the Piping Plover Recovery Plan (USFWS 1996). For unfledged chicks, the buffer would be reduced from 300 meters to 100 meters (pedestrians) and from 1,000 meters to 500 meters (ORVs). Where the standard 500 meter buffer blocks ORV access, the buffer may be reduced to no less than 200 meters to allow an access corridor along the shoreline.

3. New buffers for **Wilson's plover**: The buffer for Wilson's plover during nesting would be reduced from 75 meters to 50 meters for pedestrians and ORVs. The pedestrian buffer for unfledged chicks would be reduced from 200 meters to 100 meters, the same as for piping plovers. The ORV buffer for unfledged chicks would increase from 200 meters to a standard 500 meters; however, where an ORV corridor does not exist, the buffer may be reduced to no less than 200 meters to allow an access corridor along the shoreline.

4. New buffer for **least tern**: The buffer for unfledged chicks of least tern would be reduced from 200 meters to 100 meters for both pedestrians and ORVs. (The buffer for nests would stay the same.)

5. New buffers for **common tern**, **gull-billed tern**, and **black skimmer**: The buffer for these species during nesting would be reduced from 200 meters to 180 meters for both

[2] The term "Nesting" includes Courtship, Mating, and Scrapes (and not just actual nests) and would result in buffers being installed per Table 10-1 of the ORV FEIS.

pedestrians and ORVs. Likewise, the buffer for unfledged chicks would be reduced from 200 meters to 180 meters for both pedestrians and ORVs.

6. New buffers and corridor for **sea turtles**: Sea turtles at the Seashore have an average incubation period of 62 days (over the last three seasons). A 10 meter x 10 meter buffer is placed around all newly-laid sea turtle nests. To protect hatchlings, sea turtle nest protection buffers are expanded down to the waterline between day 50 and 55 after nests are laid in most cases. Under alternative B, the size of these "expansion" buffers for sea turtles would be reduced relative to the no-action alternative, and additional corridors provided, as follows:

    - For nests in *vehicle-free areas*: The expansion buffer would be reduced from 25 meters (12.5 meters on either side) to 15 meters on either side and, when light filtering fencing is installed, 5 meters minimum behind the nest. A pedestrian corridor during the expansion period would be available: Visitors would be able to walk in front of turtle nests – walking as close as practicable to the surf line – although occasionally, where signed, people might be asked to walk behind nest closures. There may be exceptions where a nest is near the dune line and the high tide line simultaneously.

    - For nests in *village areas*: The expansion buffer would be reduced from 50 meters (25 meters on either side) to 15 meters on either side and, when light filtering fencing is installed, 5 meters minimum behind the nest. A pedestrian corridor during the expansion period would be available: Visitors would be able to walk in front of turtle nests – walking as close as practicable to the surf line – although occasionally, where signed, people might be asked to walk behind nest closures. There may be exceptions where a nest is near the dune line and the high tide line simultaneously.

    - For nests in *ORV routes*: The expansion buffer would be reduced from the current 105 meters (52.5 meters on either side) and 10-15 meters behind nests. The new buffer would be 15 meters on either side and, when light filtering fencing is installed, a minimum of 5 meters behind the nest Corridors: The first option would be to use an existing corridor around that part of the beach where a nest occurs, if available. Second, in the absence of an existing corridor, the shorter buffer behind the nest would allow ORVs and pedestrians to travel behind a nest where sufficient beach width exists. A third option, where a turtle nest blocks access from one ORV area to another and no way around the nest exists, would permit driving in front of the nest if resources exist to monitor the nest and remove ruts. When nests are nearing hatching and hatchlings are likely to emerge, driving may continue to 9 p.m. only if resources exist to protect hatchlings and remove ruts.

    - For nests laid prior to June 1, the Seashore would retain the option of not expanding the buffer until day 60, unless signs of hatching prior to day 60 were

detected.

- For nests laid after August 20, the Seashore would retain the option of not expanding the buffer for nests that block access to ORV passage. Nests laid after August 20 would be monitored daily for signs of hatching and managed appropriately to avoid impacts if signs of hatching are observed. Where signs of hatching are observed (e.g., depression), buffers would be expanded as outlined for nests laid prior to August 20.

The foregoing buffers and corridors would be subject to the following conditions:

1. **American oystercatcher**: The proposed ORV corridor would only be available when no alternate route is available around a nest and where the nest is at least 25 meters from the vehicle corridor. The corridor would be available to pass-through traffic only; there would be no parking within the 150 meter buffer. Safety concerns may preclude pass-through corridors in some of these areas when the beach is narrow and only a small area exists between the nest and waterline. For unfledged chicks, there would be no change from current management and the buffers would be the same as in alternative A.

2. **Piping plover**: Modified buffers for unfledged chicks are contingent on the park's ability to do intensive monitoring. "Intensive monitoring" means that qualified staff members maintain regular visual confirmation of chick location from the time the chicks are located in the morning until the beach closes to driving at night. Intensive monitoring would allow park managers to have current information on the location of piping plover chicks and continually manage buffer distances and corridor locations to minimize disturbance and the potential for injury. If (a) staffing requirements cannot be met, (b) the location and fate of the chicks cannot be determined, or (c) best efforts of staff appear unlikely to prevent harm to chicks in a given instance, buffers will revert to the buffers established in the ORV FEIS. In addition, piping plover chicks will need to be located prior to opening an area in the morning to ORVs to ensure that adequate buffers are being maintained. When chicks cannot be located, areas will remain closed to all ORV access until chicks are observed, they are no longer in the area, or their fate has been determined.

3. **Wilson's plover**: Wilson's plover chicks are generally protected by the piping plover buffers. Where Wilson's plover and piping plover occur together, the buffer will default to whichever buffer is greater. In those cases where Wilson's plovers are found outside of a piping plover buffer, the park would implement increased monitoring, similar to the monitoring proposed for piping plovers.[3]

[3] Current buffers provide protection for nesting species given current staffing levels and current workload. For beach nesting species which are highly mobile, such as Wilson's and piping plovers and American oystercatchers, any decrease in buffer size increases the risk of negative impacts, given the current level of staffing. To minimize that risk, intensive or increased monitoring, as appropriate, would be necessary to achieve a level of confidence that species protection has not been compromised. Workloads and current staffing levels cannot achieve this. Therefore, the number of staff would need to be increased.

4. **Least tern**: Increased monitoring would be conducted at least tern colonies with chicks to ensure that adequate buffers are being maintained. Monitoring would be conducted no less than two times a day, once in the morning and again in the late afternoon. This increased monitoring would allow the Seashore to keep better track of chicks when they move within the colony or when the colony shifts locations, thereby enabling staff to adjust the buffers in a timely manner. If colonies consist of mixed species, the larger buffers would apply and increased monitoring for least terns would not be necessary. On the other hand, if the reduction of the buffer allows for vehicles to pass in front of a colony, then increased monitoring (similar to the monitoring proposed for piping plovers) may be warranted.

5. **Sea turtles:** Driving in front of a nest would be permitted where the nest blocks access from one ORV area to another and no way around the nest exists, but *only if* resources exist to do intensive monitoring for sea turtles, i.e., monitor nests and remove ruts. When nests are nearing hatching and hatchlings are likely to emerge, driving may continue to 9 p.m. only if resources exist to protect hatchlings and remove ruts.

   When nests laid after August 20 block access to ORV passage, the Seashore may consider not expanding the buffer. Seashore data show that these late nests rarely, if ever, hatch. Therefore, late nests will be marked and monitored for signs of hatching, but generally would not expanded where they block access to ORV passage. For late nests that do not block ORV passage, the buffer may be expanded to provide full protection for potentially emerging hatchlings.

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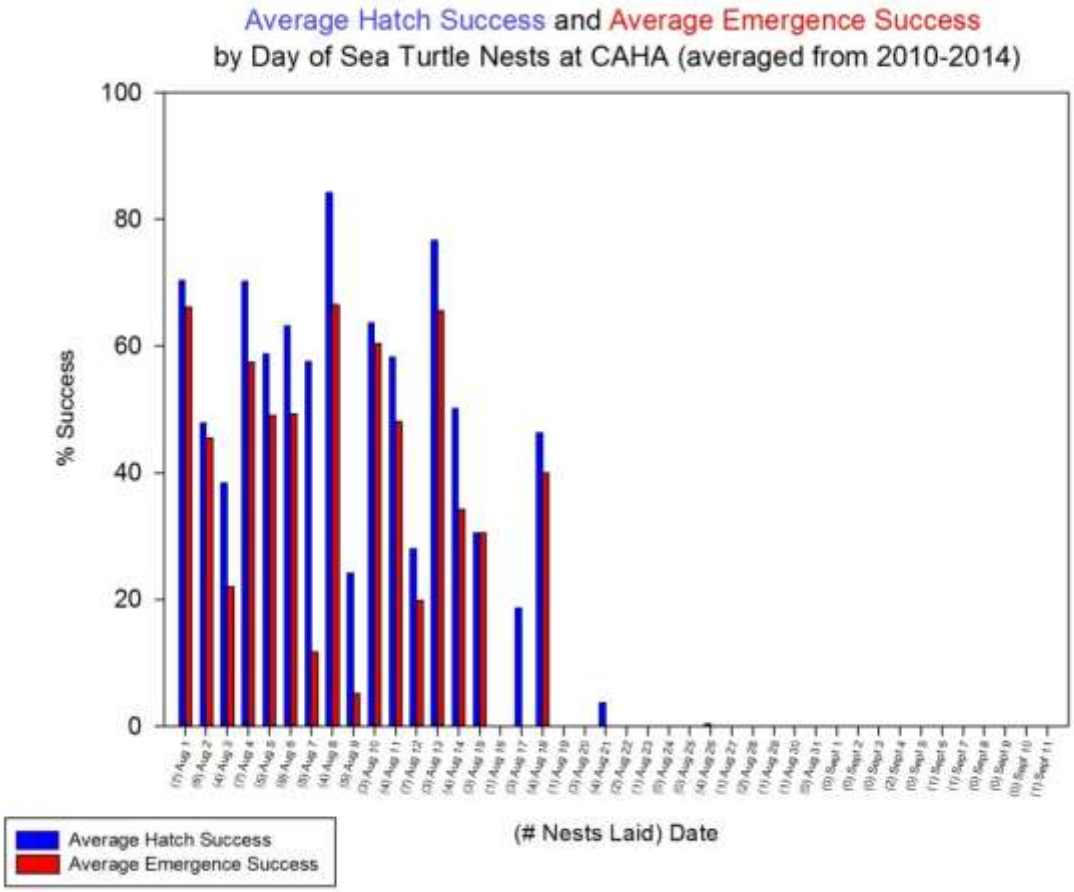

Figure 1: *This chart was created from data compiled by Seashore technicians. These data indicate minimal to no hatching success for nests laid on or after August 19th. Hatching success is the percentage of eggs that hatched. Emergence success indicates the percentage of turtles that crawled out of the nest without assistance.*

Duration of Buffers

The end point for the duration of buffers around chicks is defined as the date that the chicks fledge based on the capability of sustained flight. An exception to this definition is made for American oystercatchers, which take longer to become proficient fliers. In the ORV FEIS, fledging was defined as sustained flight of 30 meters for American oystercatchers and 15 meters for all other species. The American Oystercatcher Working Group (2012) defined fledging (i.e., flight capable) as when an oystercatcher chick can fly 100 meters and the chick is strong enough to use flight to escape ground predators. Although chicks are considered to have fledged at this point, they are still unable to fly well (100+ meters), and are susceptible to predation. For this reason, the American Oystercatcher Working Group (2012) suggests that in areas of high disturbance (such as areas near vehicle traffic), buffers should remain in place until the chicks are 45 days old and flying well. CAHA data from 2010-2013 show the average chick fledging

(able to fly 30 meters) to occur at about 43 days (with a range of 31-65 days), which is slightly longer than the 35-40 days documented in other areas.

Summary of Buffers and Corridors

The buffer modifications and additional corridors proposed in alternative B are summarized below in Tables 2.2a and b. Note that in the "Behavior" column of Table 2.2a, the term "Nesting" includes Courtship, Mating, and Scrapes (and not just actual nests) and would result in buffers being installed, per Table 10-1 of the ORV FEIS.

Table 2.2a: Buffer provisions and scientific references from which buffers were developed under Alternative B: Birds.

Species	Behavior	Disturbance	Buffer	Comments	Reference
American oystercatcher	Nesting	Pedestrian	150 meters (m) Walk behind nest	Pedestrians can walk behind buffer (as is currently allowed).	Sabine 2008 (>137m)
		ORV	A. 150m B. ORV corridor at water line (where nest is at least 25m from vehicle corridor)	ORV corridor at water line. Only available when no alternate route available and where nest is at least 25m from vehicle corridor. Pass through traffic only; no parking in corridor. Safety concerns may preclude pass-through corridors in some of these areas.	Sabine 2008 (>137m); Simons et al 2015 (25m)
	Unfledged chicks	Pedestrian	200m	Pedestrians can walk behind buffer (as is currently allowed).	Sabine 2008 (>150m)
		ORV	200m	Before opening area to traffic, buffers should remain in place until the chicks are 45 days old and flying well.	Sabine 2005 (>150m); American Oystercatcher Working Group (2012)
Piping plover (PIPL)	Nesting	Pedestrian	50m	Consistent with PIPL Recovery Plan	Appendix G, USFWS 1996
		ORV	50m		Appendix G, USFWS 1996
		Pedestrian	100m (provide symbolically fenced area as a refuge)	Modified CAHA buffers for unfledged chicks are contingent on ability to do intensive monitoring. If staffing requirements cannot be met, buffers will revert to those established in the ORV FEIS.	Appendix G, USFWS 1996

Species	Behavior	Disturbance	Buffer	Comments	Reference
	Unfledged chicks	ORV	A. 500m if there is an existing corridor B. Reduce buffer to no less than 200m if corridor does not exist	Modified CAHA buffers for unfledged chicks are contingent on ability to do intensive monitoring. If staffing requirements cannot be met, buffers will revert to those established in the ORV FEIS. Chicks will need to be located prior to opening an area or providing/establishing a corridor in the morning to ORVs to ensure that adequate buffers are being maintained. When chicks cannot be located, areas will remain closed to all ORV access until chicks are observed, they are no longer in the area, or their fate has been determined.	Appendix G, USFWS 1996
Wilson's plover (WIPL)	Nesting	Pedestrian	50m	Consistent with PIPL buffer.	See PIPL
		ORV	50m		See PIPL
	Unfledged chicks	Pedestrian	100m	WIPL are generally protected by PIPL closure. Where WIPL and PIPL occur together, default to whichever buffer is greater.	See PIPL
		ORV	A. 500m if there is an existing corridor B. Reduce buffer to no less than 200m if corridor does not exist		See PIPL
Least tern	Nesting	Pedestrian	100m		Erwin 1989 (100m) pedestrian
		ORV	100m		Erwin 1989 (100m) pedestrian (no ORV citation available)
	Unfledged chicks	Pedestrian	100m		Erwin 1989 (100m) pedestrian
		ORV	100m		Erwin 1989 (100m) pedestrian (no ORV citation available)
Common tern, gull-billed tern, &	Nesting	Pedestrian	180m		Rodgers and Smith 1995 (180m) pedestrians and motor boat

Species	Behavior	Disturbance	Buffer	Comments	Reference
black skimmer		ORV	180m		Rodgers and Smith 1995 (180m) pedestrians and motor boat
	Unfledged chicks	Pedestrian	180m		Rodgers and Smith 1995 (180m) pedestrians and motor boat
		ORV	180m		Rodgers and Smith 1995 (180m) pedestrians and motor boat

Table 2.2b: Buffer Provisions under Alternative B: Sea Turtles.

Expansion (Day 50-55)*	Disturbance	Buffer	Comments	Reference
Vehicle free areas: expansion	Pedestrian	15m on sides 5m minimum behind nest when light filtering fencing is installed.	Pedestrian corridor during expansion period: Visitors may walk in front of turtle nests -- walking as close as practicable to the surf line -- although occasionally, where signed, people may be asked to walk behind nest closures. There may be exceptions where nest is near dune line and high tide line simultaneously.	Modified from recommendations in NCWRC Handbook.**
Villages: expansion	Pedestrian	15m on sides 5m minimum behind nest when light filtering fencing is installed.	Same as above	

Expansion (Day 50-55)*	Disturbance	Buffer	Comments	Reference
ORV routes: expansion	Pedestrians and ORVs	A. 15m on sides 5m minimum behind nest when light filtering fencing is installed B. Utilize corridor around that part of the beach where nest is present if one exists C. Drive behind nest D. Drive in front of nest	Corridors: shorter buffer behind nest would allow ORVs and pedestrians to travel behind the nest where sufficient beach width exists. For turtle nests that block access from one ORV area to other and no way around the nest exists, driving may be permitted in front of nest if resources exist to monitor nest and remove ruts. Driving may continue to 9 p.m. only if resources exist during high risk times associated with hatching to protect hatchlings and remove ruts.	

* The Seashore would retain the option of not expanding the buffer for nests laid after August 20 that block access to ORV passage. Where access is affected, nests laid after August 20 would be monitored daily for signs of hatching and managed appropriately to avoid impacts if signs of hatching are observed. When hatching takes place, buffers would be expanded.

** The Handbook calls for a 50ft (15.2 meters) buffer around nest for areas with ORVs. Under alternative B, NPS would continue to mark nests during incubation so that vehicles and pedestrians do not travel in the immediate vicinity of incubating eggs. During the hatch window, the buffer would be expanded to 15 meters out from the sides of the nest, down to the high tide line (i.e., water and/or wet sand), and back from the nest 5 meters. The shorter buffer behind the nest would allow ORVs and pedestrians to travel behind the nest where sufficient beach width exists. Pedestrian and ORV buffers are the same during the hatch window to minimize the effects of tire ruts and footprints on emerging hatchlings.

TABLE 2.3 COMPARISON OF BUFFER DISTANCES – SHOREBIRDS

Species	Behavior	Disturbance	CAHA Now	CAHA Modified	Comments on CAHA Modified
American oystercatcher	Nesting	Ped.	150m	150m	Pedestrians can walk behind buffer (as is currently allowed).

Species	Behavior	Disturbance	CAHA Now	CAHA Modified	Comments on CAHA Modified
		ORV	150m	A. 150m B. ORV corridor at water line (where nest is at least 25m from vehicle corridor)	Proposed ORV corridor only when no alternate route available and where nest is at least 25m from vehicle corridor. Pass through traffic only; no parking in corridor. Safety concerns may preclude pass through corridors in some of these areas.
	Unfledged chicks	Ped.	200m	200m	Pedestrians can walk behind buffer (as is currently allowed).
		ORV	200m	200m	
Piping plover (PIPL)	Nesting	Ped.	75m	50m	Consistent with PIPL Recovery Plan
		ORV	75m	50m	
	Unfledged chicks	Ped.	300m	100m	Symbolically fenced area would be provided as a refuge. Modified CAHA buffers for unfledged chicks are contingent on ability to do intensive monitoring.
		ORV	1000m	A. 500m if there is an existing corridor B. No less than 200m if corridor does not exist	Modified CAHA buffers for unfledged chicks are contingent on ability to do intensive monitoring. If staffing requirements cannot be met, buffers will revert to 1000m buffer established in the ORV FEIS. Chicks will need to be located prior to opening an area or providing/establishing a corridor in the morning to ORVs to ensure that adequate buffers are being maintained. When chicks cannot be located, areas will remain closed to all ORV access until chicks are observed, they are no longer in the area, or their fate has been determined.
Wilson's plover (WIPL)	Nesting	Ped.	75m	50m	Consistent with PIPL buffer.
		ORV	75m	50m	
	Unfledged chicks	Ped.	200m	100m	WIPL chicks are generally protected by PIPL closure. Where WIPL and PIPL occur together, default to

Species	Behavior	Disturbance	CAHA Now	CAHA Modified	Comments on CAHA Modified
		ORV	200m	A. 500m if there is an existing corridor B. No less than 200m if corridor does not exist	whichever buffer is greater.
Least tern	Nesting	Ped.	100m	100m	CAHA buffer from Erwin 1989 (100m) pedestrian
		ORV	100m	100m	CAHA buffer from Erwin (100m) (no ORV citation available)
	Unfledged chicks	Ped.	200m	100m	Modified CAHA buffer from Erwin 1989 (100m) pedestrian
		ORV	200m	100m	Modified CAHA buffer from Erwin (100m) (no ORV citation available)
Common tern gull-billed tern & black skimmer	Nesting	Ped.	200m	180m	Modified CAHA buffers from Rodgers and Smith 1995
		ORV	200m	180m	
	Unfledged chicks	Ped.	200m	180m	Modified CAHA buffers from Rodgers and Smith 1995
		ORV	200m	180m	

TABLE 2.4 COMPARISON OF BUFFER DISTANCES – SEA TURTLES

Expansion	CAHA Now	CAHA Modified	Comments on CAHA Modified
Vehicle-Free Area Expansion	25 m (12.5 m either side)	30m (15m on either side) 5m minimum behind nest when light filtering fencing is installed.	Pedestrian corridor during expansion period: Visitors can walk in front of turtle nests -- walking as close as practicable to the surf line -- although occasionally, where signed, people may be asked to walk behind nest closures. There may be exceptions where nest is near dune line and high tide line simultaneously.

Expansion	CAHA Now	CAHA Modified	Comments on CAHA Modified
Village Expansion	50m (25 m either side)	30m (15m on either side) 5m minimum behind nest when light filtering fencing is installed.	Same as above
ORV Route Expansion	105m (52.5 m either side) 10-15m closed behind nest	A. 30m (15m on either side) 5m minimum behind nest when light filtering fencing is installed B. Utilize corridor around nest if one exists C. Drive behind nest D. Drive in front of nest	ORV corridor: For turtle nests that block access from one ORV area to other and no way around the nest exists, driving may be permitted in front of nest if resources exist to monitor nest and remove ruts. Driving may continue to 9 pm only if resources are there during high risk times associated with hatching to protect hatchlings and remove ruts. Where access is affected, nests laid after August 20 would not be expanded, but would be closely monitored. Where hatching takes place, buffers would be expanded.

Under alternative B, the Seashore would incur additional costs in order to perform the intensive and increased monitoring necessary to implement the modified buffers and additional corridors. Preliminary cost estimates are as follows:

Action	Preliminary Cost Estimate
Intensive monitoring for turtles (4 additional qualified employees)	$80,000
Intensive and increased monitoring for birds (6 additional qualified employees)	$120,000
Law enforcement/ORV management (3 additional qualified employees)	$60,000
Total Recurring	$260,000

Rationale for Buffers Proposed in Alternative B

The proposed buffer sizes for the protection of beach nesting species at CAHA are informed by the scientific literature, data collected at the seashore, and expert opinion. A description of the rationale behind the buffer revisions proposed in alternative B follows:

American oystercatcher

A range of buffer recommendations for American oystercatchers was considered in the ORV FEIS (see NPS 2010, Table 28 and Appendix A of this EA). Based on their research on breeding American oystercatcher at Cumberland Island National Seashore, Sabine et al. (2008) recommend that the pedestrian buffer size during nesting be at least 137 meters, and that the buffer size should increase to at least 150 meters for pedestrians when unfledged chicks are present. They found that vehicular activity altered American oystercatcher behavior, but not to the extent that pedestrians did. It is important to note that the vehicular activity on Cumberland Island was much less than occurs at CAHA. Given the number of vehicles and pedestrians at CAHA, the buffer size proposed in this EA for pedestrians and ORVs during incubation is the higher number suggested by Sabine et al. (2008) (i.e., 150 meters). Based on the observations from Sabine et al. (2008) and Simons et al. (2014), a vehicle corridor at the water's edge and at least 25 meters from the nest will allow passage of vehicles with minimal disturbance to nesting American oystercatchers. Under alternative B, this corridor would be allowed only when no alternate ORV route exists, and it would be for pass-through traffic only; there will be no parking within the 150 meter buffer. Observations of unfledged chick movement show that chicks may move large distances soon after hatching (CAHA unpublished data). For this reason, along with the suggestions made in Sabine et al. (2008) and USGS (2010; Open File Report 2009-1262), the NPS chose a 200 meter minimum buffer size to protect most American oystercatchers from disturbance by vehicles and pedestrians. Thus, under alternative B, there would be no ORV corridor within 200 meters of unfledged chicks.

Piping plover

Proposed buffer sizes for piping plover are consistent with the recommendations included in Appendix G of the Piping Plover Recovery Plan (USFWS 1996) which calls for buffers around nests of at least 50 meters, and buffers around unfledged chicks of 1000 meters for ORVs, unless intensive monitoring and data from past years show that a smaller buffer around chicks is sufficient to protect them from disturbance.

The proposed 100 meter pedestrian buffer is consistent with the recommendations in Appendix G of the Piping Plover Recovery Plan (USFWS 1996). A standard 500 meter buffer is proposed based on the mean maximum movements of piping plover chicks recorded at the Seashore between 2010 and 2014 (398 meters; NPS 2010-2014). To encompass the high variability of the chick movement data (i.e., chick movements ranging from 15 meters to 1118 meters), the NPS has proposed a standard 500 meter buffer. Data show that 85 percent of the chick movements recorded during this time were less than 500 meters; therefore, a 500 meter standard buffer should be adequate to protect the majority of the piping plover broods. Where ORV access may be blocked by this standard buffer, the buffer may be reduced to no less than 200 meters, as consistent with the Piping Plover Recovery Plan (USFWS 1996). These smaller buffers for unfledged chicks require intensive monitoring to ensure protection of the chicks, as recommended in the Piping Plover Recovery Plan (USFWS 1996). Intensive monitoring requires that all chicks are observed during the time that ORVs are on the beach and that a contingency plan be in place if chicks move toward the access corridor while vehicles are on the beach. Under alternative B, if intensive monitoring is not possible, buffer sizes would remain the same as those identified in the ORV FEIS (NPS 2010).

Wilson's plover

Because little to no peer-reviewed articles document necessary buffer sizes to protect Wilson's plover nests and unfledged chicks, the NPS has deferred to the buffer sizes proposed for the piping plover. At CAHA, most Wilson's plover nests are found in proximity to piping plovers and, as a result, they receive protection by the buffers created for piping plovers. In cases where Wilson's plover nests or chicks are outside of existing piping plover buffers, buffers will be created to ensure that nests have a 50 meter buffer and chicks have a 100 meter buffer for pedestrians and no less than 200 meter buffer for ORVs, consistent with measures recommended for piping plovers in the Piping Plover Recovery Plan (USFWS 1996).

Least terns

A range of buffer recommendations for least terns was considered in the ORV FEIS (NPS 2010, Table 31). For least terns, the proposed pedestrian and ORV buffer for nests remains unchanged at 100 meters based on information in Erwin (1989). Unlike piping plover chicks, least tern chicks are altricial and remain in or near the nest cup for a day or two after hatching while adults forage and bring food to the chicks at the nest. As chicks mature, they become more mobile, but typically stay within 200 meters of the nest site (Massey 1974). Accordingly, least tern chicks require a less restrictive buffer than those species with precocial chicks (i.e., those chicks which can move about freely soon after hatching). Based on basic biological information, and that presented in Erwin (1989), 100 meters is proposed as the ORV and pedestrian buffer for unfledged chicks that would provide sufficient protection for most unfledged least tern chicks from recreational disturbance.

Colonial nesting waterbirds

A range of buffer recommendations for colonial nesting waterbirds was considered in the ORV FEIS (see NPS 2010, Table 31 and Appendix A of this EA). Other than least tern colonies described above, mixed-species colonies at CAHA often include black skimmers. Black skimmer and other tern species' chicks are altricial and remain in or near the nest cup after hatching while adults forage and bring food to the chicks at the nest. As chicks mature, they become more mobile and begin to move further away from the nest site however they remain completely dependent on the adults for food, shelter and safety. Accordingly, these species require a less restrictive buffer than those species with precocial chicks (i.e., those chicks which can move about freely soon after hatching). The smallest buffer size recommendation for mixed colonies that included black skimmers is from Rodgers and Smith (1995). They studied mixed tern/black skimmer responses to pedestrian and motor boat disturbance in Florida and determined that a 180 meter buffer would be sufficient to protect nesting birds and chicks from human disturbance. Because no ORV specific data were available to base buffers on, these data were used, making the assumption that boats would have similar disturbance levels to nesting birds and their chicks as ORVs.

Sea turtles

Sea turtle nests at the Seashore are marked with 10 meter x 10 meter symbolic fencing (wooden posts with string and flagging) during incubation so that vehicles and pedestrians do not travel in the immediate vicinity of incubating eggs. While the average incubation period is 62 days at the Seashore (over the last three seasons), hatching as early as day 49 of incubation has occurred (in

2011). Therefore, when nests enter the hatch window between day 50 and 55, the buffer is expanded down to the waterline and delineated with light filtering fencing (typically, black fabric silt fencing) to provide additional protection for the hatchlings. Under alternative B, as nests reach the time period when they might hatch, the buffer would be expanded in a manner modified from those recommended in the North Carolina Wildlife Resources Commission's "Handbook for Sea Turtle Volunteers in North Carolina" (NCWRC 2006). The handbook calls for a 15.2 meter (50 feet) buffer around nest for areas with ORVs. During the hatch window, the buffer would be expanded to 15 meters out from the sides of the nest, down to the high tide line (i.e., water and/or wet sand), and back from the nest 5 meters. The shorter buffer behind the nest would allow ORVs and pedestrians to travel behind the nest where sufficient beach width exists. When there is not room for ORVs to travel behind the nest, and when no alternate route or access points exists, vehicles would be allowed to drive seaward of the expanded sea turtle closure as close as practicable to the surf line, as long as personnel are available to closely monitor the nest for signs of hatching and to eliminate vehicle tire ruts from the beach at the end of each day.

Park data show that early season nests (nests laid prior to June 1) incubate longer due to cooler sand temperatures early in the incubation period (CAHA Annual Reports 2010, 2012-2014). Therefore NPS proposes to change the expansion time to day 60 of incubation unless signs of hatching are observed. This would allow ORV routes to remain open longer. Nests laid after August 1 are considered late season nests. The predicted hatch date for these nests occurs in the cooler Fall months and development slows. Data collected at the Seashore from 2010-2014 indicate that no hatchlings emerge from nests laid on or after August 19th (see Figure 1 above; CAHA Annual Reports 2010-2014). Therefore, under alternative B, the Seashore would retain the option of not implementing buffer expansion for turtle nests laid prior to August 20, where such nests were blocking ORV access. However, all such nests would be monitored daily for signs of hatching by park staff. Should signs of hatching be observed, nest buffers would be expanded as outlined for nests laid prior to August 20.

How Alternatives Meet Objectives

As stated in Chapter 1 of this document, the action alternative selected for analysis must meet all objectives to a large degree. The action alternative must also address the stated purpose of taking action and resolve the need for action; therefore, the action alternative was assessed in light of how well it would meet the objectives of the proposed action, which are stated in Chapter 1 of this document.

Table 2.3 compares how each alternative described in this chapter would meet the objectives for taking action.

Table 2.3: Comparison of How the Alternatives Meet Objectives

Objective	Alternative A	Alternative B
Identify modified buffers	Does not meet the objective because it does not identify	Fully meets the objective by modifying buffers where

Objective	Alternative A	Alternative B
and corridors that can be implemented in a sustainable manner	modified buffers and corridors.	appropriate and providing sustainable corridors.
Provide consistent written guidelines, according to site conditions, for ORV routes, buffers, and signage	Meets the objective by providing specific written guidance.	Meets the objective to the same extent as alternative A.
Minimize impacts from ORV use to soils and topographic features	Meets the objective by directing access around sensitive resources into defined corridors.	Meets the objective in the same manner, and to the same extent, as alternative A.
Provide protection for threatened, endangered, and other protected species	Meets the objective by providing protective buffers around threatened, endangered, and other protected species.	Meets the objective, but to a lesser extent than alternative A, because the alternative B buffers are not as protective as the buffers under alternative A.
Minimize impacts to native plant species	Meets the objective Meets the objective by directing access around sensitive resources into defined corridors.	Meets the objective in the same manner, and to the same extent, as alternative A.
Minimize impacts to wildlife species and their habitats	Meets the objective to a greater extent than alternative B, because it provides larger, more protective buffers in some instances.	Meets the objective, but to a lesser extent than alternative A, because some buffers are reduced in size, with potential for greater impacts to wildlife.
Manage ORV use to allow for a variety of	Does not meet the objective because it does not provide greater access to Seashore	Fully meets the objective by providing additional access corridors for ORVs.

Objective	Alternative A	Alternative B
visitor use experiences and greater access to Seashore resources	resources.	

Of the two alternatives, alternative B best meets the objectives in taking action, and is the Seashore's preferred alternative.

Process Used to Review Scientific Literature

A review of scientific literature began soon after enactment of the 2014 Act. The purpose of the literature review was to provide the information necessary to create a synthesis designed to provide updated scientific information related to potential impacts of ORV and pedestrian disturbance to the conservation, restoration, and management of CAHA natural resources.

A necessary first step to develop a set of recommended buffers for the protection of native coastal species against pedestrian and ORV disturbance within park boundaries was to identify and review any information obtained since 2009. To this end, a systematic literature search was performed using RefWorks (www.refworks.com), an online research tool designed for conducting literature searches and producing bibliographies. The NPS, in coordination with library staff at Texas A&M University, performed this search.

To obtain the desired literature, the NPS staff developed a set of key literature search terms based on species potentially affected by ORV and pedestrian activities. Search terms included multiple species (shorebirds, sea turtles, native plants) as well as disturbance activities (e.g., pedestrian, ORV, OHV, driving, etc.) (See Appendix B, Search Strategy). Data are published in a variety of sources (e.g., peer-reviewed journals, news articles, theses, etc.). Therefore, searches included data from multiple databases (see Appendix B).

The search resulted in 286 references. Each of these references was reviewed by park subject experts (e.g., endangered species, coastal resources, natural resource management, etc.) for content related to the potential effects of ORV and pedestrian disturbance on coastal natural resources. The final list of references deemed of value for this exercise included articles related to: sea turtles (1), plover species (14), oystercatchers (1), shorebirds (11), and habitat (3). (See Appendix B).

Under the 2014 Act, NPS was requested to provide the minimal buffer necessary for protection of native coastal species potentially affected by pedestrian and ORV disturbance. Of the 30 new articles potentially relevant to this issue, few provided any specific recommendations for buffer size for any species. Additionally, those that did have buffer size recommendations were not particularly relevant to the specific issues being addressed here. Accordingly, the newly-recommended buffers in Tables 2.2a and b were based on earlier literature, data collected at the Seashore (see above, "Rationale for Buffers Proposed in Alternative B"), and expert opinion.

Consistency with the Purposes of NEPA

The NPS requirements for implementing NEPA include an analysis of how each alternative meets or achieves the purposes of NEPA, as stated in sections 101(b) and 102(1) of the Act. Each alternative analyzed in an EA should be assessed as to how it meets the following purposes:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- Ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
- Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Both alternatives assessed in this EA provide for protection of sensitive Seashore resources. Both provide protection for shorebird and sea turtle nests in line with the best available scientific information. Alternative B is less protective than alternative A, but meets the legislative mandate to "ensure that the buffers are of the shortest duration and cover the smallest area necessary to protect a species."

Both alternatives protect the aesthetics and biological resources of the Seashore, and both offer a wide range of beneficial uses of the environment. Alternative B provides greater opportunities for visitor use in that it expands vehicular and pedestrian access to parts of the Seashore that would not be open under alternative A. Alternative B supports a greater variety of individual choice by allowing greater pedestrian and vehicular access at the Seashore.

Environmentally Preferable Alternative

The NPS is required to identify the environmentally preferable alternative in its NEPA documents for public review and comment. The NPS, in accordance with the U.S. Department of the Interior policies contained in the Department Manual (515 DM 4.10) and CEQ's Forty Questions, defines the environmentally preferable alternative (or alternatives) as the alternative that best promotes the national environmental policy expressed in NEPA (section 101(b)) (516 DM 4.10). The CEQ's Forty Questions (Q6a) further clarifies the identification of the environmentally preferable alternative stating, "this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources."

Alternative A is the environmentally preferable alternative because it affords more protection to natural resources, specifically, to threatened, endangered, and special status species that nest at the Seashore. While it is believed that the buffers and corridors in alternative B will be

adequately protective of all species, alternative A would provide an extra measure of safety since it provides wider protective buffers than those in alternative B.

National Park Service Preferred Alternative

To identify the preferred alternative, the planning team evaluated each alternative based on its ability to meet the plan objectives (see Table 2.3) and the potential impacts on the environment (see Chapter 4 of this document). Alternative B was identified as the NPS preferred alternative.

In terms of species protection, both alternatives would provide the necessary buffers, as well as the proactive establishment of prenesting areas and protection of breeding and nonbreeding shorebird habitat. However, alternative A would not meet the principal project objectives because it would not provide the reduced buffers sizes and increased number of access corridors mandated by the 2014 Act. Therefore, alternative B is the NPS' preferred alternative.

Table 2.4: Comparison of Environmental Impacts from the Alternatives

Topic	Alternative A	Alternative B
Federally Listed Threatened and Endangered Species and their Habitats	Actions may affect / are likely to adversely affect piping plovers and sea turtles due to the minor to moderate adverse impacts from ORV and other recreational use.	Actions taken under alternative B may affect / are likely to adversely affect piping plovers and sea turtles due to the minor to moderate adverse impacts from ORV and other recreational use. The establishment of smaller prescribed buffers under alternative B would likely result in more adverse impacts to species as compared to alternative A. However, overall impacts under alternative B from ORV and other recreational use would be long-term minor to moderate adverse.
State-Listed and Special Status Species	Overall impacts under alternative A from ORV and other recreational use would be long-term minor to moderate adverse.	The establishment of smaller prescribed buffers under alternative B would result in more adverse impacts to species as compared to alternative A. However, overall impacts under alternative B from ORV and other recreational use would be long-

Topic	Alternative A	Alternative B
		term minor to moderate adverse.
Visitor Use and Experience	Alternative A would result in long-term minor to moderate adverse impacts to ORV users and some pedestrians due to limitations on access to areas subject to resource closures. However, other users would experience long-term beneficial impacts due to the ability to experience natural nesting and hatching activity.	Alternative B would result in long-term beneficial impacts to ORV users and some pedestrians who seek greater access than what is available under alternative A to areas otherwise subject to resource closures. However, other users would experience long-term minor adverse impacts due to a somewhat reduced ability to observe natural nesting and hatching activity free of human interference.
Seashore Management and Operations	Implementation of alternative A would result in no change to Seashore operations. Overall impacts to Seashore operations would be long-term and neutral.	Implementation of alternative B would require approximately $260,000 in additional personnel costs, together with associated housing and other costs. Overall impacts to Seashore operations would be long-term minor to moderate adverse.

3. Affected Environment

The "Affected Environment" describes existing conditions for those elements of the human environments that would be affected by the implementation of the actions considered in this EA. The components addressed include federally listed threatened or endangered species; state-listed and special status species; wildlife and wildlife habitats (with a focus on birds and invertebrate species that could be affected by ORV use or management); visitor use and experience; and Seashore management and operations. Impacts for each of these topics are analyzed in "Chapter 4: Environmental Consequences."

Because this document tiers off the ORV FEIS, readers are directed to the detailed discussion of the affected environment in that document, which is incorporated herein by reference and can be found at http://parkplanning.nps.gov/projectHome.cfm?projectID=10641. Discussions of the topics analyzed in this EA can be found at the following locations in the ORV FEIS: federally listed threatened or endangered species, pp. 200-41; state-listed and special status species, pp. 241-69; visitor use and experience, pp. 280-99; and Seashore management and operations, pp. 322-24.

For the convenience of the reader, the following brief summaries are provided for "Federally-listed Species," "State-listed and Special Status Species," "Visitor Use and Experience," and "Seashore Management and Operations."

FEDERALLY-LISTED SPECIES

A total of seven species at the Seashore are listed as either endangered or threatened by the USFWS. In some cases, the species may also be listed by the state of North Carolina. These species are: the federally- and state-listed piping plover (*Charadrius melodus*); federally-listed rufa red knot (*Calidris canutus rufa*); federally- and state-listed loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), and leatherback sea turtles (*Dermochelys coriacea*); and federally- and state-listed seabeach amaranth (*Amaranthus pumilus*).

Piping plover critical habitat was designated in 2001 and at the Seashore includes wintering habitat for the piping plover. Of the 2,043 acres of designated critical habitat in Dare and Hyde counties, approximately 1,827 acres are located within the boundaries of the Seashore, more specifically, at Bodie Island Spit, Cape Point, Hatteras Inlet Spit, Ocracoke Inlet Spit, and South Point. The critical habitat designated within the Seashore was intended to protect wintering habitat for the piping plover.

The rufa red knot was listed as a threatened species by USFWS on January 12, 2015. Although this species does not nest at the Seashore, it migrates through the area during the spring (in transit to its breeding grounds in the Canadian arctic) and in the fall (in transit to its wintering grounds in parts of the United States, the Caribbean, and South America). No prenesting closures, breeding closures or buffers are established for this species on the Seashore. However, through the establishment of closures for other breeding birds, vehicle free areas, and winter

closures, the Seashore provides protection to important foraging areas during their migration through the area. Critical habitat for red knots has not been designated by the USFWS.

As discussed above in Chapter1 (under "Issues not further investigated") seabeach amaranth has been dismissed from further analysis.

STATE-LISTED AND SPECIAL STATUS SPECIES

A number of species at the Seashore are listed or recognized as special status species by the State of North Carolina but are not federally listed as endangered or threatened. Species identified as endangered, threatened, or special concern 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. Additionally, proactive protection measures for state listed species by all natural resource agencies may preclude the need for federal listing as threatened or endangered in the future.

North Carolina state-listed and special status wildlife that are known to occur in Dare and Hyde counties include four species of mammals, nine species of reptiles, two species of amphibians, 20 species of birds, one species of freshwater fish, and 17 species of insects; however, not all of these species have been documented at the Seashore. State listed bird species at the Seashore include the American oystercatcher (*Haematopus palliatus*), Wilson's plover (*Charadrius wilsonia*), least tern (*Sternula antillarum*), common tern (*Sterna hirundo*), gull-billed tern (*Gelochelidon nilotica*), and black skimmer (*Rynchops niger*).

VISITOR USE AND EXPERIENCE

The Seashore is managed according to NPS *Management Policies 2006* which state that the park resources and values are to be enjoyed presently and in the future by the people of the United States, and that NPS is committed to providing appropriate high-quality opportunities for all visitors (NPS 2006a). Accordingly, there are a number of visitor use opportunities at the Seashore. Recreational activities include shelling, birding, kayaking, canoeing, windsurfing, camping, fishing, hunting, swimming, auto touring, biking, hiking, horseback riding, stargazing, surfing, kite boarding, and wildlife viewing. Access to these recreational activities is primarily achieved by driving on North Carolina State Highway 12 (NC-12) and parking at designated lots along the road or along unmarked pull off areas; or by using an ORV to drive along the beach or sound to the designated recreation area. ORV access to the beach is via designated ramps leading from NC-12 to the beach. Historically much of the ocean shore was open to ORV access but in accordance to the guidelines in the ORV FEIS areas of the Seashore are now either closed part of the year or all of the year to ORVs. Depending on the perspective of the visitor, a beach closed to ORVs can be a pleasant experience, or an inconvenience. Visitors who value the solitude and natural surroundings of the beach may enjoy the pedestrian only beach areas. On the other hand, visitors who prefer to use vehicles to assist in the hauling of their recreation gear, or that have difficulty walking along the sand to the beach, may find that the beach closures prevent them from accessing parts of the beach for recreation.

Visitor totals per year over the last 10 years to Cape Hatteras National Seashore have ranged from 1.9 million to 2.3 million; with the lowest count occurring in 2011 and the highest in 2012.

Visits are highest in the months of June, July, and August with over 300,000 visitors in each of those months in 2012.

SEASHORE MANAGEMENT AND OPERATIONS

Management of ORV use at the Seashore, and implementation of the related administrative activities and field operations, involves all five NPS operational divisions, as well as the Superintendent's Office.

Management and Administration. Management and administrative staff members at the Seashore have a variety of responsibilities related to ORV management, including compiling and sending out weekly access and resource updates, managing payroll for the Seashore, fielding questions from visitors regarding ORV management, fulfilling human resources functions and supervisory roles, and providing IT and other technical support, in addition to the superintendent's role in ORV management.

Visitor and Resource Protection. Law enforcement officers at the Seashore are responsible for enforcing all applicable regulations, including those related to ORV and species management. In relation to ORV management, duties of law enforcement include patrolling the Seashore, as well as providing on-the-spot interpretation to visitors regarding the reasons for certain ORV regulations and species management efforts. Other duties include responding to violations and conducting investigations. This division also issues and manages the ORV permit system and park fee collection at entrance stations, campgrounds, and ORV offices.

Resource Management. Resource management staff members at the Seashore are responsible for all monitoring and surveying of species at the Seashore, as well as establishing and changing the required resource closures once state- or federally listed species are found at the Seashore. This staff includes supervisory roles as well as full-time and seasonal field staff to implement species management measures. Field staff and GIS staff implement closure requirements and provide weekly reports and mapping of the closures to keep the public informed of their activities. Resource Management staff is also responsible for preparation of all required annual reports for protected species, any research on protected species or factors that affect the species, predator control activities, and coordination of regulatory and scientific activities with other entities such as the USFWS and NCWRC.

Interpretation. Interpretation staff members at the Seashore are responsible for providing information programs to park visitors, specifically on the subject of species management. Support (or materials) costs for these Seashore staff include printing newsletters and brochures, and obtaining materials for visitor programs.

Facility Management. Facility management staff members at the Seashore are responsible for providing maintenance and repairs for beach ramps and parking lots, as well as installation of informational signs along the beach. Facility management is in charge of maintaining the housing units for seasonal and some permanent employees.

4. Environmental Consequences

Introduction

NEPA requires that before taking an action, federal agencies discuss the environmental impacts of that action, feasible alternatives to that action, and any adverse environmental effects that cannot be avoided if the proposed action is implemented. This section describes the potential environmental impacts of implementing each of the alternatives (i.e., the no-action alternative and the one action alternative) on natural resources, the visitor experience, and park operations. These impacts provide a basis for comparing the advantages and disadvantages of the two alternatives.

This analysis of environmental consequences consists largely of a qualitative assessment of the effects of the two alternatives. The first part of this section discusses the methodology used to identify impacts and includes definitions of terms. Selected impact topics are then analyzed with reference to each of the two alternatives. The discussion of each impact topic includes a description of the positive and negative effects of the alternatives, a discussion of cumulative effects, if any, and a conclusion.

Methodology

The methodology for resource impact assessments follows direction provided in the CEQ regulations, Parts 1502 and 1508. The impact analysis and the conclusions in this part are based largely on the review of existing literature and park studies, information provided by experts within the National Park Service and other agencies, park staff insights and professional judgment.

The impacts from the two alternatives were evaluated in terms of the context, duration, and intensity of the impacts, as defined below, and whether the impacts were considered beneficial or adverse to park resources and values.

Context

Each impact topic addresses effects on resources inside and outside the Seashore, to the extent those effects are traceable to the actions set forth in the alternatives.

Duration

Short term Impacts – Those that would occur within one year.

Long term Impacts – Those that would continue after one year.

Impact Intensity

For this analysis, intensity or severity of impact is described as being negligible, minor, moderate, or major. A more specific definition of intensity is provided for each impact topic in the analysis below.

Impact Type

Unless otherwise noted, impacts would be adverse.

Direct versus Indirect Impacts

Direct effects would be caused by an action and would occur at the same time and place as the action. Indirect effects would be caused by the action and would be reasonably foreseeable but would occur later in time, at another place, or to another resource.

Impacts of Climate Change

Studies predict that coastal barrier islands and their natural and cultural resources will be affected by sea level rise and potentially stronger storm events resulting from climate change. Relative sea level is currently rising in northeastern North Carolina at a rate of 16 to 18 inches per century, a substantially higher rate than the 7 inches per century one hundred years ago and the 3 inches per century rate 200 years ago. The current rate will likely continue to increase into the future as the climate continues to warm (Riggs et al. 2008). Various alternatives for human adaption to changing conditions on the barrier islands have been proposed (Riggs et al. 2008), but much of government, business, organization and individual response to the challenges of climate change is undetermined. Future threats of deterioration, segmentation, and collapse of the barrier islands along the North Carolina Outer Banks coast as a result of increased sea-level rise and storm activity have been described (Culver et al. 2007, 2008; Riggs and Ames 2003; Riggs et al. 2009). Given the complex interactions among multiple factors and the uncertainties over human response to climate change on the barrier islands, the level of uncertainty about possible effects on specific resources or impact topics makes analysis for impacts of climate change in this document speculative. It is assumed that management actions that would facilitate resiliency into the Seashore's wildlife and plant resources (e.g., management measures to allow increases in populations of protected species) would be beneficial to those resources as they adapt to changed conditions over future decades.

Sea level rise has been observed along coastal North Carolina and it is expected to increase over time. During the next 30 years, a range of sea level rise between 4.8 cm (1.9 in) and 26.7 cm (10.5 in) has been predicted (N.C. Coastal Resources Commission Science Panel 2015). As a result it is possible that coastal areas will experience additional flooding and that existing shorelines may be lost or modified in a manner that reduces the area or quality of nesting habitat for birds and turtles. Not surprisingly, coastal nesting habitats are vulnerable to sea level rise and some have predicted loss of nesting habitat in the future for sea turtles (Fish et al. 2005) and shorebirds (Galbraith et al. 2005).

Cumulative Impacts

Regulations implementing NEPA issued by the CEQ require the assessment of cumulative impacts in the decision-making process for federal actions. Cumulative impacts 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 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The cumulative impacts analyzed in this document consider the incremental effects of the two alternatives in conjunction with past, current, and future actions at the park. Cumulative impacts were determined by combining the effects of a given alternative with other past, present, and

reasonably foreseeable future actions. The impact analysis and conclusions are based on information available in the literature, data from NPS studies and records, and information provided by experts within the National Park Service and other agencies. Unless otherwise stated, all impacts are assumed to be direct and long term.

To assess cumulative impacts, it was necessary to identify other past, ongoing, or reasonably foreseeable future actions at and around the Seashore. A list of these actions is included in Appendix D.

Analysis of Impact Topics

Federally Listed Threatened or Endangered Species

Assumptions, Methodology, and Impact Thresholds

The following information was used to assess impacts on all listed species from ORV management actions:

1. Species found in areas likely to be affected by actions described in the alternatives.

2. Habitat loss or alteration caused by the alternatives.

3. Displacement and disturbance potential of the actions and the species' potential to be affected by the activities.

According to the ESA, the term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

Specific methodologies and assumptions pertaining to the piping plover or sea turtles are described under the relevant descriptions in the following text.

The following assumption was made regarding the analysis for all alternatives:

> An indirect impact from recreation use is the attraction of mammalian and avian predators to trash associated with recreation use (USFWS 1996, 2009). Predation continues to be a major factor affecting the reproductive success of piping plovers (Elliot-Smith and Haig 2004). The Seashore would enforce proper trash disposal and anti-wildlife feeding regulations to reduce the attraction of predators to the area under all alternatives. Nevertheless, as demonstrated by the Seashore's annual piping plover reports, predation continues to be a threat to piping plover success at the Seashore (see "Chapter 3: Affected Environment"). Recreational use that brings humans into areas where plovers reside would continue to have indirect impacts by attracting predators, resulting in long-term moderate impacts under all alternatives as impacts could be detectable and outside the range of natural variability, but would not result in large declines in population as the Seashore takes steps to protect listed species from predation.

This EA serves as the biological assessment in compliance with Section 7 consultation requirements and analyzes impacts using the above terminology. Both alternatives include an

ESA summary after the conclusion section to facilitate this compliance. To provide the public with additional information on the intensity of impacts, the NEPA thresholds for each species were defined and used throughout the analysis.

The ESA defines the terminology used to assess impacts to the piping plover and sea turtles as follows.

No effect:	When a proposed action would not affect a listed species or designated critical habitat.
May affect / not likely to adversely affect:	When effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where "take" occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.
May affect / likely to adversely affect:	When any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, the proposed action "is likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the proposed action, then it "is likely to adversely affect" the species. Incidental take is the take of a listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity.
Is likely to jeopardize species / adversely modify critical habitat:	The appropriate conclusion when the NPS or the USFWS identifies an adverse effect that could jeopardize the continued existence of a species or destroy or adversely modify critical habitat of a species within or outside Seashore boundaries.

Study Area

The study area for assessment of the various species is described separately for each listed species.

PIPING PLOVER

Species-Specific Methodology and Assumptions

Potential impacts on the federally threatened piping plover populations and habitat were evaluated based on available data on the species' past and present occurrence at the Seashore, scientific literature on the species, life history, scientific studies on the impacts of human

disturbance on piping plovers, as well as documentation of the species' association with humans, pets, predators, and ORVs. Information on habitat and other existing data were acquired from staff at the Seashore, the USFWS, and available literature.

Piping Plover Impact Thresholds

The following thresholds for evaluating impacts to piping plovers were defined.

Negligible: There would be no observable or measurable impacts to piping plovers, their habitats, or the natural processes sustaining them. Impacts would be well within natural fluctuations.

Minor Adverse: Impacts on piping plovers would be detectable, but would not be outside the natural range of variability. Occasional responses by some individuals to disturbance could be expected, and may result in minimal interference to feeding, reproduction, resting, or other factors affecting population levels, but would not be expected to result in changes to local population numbers, population structure, and other demographic factors. Some impacts might occur during critical reproduction periods for piping plover, but would not result in injury or mortality. Sufficient habitat in the Seashore would remain functional to maintain a sustainable population in the Seashore.

Moderate Adverse: Impacts on piping plover, their habitats, or the natural processes sustaining them would be detectable and could be outside the natural range of variability. Frequent responses by some individuals to disturbance could be expected, with some negative impacts to feeding, reproduction, resting, or other factors affecting local population levels. Small changes to local population numbers, population structure, and other demographic factors may occur. Some impacts might occur during critical periods of reproduction or in key habitats in the Seashore and result in harassment, injury, or mortality to one or more individuals. However, sufficient population numbers and habitat in the Seashore would remain functional to maintain a sustainable population in the Seashore.

Major Adverse: Impacts on piping plover, their habitats, or the natural processes sustaining them would be detectable and would be expected to be outside the natural range of variability. Frequent responses by some individuals to disturbance would be expected, with negative impacts to feeding, reproduction, or other factors resulting in a decrease in Seashore population levels or a failure to restore levels that are needed to maintain a sustainable population in the Seashore. Impacts would occur during critical periods of reproduction or in key habitats in the Seashore and result in direct mortality or loss of habitat. Local population numbers, population structure, and other demographic factors might experience large declines.

Duration: Short-term effects would be one to two breeding seasons for piping plover.

Long-term effects would be anything beyond two breeding seasons for piping plover.

Study Area

The study area for assessment of the alternatives is the Seashore. The study area for the cumulative impacts analysis is the Seashore and the region, including the Carolina area included in the recovery plan for the piping plover (USFWS 1996).

Critical Habitat

The primary constituent elements (PCEs) for piping plover wintering habitat are those biological and physical features that are essential to the conservation of the species. The PCEs are those habitat components that support foraging, roosting, and sheltering and the physical features necessary for maintaining the natural processes that support these habitat components. These areas typically include those coastal areas that support intertidal beaches and flats and associated dune systems and flats above annual high tide (USFWS 2001). PCEs of wintering piping plover critical habitat include sand or mud flats or both with no or sparse emergent vegetation. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting piping plovers (USFWS 2001). Important components of the beach/dune ecosystem include surf-cast algae, sparsely vegetated back beach and salterns, spits, and washover areas. 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.

The units designated as critical habitat are those areas that have consistent use by piping plovers and that best meet the biological needs of the species. The amount of wintering habitat included in the designation appears sufficient to support future recovered populations, and the existence of this habitat is essential to the conservation of the species. Additional information on each specific unit is available (USFWS 2001).

Of the 2,043 acres of designated critical habitat in Dare and Hyde counties, approximately 1,827 acres are located within the boundaries of the Seashore, more specifically, at Bodie Island Spit, Cape Point, Hatteras Inlet Spit, Ocracoke Inlet Spit, and South Point. The ORV FEIS provides a detailed description of the four units of designated critical habitat (NPS 2010, pp. 190-191). These units were designated to protect piping plover wintering habitat.

IMPACTS OF ALTERNATIVE A: NO ACTION

Resource Management Activities

Establishment of Prenesting Closures. Prenesting surveying activities for piping plovers under alternative A would continue to include the survey and evaluation of all potential breeding

habitats by Seashore staff by March 1 of each year with piping plover prenesting closures recommendations based on that evaluation.

Buffer/Closure Establishment. As called for in the ORV FEIS, prenesting closures would be established by March 15. ORV corridors would be provided at Cape Point and South Point seaward of the prenesting closure, with the corridor being reduced from 50 meters (164 feet) to 35 meters (115 feet) during the breeding season. These prenesting closures would be removed by July 31 if no birds are present, or two weeks after all chicks have fledged, whichever comes later. Alternative A also assumes (per the ORV FEIS) seasonal ORV closure of Bodie Island Spit, which would provide protection from ORV use to piping plovers nesting in the area, although pedestrian use would still be permitted.

All areas would be subject to resource closures for breeding, nesting, and fledging activities, as detailed in Table 10-1 of the ORV FEIS and Table 2.1a of this EA. In addition, when scrape(s), nest(s), or chick(s) occur in the immediate vicinity of paved roads, parking lots, campground, buildings, and other facilities, such as within villages or at NPS developed sites, the NPS would retain the discretion to provide resource protection to the extent possible, while still allowing those facilities to remain operational. Regardless of the nature of the adjacent facilities, in all cases, at a minimum, the NPS would provide signs, fencing, and reduced buffers to protect scrape(s), nest(s) and chick(s) once they occur. The NPS would not reduce buffers to accommodate an ORV corridor or ORV ramp access. This management would provide the Seashore flexibility in species management in these areas but may have long-term minor adverse impacts to piping plover, as this species would not be expected to use habitat in these areas, but if they did could experience disturbance.

Piping plovers would likely experience long-term moderate benefits from the size of the resource closures under alternative A, including establishment of prenesting closures, and the fact that buffers would adjust in response to chick mobility, as these actions would be expected to improve the sustainability of the species at the Seashore.

Overall Impacts from Resource Management Activities. Overall impacts under alternative A from resource management activities (primarily resulting from the effects of surveying and field activities) would be long-term and beneficial for piping plovers. As with all species management activities, minor adverse impacts would occur from human presence during monitoring activities, but on the whole the establishment of prenesting closures early in the breeding season, vehicle-free areas (VFAs) and areas seasonally closed to ORV use, monitoring activities, and establishment of prescribed buffers would provide long-term beneficial impacts to the species.

ORV and Other Recreational Use

ORV and Pedestrian Access. Under alternative A, Seashore visitors would be provided with a degree of predictability regarding areas available for ORV use, as well as VFAs, based largely on the seasonal resource and visitor use characteristics of various areas in the Seashore. Where ORV use is permitted and there are prenesting closures, an ORV corridor would be established seaward of the prenesting closure that would be 35 meters (115 feet) rather than the 50 meter (164-foot) corridor during the nonbreeding season, subject to resource closures. All buffers, including prenesting closures, would not be reduced to accommodate an ORV corridor or ORV access ramp.

Establishment of various VFAs, both year-round and seasonally, as well as the standardized monitoring and buffers in areas where ORV are permitted would reduce pressure from recreational activities on piping plover. Under alternative A, there would exist a minor to moderate potential for disturbance and nest abandonment from direct short-term contact with people and/or essential vehicles due to the existence of an ORV corridor at Cape Point and South Point. Although the establishment of prenesting closures, designation of year-round and seasonal VFAs and the buffers established under alternative A should limit adverse impacts to piping plover, compliance with closures may not be absolute, since alternative A still includes pedestrian access to Bodie Island Spit and a conduit (ORV corridor) to Cape Point and South Point during the breeding season (all subject to resource closures). Therefore, recreational uses could result in short-term minor to moderate adverse impacts to piping plovers if non-compliance occurs. Since recreational activities would still occur, under alternative A impacts from ORV and pedestrian access to piping plover would be long-term minor to moderate adverse.

Overall Impacts from ORV and Other Recreational Use. Overall impacts under alternative A from ORV and other recreational use would be long-term minor to moderate adverse. The buffers described in Table 2.1a, together with the measures set forth in the ORV FEIS (establishment of prenesting closures and year-round and seasonal VFAs, which proactively reduce or preclude recreational use early in the breeding season; ORV permit requirements; and pet and other recreational activity restrictions) would all provide benefits in terms of species protection. Nevertheless, the access to various areas of the Seashore provided by alternative A would create the potential for disturbance to piping plover, resulting in long-term minor to moderate adverse impacts.

Cumulative Impacts. Various dredging operations are occurring (or being planned) in the vicinity of the Seashore, such as the dredging of the federally authorized navigation channel at Oregon Inlet. These dredging activities fall under two categories, major dredging projects and maintenance activities. For the dredging of Oregon Inlet, major projects occur every four to five years, with sand being deposited in areas outside the Seashore, such as on Pea Island. Major dredging of Oregon Inlet is typically avoided during the breeding season; however, maintenance dredging does occur and could result in short-term, minor, adverse impacts due to disturbance. When major dredging projects do occur, it is common for piping plover foraging and nesting habitat at the southern end of Bodie Island spit to slough off into the channel for a number of months after the dredging operation, which could cause, minor to moderate, adverse effects to piping plover.

Several beach nourishment projects have been completed or proposed along the North Carolina coast in recent years. The most recent beach nourishment project was completed in the Rodanthe area in 2014. These projects have the potential to impact piping plover nesting, foraging, and wintering habitat similar to those created by dredging projects mentioned above, due to the placement of the materials on potential sensitive habitat areas. The Seashore is evaluating the potential impacts of issuing a special use permit to allow beach nourishment along an approximately 4.8 km (3 mile) section of beach in Buxton for the purpose of protecting NC Highway 12. If implemented, the project would place over 2.8 million cubic yards of sand in and adjacent to the intertidal zone. The project may have short-term negative impacts on prey availability for foraging shorebirds and the quality of nesting habitat for sea turtles, but medium-

term beneficial impacts by providing nesting substrate for turtles and shorebirds. In the long term, if the project is permitted, it is not expected to have impacts on nesting wildlife throughout the seashore.

Storms and other weather events during the piping plover breeding season (March–August) can result (depending upon storm intensity) in temporary displacement of and disturbance to nesting birds or even in the washing away of nests and eggs (Haig and Oring 1988; Houghton 2005; Cohen 2005). In addition to the timing of summer storms, storm severity is also an important variable. Powerful storms can surge and overwash large areas of piping plover habitat including even up to the toe of the dune and beyond and result in loss of scrapes, nests, eggs, chicks and even breeding adults. Conversely, winter, late fall, and early spring storms are capable of having benefits to piping plovers by depositing new materials and creating overwash areas and hence new nesting and foraging habitat for piping plovers or negative impacts by eroding and removing otherwise suitable habitat. Hence, the impacts of storms and piping plovers depend on the timing and severity of storm events and whether they result in piping plover habitat creation or destruction.

Hurricanes can also affect the piping plover because of their impact on staff resources. Storm recovery that pulls staff from resource management (including species monitoring or law enforcement) duties during piping plover breeding season would have adverse impacts. Conversely, hurricane recovery that takes place outside of the breeding season would have no direct effect on piping plover and could enhance piping plover habitat.

Commercial fishing harvest would have minor to moderate impacts on piping plovers because plovers do not feed on any commercially important fish. However, plovers do feed on some of the same prey items of fish species that may be harvested and as such harvest of fish may mean greater prey encounters for plovers. In this case the impact of commercial fishing could result in long-term, minor to moderate increases in prey availability that would have a beneficial impact on piping plover foraging. Bycatch of non-target species by commercial fisherman, sometimes results in these species washing up or being left on the shoreline, attracting gulls and other bird species to the area. Increased predation of eggs and chicks could result in adverse minor to moderate adverse impacts to plovers.

Several of the local and NPS past, current, and future planning efforts can also affect locally sensitive bird species. If increased development within the Seashore's boundaries would result from the implementation of these plans and increase recreational use of the beaches, adverse impacts to plovers could occur.

The education component of the Seashore's Long-Range Interpretive Plan would provide long-term, minor to moderate benefits as it would help to educate visitors about the conservation needs of the birds that inhabit the Seashore and the conservation measures enacted to help protect them.

Current predator control and the predator management plan would provide long-term major benefits by helping to control mammalian predators, such as fox and others, which prey upon plover adults, eggs, and young. Continuing to remove fox (both red and gray fox), raccoons, cats, and other predators from the Seashore and continuing to use predator exclosures would be

beneficial to the piping plover. However, predator management actions such as the placement and checking of predator exclosures and traps would bring people, essential vehicles, and equipment into direct contact with piping plovers and their habitat because actions and some essential vehicle traffic would occur inside the established buffer. This could cause short-term, minor, adverse impacts. Predator trapping might result in short-term minor disturbance to nests and young, or result in loss of nests or hatchling if trappers are not cognizant of nest locations. However, overall predator management actions would be highly beneficial.

The *Cape Lookout National Seashore Interim Protected Species Management Plan* (NPS 2006b) provides long-term beneficial impacts to piping plover at the neighboring Seashore through the management policies that it employs. The outcome of the Cape Lookout National Seashore ORV management plan/EIS would also have direct, long-term impacts on bird populations within the Seashore as well as within the state of North Carolina. Specifically, it would have an impact on the region's goal of achieving compliance with the piping plover recovery plan (USFWS 1996). However, whether the impact of the ORV plan would be beneficial or adverse to piping plovers would depend upon the management decisions that are made and ultimately implemented.

The replacement of the Herbert C. Bonner Bridge would occur within the Seashore. An EIS and Biological Opinion for this project found that, "the proposed replacement of the Bonner Bridge… as proposed, is not likely to jeopardize the continued existence of these species [including piping plover], and is not likely to destroy or adversely modify proposed critical wintering habitat for the piping plover." Given these findings, this project would be expected to result in short-term, negligible, adverse impacts to piping plovers if minimal disturbance from construction noise and lighting to courting, nesting, and foraging plovers is experienced.

The overall cumulative impacts of these past, current and future actions, would be long-term negligible to minor, depending on the intensity and duration of unpredictable factors such as storm events, with long-term beneficial impacts from actions such as increased interpretive programs as part of the long-range interpretive plan and predator management within the Seashore. Many of these actions do not directly impact piping plover habitat in the area, as most of this habitat is located within the Seashore and is impacted by NPS management actions more than any of the aforementioned past, present, and future actions. These impacts, combined with the long-term minor to moderate, and potentially major adverse, as well as beneficial impacts of alternative A, would be long-term, moderate adverse impacts, as actions within the Seashore would act as a driver for overall cumulative impacts.

Conclusion. Overall impacts under alternative A from resource management activities (primarily resulting from the effects of surveying and field activities) would be long-term and beneficial for piping plovers. As with all species management activities, minor adverse impacts would occur from human presence during monitoring activities, but on the whole the establishment of prenesting closures early in the breeding season, year-round and seasonal VFAs, monitoring activities, and establishment of prescribed buffers would provide long-term beneficial impacts to the species. Overall impacts under alternative A from ORV and other recreational use would be long-term minor to moderate adverse. Measures called for in the ORV FEIS (establishment of prenesting closures and year-round and seasonal VFAs, which proactively reduce or preclude ORV use throughout the breeding season; ORV permit requirements; and pet and other recreational activity restrictions) would all provide benefits in terms of species protection.

Cumulative impacts would be long-term minor to moderate adverse.

Determination of Effect. Under the ESA, the actions taken under alternative A may affect and are likely to adversely affect piping plover due to the minor to moderate impacts from ORV and other recreational use. Under alternative A, year-round and seasonal VFAs would provide protection for migrating piping plover and plover establishing territories early in the season, and established buffers and subsequent monitoring activities would provide protection thereafter. However, recreational uses would still occur in the vicinity of plovers during breeding season in areas such as Cape Point and South Point.

Under the ORV FEIS, nonessential ORV traffic is prohibited from all areas (other than the soundside access areas), from 9:00 p.m. to 7:00 a.m. from May 1 to September 15. From September 16 to April 30, the beach is opened for night driving, in designated ORV routes, for vehicles displaying a valid ORV permit. A 0.5 mile buffer for expanded sea turtle nests applies. The NPS retains the discretion to limit night driving to certain areas or routes, based on resource protection considerations. These restrictions to night driving provide long-term minor to moderate benefits to piping plovers but still result in long-term minor adverse impacts during the time when night driving is allowed by permit. And while there may be beneficial impacts from surveys and monitoring, and management of recreation, the actions under alternative A would also likely cause some adverse effects.

Critical Habitat

A biological opinion was issued by the USFWS in consultation with the NPS on November 15, 2010 to analyze the effects of the ORV FEIS preferred alternative on piping plover critical habitat. Because alternative A continues the current management direction, no additional adverse effects to critical habitat are expected.

IMPACTS OF ALTERNATIVE B: MODIFY BUFFERS AND PROVIDE ADDITIONAL ACCESS CORRIDORS.

Resource Management Activities

Establishment of Prenesting Closures. Prenesting surveying activities for piping plovers under alternative B would be the same as under alternative A. In particular, as called for in the ORV FEIS, they would continue to include the survey and evaluation of all potential breeding habitats by Seashore staff by March 1 of each year with piping plover prenesting closures recommendations based on that evaluation.

Buffer/Closure Establishment. As under alternative A, prenesting closures would be established by March 15, as called for in the ORV FEIS. ORV corridors would be provided at Cape Point and South Point seaward of the prenesting closure, with the corridor being reduced from 50 meters (164 feet) to 35 meters (115 feet) during the breeding season. These prenesting closures would be removed by July 31 if no birds are present, or two weeks after all chicks have fledged, whichever comes later. Like alternative A, alternative B also assumes (per the ORV FEIS) seasonal ORV closure of Bodie Island Spit, which would provide protection from ORV use to piping plovers nesting in this area, although pedestrian use would still be permitted.

All areas would be subject to resource closures for breeding, nesting, and fledging activities, as detailed in in Table 10-1 of the ORV FEIS, and modified by table Table 2.2a of this EA. The buffers in alternative B would differ from those in alternative A as follows:

COMPARISON OF BUFFER DISTANCES – PIPING PLOVER

TABLE 2.3 COMPARISON OF BUFFER DISTANCES – SHOREBIRDS

Species	Behavior	Disturbance	CAHA Now	CAHA Modified	Comments on CAHA Modified
Piping plover	Nesting	Ped.	75m	50m	Consistent with PIPL Recovery Plan
		ORV	75m	50m	
	Unfledged chicks	Ped.	300m	100m	Symbolically fenced area would be provided as a refuge. Modified CAHA buffers for unfledged chicks are contingent on ability to do intensive monitoring.
		ORV	1000m	A. 500m if there is an existing corridor B. Reduce buffer to no less than 200m if corridor does not exist	If staffing requirements cannot be met, buffers will revert to 1000m buffer established in the ORV FEIS. Chicks will need to be located prior to opening an area or providing/establishing a corridor in the morning to ORVs to ensure that adequate buffers are being maintained. When chicks cannot be located, areas will remain closed to all ORV access until chicks are re-located, or their fate has been determined.

Modified buffers for unfledged chicks under alternative B are contingent on the park's ability to conduct intensive monitoring. "Intensive monitoring" means that qualified staff members maintain regular visual confirmation of chick location from the time the chicks are located in the morning until the beach closes to driving at night. If staffing requirements cannot be met, buffers will revert to the buffers established in the ORV FEIS.[4] In addition, piping plover chicks will need to be located prior to opening an area or providing/establishing a corridor in the morning to ORVs to ensure that adequate buffers are being maintained. When chicks cannot be located, areas will remain closed to all ORV access until chicks are observed, or the fate of the chicks has been determined.

[4] Current buffers provide protection for nesting species given current staffing levels and current workload. For beach nesting species which are highly mobile, such as Wilson's and piping plovers and American oystercatchers, any decrease in buffer size increases the risk of negative impacts, given the current level of staffing. To minimize that risk, intensive monitoring would be necessary to achieve a level of confidence that species protection has not been compromised. Workloads and current staffing levels cannot achieve this. Therefore, the number of qualified staff would need to be increased.

As with alternative A, when scrape(s), nest(s), or chick(s) occur in the immediate vicinity of paved roads, parking lots, campground, buildings, and other facilities, such as within villages or at NPS developed sites, the NPS would retain the discretion to provide resource protection to the extent possible, while still allowing those facilities to remain operational. Regardless of the nature of the adjacent facilities, in all cases, at a minimum, the NPS would provide signs, fencing, and reduced buffers to protect scrape(s), nest(s) and chick(s) once they occur. The NPS would not reduce buffers to accommodate an ORV corridor or ORV ramp access. This management would provide the Seashore flexibility in species management in these areas but may have long-term minor to moderate adverse impacts to piping plover, as this species would not be expected to use habitat in these areas, but if they did, could experience disturbance.

Piping plovers would likely experience long-term minor to moderate adverse impacts due to the reduction of the size of the buffers. However, although the buffers for piping plovers are smaller under this alternative than under alternative A, they are consistent with the 1996 Recovery Plan (USFWS 1996) and assume that intensive monitoring would be in place to compensate for the reduction in buffer size. Accordingly, expected impacts to piping plovers would likely be greater under this alternative than under alternative A. However, overall impacts would still be long-term, minor to moderate, and adverse.

Overall Impacts from Resource Management Activities. Overall impacts under alternative B from resource management activities (primarily resulting from the effects of surveying and field activities) would be long-term and beneficial for piping plovers. As with all species management activities, minor adverse impacts would occur from human presence during monitoring activities, but on the whole the establishment of prenesting closures early in the breeding season, VFAs and areas seasonally closed to ORV use, monitoring activities, and establishment of prescribed buffers would provide long-term beneficial impacts to the species.

ORV and Other Recreational Use

ORV and Pedestrian Access. Under alternative B, Seashore visitors would be provided with greater access to various parts of the Seashore due to the modified buffers called for in this alternative. The reduction of the ORV buffer from 1000 meters to a standard buffer of 500 meters, with a no less than 200 meter buffer if a corridor does not exist, would place ORVs in greater proximity to unfledged chicks. Even though the reduced buffers would be accompanied by intensive monitoring, the potential for impact on chicks would be greater than under alternative A.

Under alternative B, there would exist the potential for disturbance and nest abandonment from direct short-term contact with people and/or essential vehicles due to the existence of an ORV corridor at Cape Point and South Point. This potential would be exacerbated by the reduced size of the buffers, but would be offset to a large extent by intensive monitoring.

Although the establishment of prenesting closures, designation of year-round and seasonal VFAs and the buffers established under alternative B should limit adverse impacts to piping plover, compliance with closures may not be absolute, since alternative B still includes pedestrian access to Bodie Island Spit and a higher probability of a conduit (ORV corridor) to Cape Point and South Point during the breeding season (all subject to resource closures). Therefore, recreational

uses could result in short-term, minor to moderate, adverse impacts to piping plovers if non-compliance occurs. Since recreational activities would still occur, under alternative B impacts from ORV and pedestrian access to piping plover would be long-term, minor to moderate, and adverse.

Overall Impacts from ORV and Other Recreational Use. Overall impacts under alternative B from ORV and other recreational use would be long-term, minor to moderate, and adverse. The buffers described in Table 2.2a, together with the measures set forth in the ORV FEIS (establishment of prenesting closures and year-round and seasonal VFAs, which proactively reduce or preclude recreational use early in the breeding season; ORV permit requirements; and pet and other recreational activity restrictions) would offset these adverse impacts to a large degree. Nevertheless, the access to various areas of the Seashore provided by alternative B would create the potential for disturbance to piping plover, resulting in long-term, minor to moderate, adverse impacts.

Cumulative Impacts. Cumulative impacts under alternative B would be the same as under alternative A, i.e., long-term, minor to moderate, and adverse impacts.

Conclusion. Overall impacts under alternative B from resource management activities (primarily resulting from the effects of surveying and field activities) would be long-term and beneficial for piping plovers. As with all species management activities, minor adverse impacts would occur from human presence during monitoring activities, but on the whole the establishment of prenesting closures early in the breeding season, year-round and seasonal VFAs, monitoring activities, establishment of prescribed buffers, and intensive monitoring would provide long-term beneficial impacts to the species. Overall impacts under alternative B from ORV and other recreational use would be long-term, minor to moderate, and adverse. Measures called for in the ORV FEIS (establishment of prenesting closures and year-round and seasonal VFAs, which proactively reduce or preclude ORV use throughout the breeding season; ORV permit requirements; and pet and other recreational activity restrictions) would all provide benefits in terms of species protection.

Cumulative impacts would be long-term minor to moderate adverse.

Determination of Effect. Under the ESA, the actions taken under alternative B may affect/are likely to adversely affect piping plover due to the minor to moderate impacts from ORV and other recreational use. Under alternative B, year-round and seasonal VFAs would provide protection for migrating piping plover and plover establishing territories early in the season, and established buffers and subsequent intensive monitoring activities would provide protection thereafter. However, recreational uses would still occur in the vicinity of plovers during breeding season in areas such as Cape Point and South Point.

Under the ORV FEIS, nonessential ORV traffic is prohibited from all areas (other than the soundside access areas), from 9:00 p.m. to 7:00 a.m. from May 1 to September 15. From September 16 to April 30, the beach is opened for night driving, in designated ORV routes, for vehicles displaying a valid ORV permit. A 0.5 mile buffer for expanded sea turtle nests applies. The NPS retains the discretion to limit night driving to certain areas or routes, based on resource protection considerations. These restrictions to night driving provide long-term benefits to piping

plovers but still result in long-term minor adverse impacts during the time when night driving is allowed by permit. And while there may be beneficial impacts from surveys and monitoring, and management of recreation, the actions under alternative B would also likely cause some adverse effects.

Critical Habitat

A biological opinion was issued by the USFWS in consultation with the NPS on November 15, 2010 to analyze the effects of the ORV FEIS preferred alternative on piping plover critical habitat. Because alternative A continues the current management direction, no additional adverse effects to critical habitat are expected.

Under the ORV FEIS, designated critical habitat for wintering piping plover is protected with permanent closures which encompass the critical habitat designation.

Because the only changes to the ORV FEIS that are being proposed with alternative B of this EA are changes to size and duration of wildlife buffers during the nesting season (and critical habitat for the piping plover was designated at the Seashore to protect wintering habitat), implementation of alternative B would not result in any additional effects to critical habitat than were already examined in the Biological Opinion issued by the USFWS on November 15, 2010 for activities proposed by the preferred alternative in the ORV FEIS.

SEA TURTLES

Species-specific Methodology and Assumptions

Potential impacts on federally listed sea turtle populations and their habitat within the Seashore were evaluated based on the species' known interactions with humans, domestic pets, recreational and nighttime activities, predators, artificial lighting, and ORVs, as well as past and present occurrence at the Seashore.

Although five threatened or endangered sea turtle species occur in the waters of North Carolina, only four species, the loggerhead, green, Kemp's ridley, and leatherback, are known to nest at the Seashore. The hawksbill is only known to occur at the Seashore through occasional strandings, usually due to death or incapacitation from hypothermia. Therefore, the analysis focuses only on the four species that nest at the Seashore. For these four species, the analysis focuses on effects to sea turtles from a variety of human recreation and other activities, as well as impacts incurred as a result of surveying and management activities. Except for the timing of nest laying activities, the nesting habits for loggerhead, green, and leatherback sea turtles at the Seashore are similar. Kemp's ridley differ from the other nesting sea turtle species as they nest predominantly during daytime hours. Therefore, the analysis generally discusses the impacts on the sea turtles as a group. Impacts to a specific species are noted where they differ from impacts to the other sea turtle species. Sea turtle nesting habitat overlaps protected bird species habitat seaward of the primary dune line. Consequently, management of these species could also benefit nesting sea turtles and is included in the analysis. However, the extent to which the bird closures are beneficial to the turtles depends on the location, size, and duration of the closures.

In general, direct and indirect impacts to sea turtles, their nests, eggs, and hatchlings would primarily occur during the sea turtle nesting and hatching seasons from May 1 to November 15 and during summer and fall storm events when post-hatchlings may wash ashore. Direct impacts to live stranded turtles may occur year-round.

The information contained in this analysis was obtained through best professional judgment of Seashore staff and experts in the field, and by reviewing applicable peer-reviewed scientific literature.

Sea Turtle Impact Thresholds

The following thresholds for evaluating impacts to sea turtles were defined.

Negligible: There would be no observable or measurable impacts to sea turtles, their habitats, or the natural processes sustaining them. Impacts would be well within the natural range of variability.

Minor Adverse: Impacts to sea turtles, their habitats, or the natural processes sustaining them would be detectable, but would not be outside the natural range of variability. Disturbance to some nesting females could be expected to occur, but would be infrequent. Complete or partial nest loss due to human activities would occur infrequently. Occurrences of disorientation/disruption of hatchling movement would occur infrequently (less than 10% of all hatchling emergence events). Direct hatchling mortality from human activities would be rare.

Moderate Adverse: Impacts to sea turtles their habitats or the natural processes sustaining them would be detectable and could be outside the natural range of variability. Occasional disturbance to some nesting females could be expected, with negative impacts to reproduction affecting local population levels. Complete or partial nest loss due to human activities would occur occasionally. Occurrences of disorientation/disruption of hatchling movement would occur occasionally (more than 10% and less than 30% of all hatchling emergence events). Direct hatchling mortality from human activities would occasionally occur. However, sufficient population numbers and habitat in the Seashore would remain functional to maintain a sustainable population in the Seashore.

Major Adverse: Impacts to sea turtles, their habitats, or the natural processes sustaining them would be detectable and would be expected to be outside the natural range of variability. Frequent disturbance to nesting females would be expected, with negative impacts to reproduction, or other factors resulting in a decrease in Seashore population levels or a failure to restore levels that are needed to maintain a sustainable population in the Seashore. Impacts could include in direct mortality to one or more nesting females. Complete or partial nest loss due to human activities would occur frequently. Occurrences of disorientation/disruption of hatchling movement would occur frequently (more than 30% of all hatchling emergence events). Direct hatchling mortality from human activities would frequently occur. Local population numbers, population structure, and other demographic factors might experience large declines.

Duration: Short-term effects would last up to two seasons.

Long-term effects would be continued beyond two seasons.

Study Area

The study area for assessment of the alternatives is the Seashore. The study area for the cumulative impacts analysis is the state of North Carolina.

IMPACTS OF ALTERNATIVE A: NO ACTION

Resource Management Activities

Surveying activities for sea turtles would continue under alternative A. Monitoring activities and seasonal closures would continue as well, as provided under the ORV FEIS. These activities would result in long-term beneficial impacts to sea turtles.

ORV and Other Recreational Use

VFAs would continue under this alternative and provide protection to sea turtles. In addition, closures would continue to be expanded 50 to 55 days after nests were laid. Expanded closures would be 25 meters (12.5 meters on either side) (VFAs), 50 meters (25 meters on either side) (villages), and 105 meters (52.5 meters on either side) (10-15 meters behind nests) (ORV corridors).

Under alternative A, sea turtles would still be exposed to possible negative impacts from pedestrians and risk of mortality and injury due to ORV-related recreational activity. The buffers established under this alternative would reduce but not eliminate this risk. Overall, the impacts of the buffers established by alternative A would be long-term minor to moderate adverse, due to recreational access throughout the Seashore during the sea turtle nesting season.

Cumulative Impacts. Other past, present, and future planned actions within and around the Seashore have the potential to impact the population of all three species of sea turtles that nest at the Seashore. Past storms such as hurricanes and other weather events during the turtle nesting and hatching season (April–November) have substantially impacted turtle nesting success within the Seashore and throughout the state of North Carolina and would continue to have long-term, moderate to major, adverse impacts that may affect/are likely to adversely affect sea turtles. Storms, depending upon their intensity, can result in partial or complete nest loss due to flooding of nests, exposing nests due to erosion, or through the accumulation of additional sand on top of a nest. Sea turtles have developed nesting strategies (e.g., laying lots of eggs and nesting several times during a season) to compensate for catastrophic natural events. Storms also have altered the beachscape in both positive and negative manners. In some areas, storms cause beach erosion, which has made those areas less optimal for nesting, while in other areas, storms have created overwash areas that create new nesting habitat. Weather events such as cold fronts can also cause sudden drops in ocean and soundside water temperatures that can cause hypothermia, which can kill sea turtles. Hurricanes can also affect sea turtles because of their impact on staff resources. Other recovery efforts that divert staff from resource management (in particular, surveying) activities during sea turtle nesting and hatchling season can have long-term, minor, adverse impacts by causing nests to be missed due to a lack of surveying, which means that nests are not provided with proper protection during the incubation and/or hatch windows.

The dredging of the federally authorized navigation channel at Oregon Inlet and disposing of material on Pea Island has occurred in the past and would continue to occur on an annual basis in the future with long-term, minor to moderate, adverse impacts. Dredging is typically done by hydraulic pipeline dredge with work generally performed during the fall and winter months (USACE 2002). Maintenance of the navigation channels with pipeline dredges should not affect turtle species because pipeline dredges are not known to take sea turtles. Hopper dredging, which is known to take sea turtles, is currently performed under a Regional Biological Opinion (RBO) issued by the NMFS for hopper dredging in the southeastern United States. All provisions of this RBO, or any issued subsequently, are strictly followed. No sea turtles have ever been taken by hopper dredges at Oregon Inlet, and under the recommended plan, the use of a hopper dredge to construct and maintain the widener would be extremely rare (USACE 2002). Nests laid in the project area are currently relocated by Department of Interior personnel because of the severely eroded nature of some beach areas and the possibility of nest overwash by high tides. However, because encroaching into the nesting season during dredging and disposal events could occasionally occur, and because of the possibility of missing a sea turtle nest during the nest monitoring program or inadvertently breaking eggs during relocation, it has been determined that the recommended project may affect both the loggerhead and green sea turtles that nest on Pea Island (USACE 2002). Dredging occurs during the turtle nesting season, and occasionally a hopper dredge is used, which has been known to be responsible for incidental takes of sea turtles. Heavy construction equipment may also be used during the deposition of the dredged material, which is typically placed on Pea Island. Heavy equipment use could lead to increased erosion or soil compaction, making the habitat less suitable for nesting.

Several beach nourishment projects have been completed or proposed along the North Carolina coast in recent years. The most recent beach nourishment project was completed in the Rodanthe area in 2014. These projects have the potential to impact sea turtles similar to those created by dredging projects mentioned above.

The Seashore is evaluating the potential impacts of issuing a special use permit to allow beach nourishment along an approximately 4.8 km (3 mile) section of beach in Buxton for the purpose of protecting NC Highway 12. If implemented, the project would place over 2.8 million cubic yards of sand in and adjacent to the intertidal zone. The project may have short-term negative impacts on the quality of nesting habitat for sea turtles, but medium-term beneficial impacts by providing nesting substrate for turtles. In the long-term, if the project is permitted, it is not expected to have impacts on nesting wildlife throughout the seashore.

Several local and NPS past, current, and future planning efforts can also affect the sea turtles. For example, new development might result from the County Land Use Development Plan for Dare and Hyde Counties. Although the details are lacking, additional development within the Seashore's boundaries that may result from implementing the land use plan may have long-term, minor to moderate, adverse impacts by increasing the amount of light pollution on the beaches causing adult turtles to abort nesting attempts and hatchlings to be disoriented when trying to make their way to the sea. Development might also increase the recreational use of the beaches and the impacts that recreation has on sea turtles.

The educational aspect of the Seashore's Long-range Interpretive Plan would provide long-term, minor benefits to the sea turtles because it would help to educate visitors about the sea turtles that inhabit the Seashore and the protection measures that are put in place to help protect them. The Predator Management Plan would also provide long-term, minor benefits to the sea turtles by helping to control mammalian predators, such as fox and raccoon, which prey upon sea turtle eggs and hatchlings. However, there could be a slight chance that predator trapping would result in disturbance to females or hatchlings, or result in nest or hatchling loss if trappers are not cognizant of nest locations resulting in long-term, minor to moderate, adverse impacts.

The *Cape Lookout National Seashore Interim Protected Species Management Plan* (2006b) provides long-term, moderate beneficial impacts to all four species of nesting sea turtles at the Seashore through the management policies that it employs. The outcome of the Cape Lookout National Seashore ORV Management Plan/EIS would also have direct, long-term impacts on the nesting sea turtle populations within the Seashore, as well as within the state of North Carolina. Specifically, it would have an impact on the state's goal of achieving 2,000 loggerhead nests annually within the state per the Loggerhead Recovery Plan (NMFS and USFWS 2008). However, whether the impact of the ORV plan would be beneficial or adverse to sea turtles would depend upon the management decisions that are made and ultimately implemented.

During the replacement of the Herbert C. Bonner Bridge, construction noise and lighting may adversely impact nesting females, and dredging in Pamlico Sound could impact waterborne turtles resulting in long-term, minor to moderate, adverse impacts. The presence of shading from the bridge and pilings driven into the substrate may also alter the optimal suitability of the beach surrounding the bridge for turtle nesting. However, the new bridge would also provide some long-term, minor benefits by allowing barrier island processes to occur more naturally than with the present bridge. The new bridge would allow the natural formation of new habitats such as overwash fans, new inlets, and low sloping beaches that could provide suitable habitat for nesting turtles. The EIS for this project found that the proposed replacement of the Bonner Bridge, and subsequent phases of elevating portions of NC-12 onto bridges is no likely to jeopardize the continued existence of listed sea turtles (FHWA 2007).

The current prohibition of nonessential recreational ORV use from 9:00 p.m. to 7:00 a.m. has virtually eliminated potential impacts to adult and hatchling turtles caused by night driving. Although the Kemp's ridley turtle is potentially a daytime nester, the extremely low frequency of nesting Kemp's ridley turtles (only one nest has ever been documented at the Seashore), make the likelihood of a nonessential recreational ORV encounter with a nesting Kemp's ridley turtle very unlikely. However, the opening of select ORV routes with no or a low density of turtle nests from September 16 through November 15, subject to terms and conditions of a permit, does occasionally impact turtles in those select ORV route areas. Beach fires are allowed, but are restricted to areas in front of Coquina Beach, Rodanthe, Waves, Salvo, Avon, Buxton, Frisco, Hatteras Village, and the Ocracoke Day-Use Areas. While a permit is required to have a beach fire, allowing beach fires still causes adverse impacts to adult and hatchling turtles through light pollution.

The overall cumulative impact of these past, current, and future actions—added to the effects of actions under alternative A—would result in long-term, moderate to major, adverse cumulative impacts that may affect/are likely to adversely affect sea turtles within Cape Hatteras National Seashore.

Conclusion. Through the protection of adult and hatchling sea turtles, surveys and management activities, limiting ORVs to designated use areas, alternative A would provide long-term beneficial impacts. Because ORVs and pedestrians would be restricted from entering established buffers, the chances are greatly reduced that hatchlings may be killed by recreational activities. ORV use and other recreational activities occurring under alternative A would have long-term minor to moderate adverse impacts.

Past, present, and future activities both inside the Seashore and within the state of North Carolina—when combined with the impacts of surveying and management activities, ORV use, and other recreational activities expected under this alternative—would continue to result in long-term minor to moderate adverse cumulative impacts.

Determination of Effect. Under alternative A, resource management activities would result in long-term benefits due to the protection provided to sea turtles from daily surveys for nests during the sea turtle nesting season (May 1 – September 15) and installation of closures around each nest found, expanding the closures and installing light filtering fencing around the nests during the hatch window, and relocating nests from areas prone to erosion or frequent flooding. The benefits of establishing prenesting closures for birds, combined with other areas that are closed to ORV use either year-round or seasonally, such as some of the village beaches and Bodie Island Spit, would close approximately 39 miles of Seashore beach to ORV use during the turtle nesting and hatching season. These closures would minimize potential impacts to nesting turtles, turtle nests, and turtle hatchlings in these areas. However, the benefits would be tempered somewhat by the fact that the prenesting areas would only be closed to ORV use from March 15 through July 31, which does not encompass the entire turtle nesting season and ORV corridors would be provided seaward of the prenesting closures at Cape Point and South Point.

ORV and other recreational use would have long-term minor to moderate adverse impacts due to the earlier re-opening of prenesting closures (after shorebird breeding activity has concluded), resulting in increased recreational access throughout the Seashore during the sea turtle nesting

season. ORV and other recreational use would have impacts on sea turtles by affecting the beach profile and substrate characteristics in ways that reduce suitability for nesting and hatching success and likely continued closure violations and vandalism. Under the ORV FEIS, nonessential ORV traffic is prohibited from all areas (other than the soundside access areas), from 9:00 p.m. to 7:00 a.m. from May 1 to September 15. From September 16 to April 30, the beach is opened for night driving, in designated ORV routes, for vehicles displaying a valid ORV permit. A 0.5 mile buffer for expanded sea turtle nests applies. The NPS retains the discretion to limit night driving to certain areas or routes, based on resource protection considerations. These restrictions to night driving provide long-term minor to moderate benefits to sea turtles, but still result in long-term minor adverse impacts during the time when night driving is allowed by permit. Opening select ORV routes from September 16 through November 15, subject to terms and conditions of a permit, only in areas where there are no turtle nests, would protect turtle hatchlings. Under the ESA, these impacts, together with the cumulative impacts described above, would result in a finding of may affect/are likely to adversely affect sea turtles because the actions would result in direct or indirect impacts to the species that are not discountable, insignificant, or beneficial. Though there would be beneficial impacts from resource management activities, the actions under alternative A would also likely cause adverse effects.

IMPACTS OF ALTERNATIVE B: MODIFY BUFFERS AND PROVIDE ADDITIONAL ACCESS CORRIDORS

Resource Management Activities

Surveying activities for sea turtles would continue under alternative B in the same manner as alternative A. Monitoring activities and seasonal closures would continue as well, as provided under the ORV FEIS. These activities would result in long-term beneficial impacts to sea turtles. As under alternative A, relocation of nests would be considered only as an option of last resort. Overall, resource management activities would provide long-term beneficial impacts to sea turtles.

ORV and Other Recreational Use

VFAs would continue under this alternative and provide protection to sea turtles. In addition, closures would generally continue to be expanded 50 to 55 days after nests were laid. However, the buffers in alternative B would differ from those in alternative A as follows:

COMPARISON OF BUFFER DISTANCES – SEA TURTLES

Expansion	CAHA Now	CAHA Modified	Comments on CAHA Modified

Expansion	CAHA Now	CAHA Modified	Comments on CAHA Modified
Vehicle-Free Area Expansion	25 m (12.5 m either side)	15m on sides 5m minimum behind nest when light filtering fencing is installed.	Pedestrian corridor during expansion period: Visitors can walk in front of turtle nests -- walking as close as practicable to the surf line – although occasionally, where signed, people may be asked to walk behind nest closures. There may be exceptions where nest is near dune line and high tide line simultaneously.
Village Expansion	50m (25 m either side)	15m on sides 5m minimum behind nest when light filtering fencing is installed.	Same as above
ORV Route Expansion	105m (52.5 m either side) 10-15m closed behind nest	A. 15m on sides 5m minimum behind nest when light filtering fencing is installed B. Utilize corridor around nest if one exists C. Drive behind nest D. Drive in front of nest	ORV corridor: For turtle nests that block access from one ORV area to other and no way around the nest exists, driving may be permitted in front of nest if resources exist to closely monitor nest activity and remove ruts. Driving may continue to 9 pm only if resources are there during high risk times associated with hatching to protect hatchlings and remove ruts. Where access is affected, nests laid after August 20 would not be expanded to the waterline, but would be monitored daily for signs of hatching. Where hatching takes place, buffers would be expanded as outlined for nests laid prior to August 20.

Note: The NCWRC Handbook calls for a 50ft (15.2 meters) buffer around nest for areas with ORVs. Under alternative B, NPS would continue to mark nests during incubation so that vehicles and pedestrians do not travel in the immediate vicinity of incubating eggs. During the hatch window, the buffer would be expanded to 15m out from the sides of the nest, down to the high tide line (i.e., water and/or wet sand, and back from the nest 5m. The shorter buffer behind the nest would allow ORVs and pedestrians to travel behind the nest where sufficient beach width exists. Pedestrian and ORV buffers are the same during the hatch window to minimize the effects of tire ruts and footprints on emerging hatchlings.

For nests laid prior to June 1, the Seashore would retain the option of not expanding the buffer until day 60, unless signs of hatching prior to day 60 were detected.

The Seashore would retain the option of not expanding the buffer for nests laid after August 20 that block access to ORV passage. Where access is affected, nests laid after August 20 would be monitored daily for signs of hatching and managed appropriately to avoid impacts if signs of hatching are observed. As noted, where hatching takes place, buffers would be expanded.

Under this alternative, beach driving would be allowed seaward of select sea turtle expanded closures. However, impacts would be offset by daily raking of ruts, which is consistent with the Loggerhead Recovery Plan (NMFS and USFWS 2008). Under alternative B, as with alternative A, sea turtles would still be exposed to mortality and injury risks due to recreational activity,

both pedestrian- and ORV-related. Overall, the buffers established under this alternative would reduce but not eliminate this risk. Impacts would be long-term, minor, and adverse due to recreational access throughout the Seashore during the sea turtle nesting season.

Overall, the impacts of the buffers established by alternative B would be long-term minor to moderate adverse.

Cumulative Impacts. Cumulative impacts under alternative B would be the same as under alternative A, i.e., long-term, moderate to major, and adverse impacts.

Conclusion. Through the protection of adult and hatchling sea turtles, surveys and management activities, limiting ORVs to designated use areas, alternative B would provide long-term beneficial impacts. Because ORVs and pedestrians would be restricted from entering established buffers, the chances are greatly reduced that hatchlings may be killed by recreational activities. Impacts from ORV use and other recreational activities occurring under alternative B would be greater than under alternative A, and would be long-term, minor to moderate, and adverse.

Past, present, and future activities both inside the Seashore and within the state of North Carolina—when combined with the impacts of surveying and management activities, ORV use, and other recreational activities expected under this alternative—would continue to result in long-term, moderate to major, and adverse cumulative impacts.

Determination of Effect. Under alternative B, resource management activities would result in long-term benefits due to the protection provided to sea turtles from daily surveys for nests during the sea turtle nesting season (May 1 – September 15) and installation of closures around each nest found. The closures established under alternative B are smaller than the closures that would occur under alternative A, but are still adequate to protect turtles, nests, and hatchlings, when combined with raking, installing light filtering fencing around the nests during the hatch window, and relocating nests from areas prone to erosion or frequent flooding.

Establishing prenesting closures for birds, combined with other areas that are closed to ORV use either year-round or seasonally, such as some of the village beaches and Bodie Island Spit, would also close approximately 39 miles of Seashore beach to ORV use during the turtle nesting and hatching season. These closures would benefit turtles by minimizing potential impacts to nesting turtles, turtle nests, and turtle hatchlings in these areas. However, the benefits would be tempered somewhat by the fact that the prenesting areas would only be closed to ORV use from March 15 through July 31, which does not encompass the entire turtle nesting season. Furthermore, ORV corridors would be provided seaward of the prenesting closures at Cape Point and South Point.

ORV and other recreational use would have long-term minor to moderate adverse impacts due to the re-opening of prenesting closures after shorebird breeding activity has concluded, resulting in increased recreational access throughout the Seashore during the sea turtle nesting season. ORV and other recreational use would have impacts on sea turtles by affecting the beach profile and substrate characteristics in ways that reduce suitability for nesting and hatching success and likely continued closure violations and vandalism. Under the ORV FEIS, nonessential ORV traffic is prohibited from all areas (other than the soundside access areas), from 9:00 p.m. to 7:00

a.m. from May 1 to September 15. From September 16 to April 30, the beach is opened for night driving, in designated ORV routes, for vehicles displaying a valid ORV permit. A 0.5 mile buffer for expanded sea turtle nests applies. The NPS retains the discretion to limit night driving to certain areas or routes, based on resource protection considerations. These restrictions to night driving provide long-term benefits to sea turtles but still result in long-term minor adverse impacts during the time when night driving is allowed by permit. Opening select ORV routes from September 16 through November 15, subject to terms and conditions of a permit, only in areas where there are no turtle nests, would protect turtle hatchlings. Under the ESA these impacts, together with the cumulative impacts described above, would result in a finding of may affect/are likely to adversely affect sea turtles because the actions would result in direct or indirect impacts to the species that are not discountable, insignificant, or beneficial. Though there would be beneficial impacts from resources management activities, the actions under alternative B would also likely cause adverse effects.

State-Listed and Special Status Species

Guiding Regulations and Policies

The NPS *Management Policies 2006* state that NPS will inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible. In addition, the NPS will inventory other native species that are of special management concern to parks (such as rare, declining, sensitive, or unique species and their habitats) and will manage them to maintain their natural distribution and abundance (NPS 2006a, sec. 4.4.2.3). As a result, the NPS is obligated to manage access to important habitat for such species. In addition, one of the Seashore's management goals is to provide protection for species that occur within the Seashore and that suffer population reductions or require special management. Therefore, an analysis of the potential impacts to state-listed species and certain Seashore sensitive species is included in this section.

Assumptions, Methodology, and Impact Thresholds

The following information was used to assess impacts on state-listed and special status species:

1. Species found in areas likely to be affected by management actions described in the alternatives.

2. Habitat loss or alteration caused by the alternatives.

3. Displacement and disturbance potential of the actions and the species' potential to be affected by the activities.

Specific methodologies that were implemented and assumptions that were made that pertained to the American oystercatcher, colonial waterbirds, and Wilson's plover are described under the relevant species impact analysis below.

Study Area

The study area for state-listed and special status species is defined as the Seashore for the analysis of the impacts of the alternatives and defined as the state of North Carolina for the analysis of cumulative impacts.

Impact Thresholds

The following thresholds for evaluating impacts to state-listed and special status species were defined.

Negligible: There would be no observable or measurable impacts to state-listed/special status species, their habitats, or the natural processes sustaining them. Impacts would be well within natural fluctuations.

Minor Adverse: Impacts on state-listed/special status species, their habitats, or the natural processes sustaining them would be detectable, but would not be outside the natural range of variability. Occasional responses by some individuals to disturbance could be expected, but without interference to feeding, reproduction, resting, or other factors affecting population levels. Small changes to local population numbers, population structure, and other demographic factors might occur. However, some impacts might occur during critical reproduction periods for a native species, but would not result in injury or mortality. Sufficient habitat in the Seashore would remain functional to maintain a sustainable population in the Seashore.

Moderate Adverse: Impacts on state-listed/special status species, their habitats, or the natural processes sustaining them would be detectable and could be outside the natural range of variability. Frequent responses by some individuals to disturbance could be expected, with some negative impacts to feeding, reproduction, resting, or other factors affecting local population levels. Some impacts might occur during critical periods of reproduction or in key habitats in the Seashore and result in harassment, injury, or mortality to one or more individuals. However, sufficient population numbers and habitat in the Seashore would remain functional to maintain a sustainable population in the Seashore.

Major Adverse: Impacts on state-listed/special status species, their habitats, or the natural processes sustaining them would be detectable, would be expected to be outside the natural range of variability, and would be permanent. Frequent responses by some individuals to disturbance would be expected, with negative impacts to feeding, reproduction, or other factors resulting in a decrease in Seashore population levels or a failure to restore levels that are needed to maintain a sustainable population in the Seashore. Impacts would occur during critical periods of reproduction or in key habitats in the Seashore and result in direct mortality or loss of habitat. Local population numbers, population structure, and other demographic factors might experience large declines.

Duration: Short-term effects would be up to two breeding seasons for state-listed/special status species.

Long-term would be anything beyond two breeding seasons for state-listed/special status species.

Species-Specific Methodology and Assumptions

Potential impacts on state-listed/special status species populations and habitat were evaluated based on available data on the species' past and present occurrence at the Seashore, as well as the species' association with humans, pets, predators, and ORVs. Information on habitat and other existing data were acquired from staff at the Seashore, the USFWS, and available literature.

The following assumptions were made regarding the analysis for all alternatives:

- An indirect impact from recreation use is the attraction of mammalian and bird predators to trash associated with recreation use (USFWS 1996, 2009). Predation continues to be a major factor affecting the reproductive success of piping plovers (Elliot-Smith and Haig 2004), as well as other shorebirds at the Seashore. The Seashore would enforce proper trash disposal and anti-wildlife feeding regulations to reduce the attraction of predators to the area under all alternatives. Nevertheless, as demonstrated by the Seashore's annual species reports, predation continues to be a threat to species success at the Seashore (see "Chapter 3: Affected Environment"). Recreational use that brings humans into areas where state-listed/sensitive species reside would continue to have indirect impacts by attracting mammalian predators, resulting in long-term moderate impacts under all alternatives as impacts could be detectable and outside the range of natural variability, but would not result in large declines in population as the Seashore takes steps to protected listed species from predation.

IMPACTS OF ALTERNATIVE A: NO ACTION

Resource Management Activities

Establishment of Prenesting Closures. Under alternative A, prenesting surveying activities for American oystercatcher, Wilson's plover, least tern, common tern, gull-billed tern, and black skimmer ("species of concern") would continue to include the survey and evaluation of all potential breeding habitats by Seashore staff by March 1 of each year with prenesting closures recommendations based on that evaluation.

Buffer/Closure Establishment. As called for in the ORV FEIS, prenesting closures would be established by March 15 for American oystercatchers and Wilson's plover and April 15 for terns and black skimmers. These prenesting closures would be removed by July 31 if no birds are present, or two weeks after all chicks have fledged, whichever comes later.

All areas would be subject to resource closures for breeding, nesting, and fledging activities, as detailed in Table 10-1 of the ORV FEIS and Table 2.1a of this EA. In addition, when scrape(s), nest(s), or chick(s) occur in the immediate vicinity of paved roads, parking lots, campground, buildings, and other facilities, such as within villages or at NPS developed sites, the NPS would retain the discretion to provide resource protection to the extent possible, while still allowing those facilities to remain operational. Regardless of the nature of the adjacent facilities, in all cases, at a minimum, the NPS would provide signs, fencing, and reduced buffers to protect scrape(s), nest(s) and chick(s) once they occur. The NPS would not reduce buffers to accommodate an ORV corridor or ORV ramp access. This management would provide the Seashore flexibility in species management in these areas but may have long-term minor adverse impacts to piping plover, as this species would not be expected to use habitat in these areas, but if they did could experience disturbance.

State species of concern would likely experience long-term moderate benefits from the size of the resource buffers under alternative A, including establishment of prenesting closures, and the fact that buffers would adjust in response to chick mobility, as these actions would be expected to improve the sustainability of the species at the Seashore.

Overall Impacts from Resource Management Activities. Overall impacts under alternative A from resource management activities (primarily resulting from the effects of surveying and field activities) would be long-term and beneficial for all species of concern. As with all species management activities, minor adverse impacts would occur from human presence during monitoring activities, but on the whole the establishment of prenesting closures early in the breeding season, vehicle-free areas (VFAs) and areas seasonally closed to ORV use, monitoring activities, and establishment of prescribed buffers would provide long-term beneficial impacts to the species

ORV and Other Recreational Use

ORV and Pedestrian Access. Under alternative A, Seashore visitors would be provided with a degree of predictability regarding areas available for ORV use, as well as VFAs, based largely on the seasonal resource and visitor use characteristics of various areas in the Seashore. Where ORV use is permitted and there are prenesting closures, an ORV corridor would be established

seaward of the prenesting closure that would be 35 meters (115 feet) rather than the 50 meter (164 foot) corridor during the nonbreeding season, subject to resource closures. All buffers, including prenesting closures, would not be reduced to accommodate an ORV corridor or ORV access ramp.

Year-round and seasonal VFAs, together with standardized monitoring and buffers in areas where ORV are permitted, would reduce pressure from recreational activities on species of concern. Under alternative A, there would exist a minor to moderate potential for disturbance and nest abandonment from direct short-term contact with people and/or vehicles. Although the establishment of prenesting closures, designation of year-round and seasonal VFAs and the buffers established under alternative A should limit adverse impacts to species of concern, compliance with closures may not be absolute. Therefore, recreational uses could result in short-term minor to moderate adverse impacts to species of concern if non-compliance occurs. Since recreational activities would still occur, under alternative A impacts from ORV and pedestrian access to species of concern would be long-term minor to moderate adverse.

Overall Impacts from ORV and Other Recreational Use. Overall impacts under alternative A from ORV and other recreational use would be long-term minor to moderate adverse. The buffers described in Table 2.1a, together with the measures set forth in the ORV FEIS (establishment of prenesting closures and year-round and seasonal VFAs, which proactively reduce or preclude recreational use early in the breeding season; ORV permit requirements; and pet and other recreational activity restrictions) would all provide benefits in terms of species protection. Nevertheless, the access to various areas of the Seashore provided by alternative A would create the potential for disturbance to species of concern, resulting in long-term minor to moderate adverse impacts.

Cumulative Impacts. Cumulative impacts under alternative A would be the same as under alternative A for piping plovers (see above), i.e., long-term, minor to moderate, and adverse impacts.

Conclusion. Overall impacts under alternative A from resources management activities (primarily resulting from the effects of surveying and field activities) would be long-term and beneficial for state species of concern. As with all species management activities, minor adverse impacts would occur from human presence during monitoring activities, but on the whole the establishment of prenesting closures early in the breeding season, year-round and seasonal VFAs, monitoring activities, and establishment of prescribed buffers would provide long-term beneficial impacts to these species. Overall impacts under alternative A from ORV and other recreational use would be long-term minor to moderate adverse. Measures called for in the ORV FEIS (establishment of prenesting closures and year-round and seasonal VFAs, which proactively reduce or preclude ORV use throughout the breeding season; ORV permit requirements; and pet and other recreational activity restrictions) would all provide benefits in terms of species protection.

Cumulative impacts would be long-term minor to moderate adverse.

IMPACTS OF ALTERNATIVE B: MODIFY BUFFERS AND PROVIDE ADDITIONAL ACCESS CORRIDORS

Resource Management Activities

Establishment of Prenesting Closures. Prenesting surveying activities for species of concern under alternative B would be the same as under alternative A. In particular, as called for in the ORV FEIS, they would continue to include the survey and evaluation of all potential breeding habitats by Seashore staff by March 1 of each year with prenesting closures recommendations based on that evaluation.

Buffer/Closure Establishment. As under alternative A, prenesting closures would be established by March 15 for American oystercatchers and Wilson's plover and by April 15 for terns and black skimmers, as called for in the ORV FEIS. Prenesting closures would be removed by July 31 if no birds are present, or two weeks after all chicks have fledged, whichever comes later.

Pedestrian and ORV use would be permitted in much of the Seashore, but open areas would be subject to resource closures for breeding, nesting, and fledging activities, as detailed in Table 10-1 of the ORV FEIS, and modified by Table 2.2a of this EA. The buffers in alternative B would differ from those in alternative A as follows:

COMPARISON OF BUFFER DISTANCES – STATE BIRD SPECIES OF CONCERN

Species	Behavior	Disturbance	CAHA Now	CAHA Modified	Comments on CAHA Modified
American oystercatcher	Nesting	Ped.	150m	150m	Pedestrians can walk behind buffer (as is currently allowed).
		ORV	150m	A. 150m B. ORV corridor at water line (where nest is at least 25m from vehicle corridor)	Proposed ORV corridor only when no alternate route available and where nest is at least 25m from vehicle corridor. Pass through traffic only; no parking in corridor.
	Unfledged chicks	Ped.	200m	200m	Pedestrians can walk behind buffer (as is currently allowed).
		ORV	200m	200m	
Wilson's plover	Nesting	Ped.	75m	50m	Consistent with PIPL buffer.

Species	Behavior	Disturbance	CAHA Now	CAHA Modified	Comments on CAHA Modified
		ORV	75m	50m	
	Unfledged chicks	Ped.	200m	100m	WIPL are generally protected by PIPL closure. Where WIPL and PIPL occur together, default to whichever buffer is greater. In cases where Wilson's plovers are found outside of a piping plover buffer, the park would implement increased monitoring.
		ORV	200m	A. 500m if there is an existing corridor B. Reduce buffer to no less than 200m if corridor does not exist	
Least tern	Nesting	Ped.	100m	100m	Modified CAHA buffer from Erwin 1989 (100m) pedestrian
		ORV	100m	100m	Modified CAHA buffer from Erwin (100m) (no ORV citation available)
	Unfledged chicks	Ped.	200m	100m	Modified CAHA buffer from Erwin 1989 (100m) pedestrian
		ORV	200m	100m	Modified CAHA buffer from Erwin (100m) (no ORV citation available)
Common tern gull-billed tern & black skimmer	Nesting	Ped.	200m	180m	Modified CAHA buffers from Rodgers and Smith 1995
		ORV	200m	180m	
	Unfledged chicks	Ped.	200m	180m	Modified CAHA buffers from Rodgers and Smith 1995
		ORV	200m	180m	

Modified buffers and corridors under alternative B are contingent on the conditions set forth above in Chapter 2 and, in particular, on the park's ability to do intensive monitoring for piping plovers. "Intensive monitoring" means that qualified staff members maintain regular visual confirmation of chick location from the time the chicks are located in the morning until the beach closes to driving at night. If staffing requirements could not be met, buffers would revert to the buffers established in the ORV FEIS.

In addition, increased monitoring would be conducted where Wilson's plovers are found outside of a piping plover buffer, and where least tern colonies have chicks. The increased monitoring would ensure that adequate buffers are being maintained. For least tern colonies, monitoring

would be conducted at least two times a day. This increased monitoring would allow the Seashore to keep better track of chicks within a colony, or when a colony shifts locations, thereby enabling staff to adjust the buffers in a timely manner. If colonies consist of mixed species, the larger buffers would apply and increased monitoring for least terns would not be necessary. On the other hand, if the reduction of the buffer allows for vehicles to pass in front of a least tern colony, then intensive monitoring (similar to the monitoring proposed for piping plovers may be warranted.

As with alternative A, when scrape(s), nest(s), or chick(s) occur in the immediate vicinity of paved roads, parking lots, campground, buildings, and other facilities, such as within villages or at NPS developed sites, the NPS would retain the discretion to provide resource protection to the extent possible, while still allowing those facilities to remain operational. Regardless of the nature of the adjacent facilities, in all cases, at a minimum, the NPS would provide signs, fencing, and reduced buffers to protect scrape(s), nest(s) and chick(s) once they occur. The NPS would not reduce buffers to accommodate an ORV corridor or ORV ramp access. This management would provide the Seashore flexibility in species management in these areas but may have long-term minor adverse impacts to piping plover, as this species would not be expected to use habitat in these areas, but if they did could experience disturbance.

State bird species of concern would likely experience long-term minor to moderate adverse impacts due to the reduction of the size of the buffers called for in this alternative, and additional access corridors. However, although the buffers are smaller under this alternative than under alternative A, they are consistent with the available literature (see Chapter 2 and Appendix A). For example, preliminary data based on 7 nesting pairs suggests that driving in front of American oystercatcher nests did not affect American oystercatcher incubation behavior and physiology due to experiencing vehicular traffic (Simons et al. 2015). Therefore, impacts are expected to be long-term minor to moderate adverse. For Wilson's plovers, American oystercatchers, terns (least, common, and gull-billed), and black skimmers, smaller buffers may result in additional disturbance relative to alternative A, with impacts that are long-term, minor to moderate, and adverse. Overall, expected impacts to species of concern would be long-term, minor to moderate, and adverse.

Overall Impacts from Resource Management Activities. Overall impacts under alternative B from resource management activities (primarily resulting from the effects of surveying, field activities, and modified (reduced) buffers) would be long term, minor to moderate, and adverse. Although long-term beneficial impacts to each species would result from monitoring activities as well as both the establishment of prenesting closures early in the breeding season and VFAs and areas seasonally closed to ORV use, on balance, the smaller resource protection buffers in this alternative would afford less protection than under alternative A, with corresponding adverse impacts to species. In addition, as with all species management activities, minor adverse impacts would occur from human presence during monitoring activities.

ORV and Other Recreational Use

ORV and Pedestrian Access. Under alternative B, Seashore visitors would be provided with greater access to various parts of the Seashore due to the modified buffers called for in this alternative. The reduction of the buffers shown in the table above would place pedestrians and/or

ORVs in greater proximity to nest and chicks. Even though the reduced buffers would be accompanied by intensive monitoring, the overall impact on chicks would be greater than under alternative A.

Under alternative B, there would exist the potential for disturbance and nest abandonment from direct short-term contact with people and/or vehicles. This risk would be greater than under alternative A, and would result from the reduced size of the buffers. However, it would be offset to a large extent by intensive monitoring.

Although the establishment of prenesting closures, designation of year-round and seasonal VFAs and the buffers established under alternative B should limit adverse impacts to species of concern, compliance with closures may not be absolute. Therefore, recreational uses could result in short-term minor to moderate adverse impacts to species of concern if non-compliance occurs, due to the smaller size of the buffers. Since recreational activities would still occur, impacts to species of concern under alternative B from ORV and pedestrian access would be long-term minor to moderate adverse.

Cumulative Impacts. Cumulative impacts under alternative B would be the same as under alternative A, i.e., long-term, minor to moderate, and adverse impacts.

Conclusion. Overall impacts under alternative B from resources management activities (primarily resulting from the effects of surveying, field activities, and reduced buffers) would be long-term and minor to moderate adverse for state bird species of concern. As with all species management activities, minor adverse impacts would occur from human presence during monitoring activities. In addition, while the establishment of prenesting closures early in the breeding season, year-round and seasonal VFAs, and intensive monitoring in select locations would provide long-term beneficial impacts to these species, the establishment of smaller prescribed buffers under this alternative would result in adverse impacts to species as compared to alternative A. Overall impacts under alternative B from ORV and other recreational use would be long-term, minor to moderate, and adverse. Measures called for in the ORV FEIS (establishment of prenesting closures and year-round and seasonal VFAs, which proactively reduce or preclude ORV use throughout the breeding season; ORV permit requirements; and pet and other recreational activity restrictions) would all provide benefits in terms of species protection.

Cumulative impacts would be long-term minor to moderate adverse.

Visitor Use and Experience

Guiding Regulations and Policies

The Seashore's authorizing legislation states that the national seashore shall be set apart "for the benefit and enjoyment of the people." NPS *Management Policies 2006* (NPS 2006a, sec. 8.2) state that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. Section 1.5 of NPS *Management Policies 2006* (NPS 2006a, sec. 1.5) states that in its role as steward of park resources, the NPS

must ensure that park uses that are allowed would not cause impairment of, or unacceptable impacts on, park resources and values. When proposed park uses and the protection of park resources and values come into conflict, the protection of resources and values must be predominant.

As stated in NPS *Management Policies 2006* (NPS 2006a, sec. 8.2.3.1), off-road motor vehicle use in national park units is governed by Executive Order 11644 of 1972 (Use of Off-Road Vehicles on Public Lands, as amended by Executive Order 11989 of 1977). ORV routes and areas may be allowed only in locations where there will be no adverse impacts on the area's natural, cultural, scenic, and esthetic values, and in consideration of other existing or proposed recreational uses. The Executive Orders require that ORV routes and areas be located to minimize conflicts between ORV use and other existing or proposed recreational uses of the same or neighboring public lands and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.

While recreation is a key component of the NPS *Management Policies 2006*, the policies also instruct park units to maintain all native plants and animals as parts of the natural ecosystem. The NPS is to achieve this by preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur (NPS 2006a, sec. 4.4.1).

Assumptions, Methodology, and Impact Thresholds

The potential for change in visitor experience was evaluated by assessing the limitations and assumed changes to visitor access and associated visitor uses, including ORV use, related to the proposed alternatives, and determining whether these projected changes would affect the visitor experience. The following thresholds for evaluating impacts on visitor use and experience were defined.

Negligible: Visitors would likely be unaware of impacts associated with proposed changes. There would be no noticeable change in visitor use and experience or in any defined indicators of visitor satisfaction or behavior.

Minor: Changes in visitor use or experience would be slight and detectable, but would not appreciably limit or enhance any critical characteristics of the visitor experience. Visitor satisfaction would remain stable.

Moderate: A few critical characteristics of the existing visitor experience would change, and the number of visitors engaging in a specified activity would be altered. Some visitors participating in that activity or visitor experience might be required to pursue their choices in other available local or regional areas. Visitor satisfaction at the Seashore would begin to either decline or increase.

Major: Many critical characteristics of the existing visitor experience would change, and visitor satisfaction would be substantially decreased or enhanced. The number of visitors engaging in a specified activity would be substantially altered. Many visitors participating in an activity or visitor experience would not be able to pursue their choices in other local or regional areas.

Duration: Short-term impacts would occur sporadically throughout a year, but would generally last no more than three weeks per year.

Long-term impacts would occur more than three weeks per year and likely for consecutive years.

Study Area

The geographic study area for the visitor use and experience analysis includes the entire area within the Seashore boundary.

IMPACTS OF ALTERNATIVE A: NO ACTION

Under alternative A, visitor use and experience would not change. Since the implementation of the ORV FEIS in 2012, ORV permit sales have increased each year through 2014. Implementation of alternative A would not be expected to affect permit sales, and visitation trends would be expected to continue along the present trajectory.

Under alternative A, visitors utilizing the beach on foot would be able to access all areas of the beach not in a resource closure as they do now, i.e., by walking below mean low tide or around the closure through the dunes. Passage through water could be hazardous during storm and lunar tides. Impacts to some pedestrians would be long term, minor to moderate, and adverse due to the need to avoid certain parts of the beach and because of occasional potential exposure to hazardous conditions. Other pedestrians would appreciate the opportunity to experience shorebird and sea turtle nesting and hatching behaviors in a mostly natural environment. Impacts to these visitors would be long term and beneficial.

Under Alternative A, some areas of the beach, otherwise open to ORVs, may be inaccessible due to resource closures. The only option for those wishing to reach these inaccessible areas would

be to leave their vehicle and walk below mean low tide or behind the duneline and around the resource closure. For some visitors this is not desirable or feasible due to their health or level of daily physical activity. As in the case of pedestrians, impacts to ORV users would be long term, minor to moderate, and adverse due to the need to avoid certain parts of the beach and because of occasional potential exposure to hazardous conditions. Other visitors, however, would experience long-term beneficial impacts from the closures, for the reasons noted above. Overall, impacts to visitor use and experience under alternative A would be both minor to moderate adverse and beneficial, depending on the experience sought by a particular visitor.

Cumulative Impacts. Other actions, primarily construction-related, would have short-term minor impacts on visitor use and experience. The impacts of these actions, in combination with the minor to moderate adverse impacts of alternative A, would result in long-term minor to moderate adverse cumulative impacts to ORV users and some pedestrians. However, the beneficial impacts of other actions and restrictions on ORV use under alternative A would provide long-term cumulative benefits for visitors who desire an experience wildlife nesting and hatching under mostly natural conditions.

Conclusion. Overall, Alternative A would result in long-term minor to moderate adverse impacts to ORV users and some pedestrians due to limitations on access to areas subject to resource closures. However, other users would experience long-term beneficial impacts due to the ability to experience natural nesting and hatching activity.

IMPACTS OF ALTERNATIVE B: MODIFY BUFFERS AND PROVIDE ADDITIONAL ACCESS CORRIDORS

Under alternative B, the number of visitors to the park is not likely to be affected dramatically by the modified buffers and additional access corridors. ORV permit sales would be expected to continue their current trend. Given that permit sales constitute a small portion of the total visitation to the park, the buffers and corridors are not expected to affect overall visitation and the associated visitor experience. (CAHA receives on average 2 million visits per year, the majority of whom do not purchase an ORV permit.)

The current predicted carrying capacity has not been reached in four years of implementation of the ORV FEIS. (Carrying capacity is defined as the number of four wheel drive vehicles spaced side by side, perpendicular to the ocean with doors open or approximately 20 linear feet of beach per vehicle.) The carrying capacity for ORVs would nonetheless increase under alternative B due to the additional amount of open beach that this alternative affords. The modified buffers and new access corridors would ensure access to areas otherwise closed to ORV due to resource closures, as compared to alternative A.

Under alternative B, visitors utilizing the beach on foot would be able to access all areas of the beach not in a resource closure as they do now, i.e., by walking below mean low tide or around the closure through the dunes. However, the additional corridors around and in front of resource closures would give visitors the opportunity to access additional beach. This could result in a change of distribution of visitors on the beach but not overall numbers. In addition, visitors now

would walk as close as practicable to the surf line instead of water, providing for a safer experience.

All areas of the beach would be evaluated for access using an adaptive approach. Where no other access is possible (i.e. alternate ramps or bypass routes), ORV and pedestrian routes in front of nesting shorebirds could be allowed, as specified in Tables 2.2a and b of this document. Overall, impacts to ORV users and many pedestrians would be long term and beneficial due to greater access to more areas of beach and because of reduced exposure to potentially hazardous conditions. Some visitors wanting to observe sensitive wildlife species in more protected conditions would experience long-term, minor adverse impacts.

Cumulative Impacts. Other actions, primarily construction-related, would have short-term minor impacts on visitor use and experience. The impacts of these actions would be somewhat offset by the greater access afforded by alternative B, resulting in long-term minor to moderate adverse cumulative impacts to ORV users and some pedestrians. However, the impacts of reduced buffer sizes and more corridors would be potentially adverse for visitors who desire an experience wildlife nesting and hatching under mostly natural conditions.

Conclusion. Overall, Alternative B would result in long-term beneficial impacts to ORV users and some pedestrians seeking additional access to areas otherwise subject to resource closures. However, other users would experience long-term minor adverse impacts due to a somewhat reduced ability to observe natural nesting and hatching activity free of human interference.

Seashore Management and Operations

Guiding Regulations and Policies

Direction for management and operations at the Seashore is set forth in the *Organic Act*, the Seashore's enabling legislation, General Management Plan (NPS 1984), Strategic Plan (NPS 2007a), and the current Superintendent's Compendium.

Assumptions, Methodology, and Impact Thresholds

Seashore management and operations, for the purpose of this analysis, refer to the quality and effectiveness of Seashore staff to maintain and administer Seashore resources and provide for an appropriate visitor experience. This includes an analysis of the projected need for staff time and materials under each alternative, as well as the various funding mechanisms available to implement these alternatives. The analysis also considers trade-offs for staff time or the budgetary needs required to accomplish the proposed alternatives and discusses each alternative in terms of its impacts to Seashore Management (the superintendent's staff), and the divisions of Administration, Interpretation, Resource Management, Facility Management (Maintenance), and Visitor Protection at the Seashore.

The following thresholds for evaluating impacts on Seashore management and operations were defined and applied to adverse impacts.

Negligible: Seashore or agency operations would not be impacted or the impact would not have a noticeable or measurable impact on Seashore or agency operations.

Minor: Impacts would be noticeable and would result in a measurable, but small, change in Seashore or agency operations. Any required changes in Seashore staffing and funding could be accommodated within normal budget cycles and expected annual funding without appreciably affecting other operations within the Seashore. Current levels of funding and staffing would not be reduced or increased, but priorities may need to be changed.

Moderate: Impacts would be readily apparent and would result in a substantial change in Seashore or agency operations that would be noticeable to staff and the public. Required changes in Seashore staffing and/or funding could not be accommodated within expected annual funding and would measurably affect other operations within the Seashore by shifting staff and funding levels between operational divisions. Increases or decreases in staff and funding would be needed or other Seashore operations would have to be reduced and/or priorities changed.

Major: Impacts would be readily apparent and would result in a substantial change in Seashore operations that would be noticeable to staff and the public and would be markedly different from existing operations. These changes in Seashore staffing and/or funding could not be accommodated by expected annual funding and would require the Seashore to readdress its ability to sustain current Seashore operations. Increases or decreases in staff and funding would be needed and/or other Seashore programs would have to be substantially changed or eliminated.

Duration: Short-term effects would be one fiscal year.

Long-term effects would continue beyond one fiscal year indefinitely into the future.

Study Area

The study area for Seashore management and operations is the units of the Outer Banks Group: Cape Hatteras National Seashore, Wright Brothers National Memorial, and Fort Raleigh National Historic Site. All units were considered because of shared staff and funding sources.

IMPACTS OF ALTERNATIVE A: NO ACTION

Under alternative A, there would be no increase in duties related to ORV management for staff that would require re-prioritization of work. Staff could accomplish their duties with existing staffing and budget levels. As a result, alternative A would have negligible impacts on Seashore management and operations.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative A would include the implementation of various plans and policies that would require varying levels of staff time for plan production and implementation (see Appendix B).

The combination of these past, present, and reasonably foreseeable future actions, when combined with the long-term negligible to moderate impacts of alternative A, are expected to have long-term minor to moderate adverse cumulative impacts to Seashore operations and management.

Conclusion. Implementation of alternative A would result in no change to Seashore operations. Overall impacts to Seashore operations would be long-term and negligible. Cumulative impacts to Seashore operations and management under alternative A would be long-term minor to moderate adverse.

IMPACTS OF ALTERNATIVE B: MODIFY BUFFERS AND PROVIDE ADDITIONAL ACCESS CORRIDORS

Under alternative B, the Seashore would incur additional cost and staff in order to perform the intensive and increased monitoring necessary to implement the modified buffers and corridors. Preliminary cost estimates are as follows:

Action	Preliminary Cost Estimate
Intensive monitoring for turtles (4 additional qualified employees)	$80,000
Intensive and increased monitoring for birds (6 additional qualified employees)	$120,000
Law enforcement/ORV management (3 additional qualified employees)	$60,000
Total Recurring	$260,000

In addition, there would be additional housing, materials, and other costs to run the expanded monitoring program. These costs would be covered by the revenue generated by the sale of ORV permits. However, there would still exist impacts to Seashore operations and management because funds used for the expanded monitoring program could not be used for other aspects of managing the ORV program. On balance, impacts would be long-term, minor to moderate, and adverse.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative B would be the same as those under

alternative A and would include the implementation of various plans and policies that would require varying levels of staff time for plan production and implementation. The combination of these past, present, and reasonably foreseeable future actions, when combined with the long-term minor to moderate impacts of alternative B, are expected to have long-term minor to moderate adverse cumulative impacts to Seashore operations and management.

Conclusion. Implementation of alternative B would require approximately $260,000 in additional personnel costs, plus additional associated housing and other costs. Overall impacts to Seashore operations would be long-term minor to moderate adverse. Cumulative impacts to Seashore operations and management under alternative B would be long-term minor to moderate adverse.

5. Consultation and Coordination

Agencies

Federal and State agencies and organizations that will receive this environmental assessment include:

Federal Agencies

U.S Fish and Wildlife Service, Ecological Services, Raleigh Field Office

State Agencies

North Carolina State Environmental Review Clearinghouse
North Carolina Department of Environment and Natural Resources
Division of Coastal Management
Coastal Resources Commission
Division of Marine Fisheries
North Carolina Natural Heritage Program
North Carolina Department of Transportation
North Carolina State Historic Preservation Officer
North Carolina Wildlife Resources Commission
U.S Fish and Wildlife Service, Ecological Services, Raleigh Field Office
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This document will be posted on the NPS Planning Environment and Public Comment (PEPC) web site.

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Appendix A

Buffer Distances Recommended in the Scientific Literature

BUFFER DISTANCES RECOMMENDED FOR AMERICAN OYSTERCATCHERS (AMOY)

Buffer Distance	Source	Disturbance Types	Behavior/Location	Region
450 feet (137 meters)	Sabine 2005	Pedestrians, ORVs / other vehicles, boats, pets	Nesting	Cumberland Island National Seashore, Georgia
492 feet (150 meters)	Sabine 2005	Pedestrians, ORVs / other vehicles, boats, pets	Brood rearing	Cumberland Island National Seashore, Georgia
100 feet (30 meters)	Maine Department of Environmental Protection 2009	Development, vegetation removal	Feeding Area[a]	Maine
250 feet (76 meters)	Maine Department of Environmental Protection 2009	Development, vegetation removal	Roosting Area[b]	Maine
338 feet (103 meters)	Rodgers and Schwikert 2002	Personal watercraft	Nonbreeding adult foraging and loafing	West and east coasts of Florida
656 feet (200 meters)	Cohen et al. 2010	All human disturbance	Nesting	Recommendations developed for Cape Hatteras National Seashore
200m	AMOY BMP Working Group 2012	All human disturbance	Nesting	Atlantic and Gulf Coast, United States
300m	AMOY BMP Working Group 2012	All human disturbance	Unfledged chicks, until chick can fly 100m	Atlantic and Gulf Coast, United States
Restrict all ORV and pedestrian recreation to a corridor within 50 m of the oceanside mean high tide line at all sites used in the last 10 years by nesting American oystercatchers. The corridor should be reduced or closed during the hatchling stage to reduce chick mortality from ORVs.	Cohen et al. 2010 (minimum protection option)	ORVs and pedestrians	Nesting and Unfledged chicks	Recommendations developed for Cape Hatteras National Seashore

Buffer Distance	Source	Disturbance Types	Behavior/Location	Region
>137m	Sabine et al. 2008	Pedestrians Note: Low level of ORV activity elicited lower response than did pedestrians	Nesting	Cumberland Island National Seashore, Georgia
25m	Simons et al. 2015	ORVs	Nesting	Cape Hatteras National Seashore

[a] Shorebird feeding areas include the intertidal zone and a 100-foot adjacent buffer area.

[b] Shorebird roosting areas include the intertidal zone, the roosting area, and a 250-foot area adjacent buffer area.

RECOMMENDED BUFFER DISTANCES FOR COLONIALLY NESTING WATERBIRDS

Species	Buffer Distance	Disturbance Type	Behavior/Stage	Source	Location
Mixed tern / skimmer colonies	591 feet (180 m)	Pedestrians and motor boats	Incubating and brooding adults	Rodgers and Smith 1995	Florida
Black skimmer	328 feet (100 m)	Pedestrian, ATV, ORV, boats	Adult foraging and loafing	Rodgers and Smith 1997	Florida
Least tern	328 feet (100 m)	All human disturbance	Established colonies post egg laying	Erwin 1989	Virginia, North Carolina
Common tern Black skimmer	656 feet (200 m)	All human disturbance	Established colonies, post egg laying	Erwin 1989	Virginia, North Carolina
Common tern Least tern	150 feet[a] (50 yds)	All human disturbance	Nesting	Blodget and Melvin 1996	Massachusetts
Common tern Least tern	300 feet (100 yds)	All human disturbance	Chicks	Blodget and Melvin 1996	Massachusetts
Least tern	656 feet (200 m)	All human disturbance	Courtship/nesting	Erwin 1989	Virginia, North Carolina
Common tern Black skimmer	984 feet (300 m)	All human disturbance	Courtship/nesting	Erwin 1989	Virginia, North Carolina
All colonial waterbirds	1000 feet (305 m)	All human disturbance	Established colonies	Buckley and Buckley 1976	New York New England
Least tern	328 feet (100 m)	All human disturbance	Buffer entire colony after nesting	Cohen et al. 2010	Recommendations developed for Cape Hatteras National Seashore
Black skimmer Common tern Gull-billed tern	200 m	All human disturbance	Buffer entire colony after nesting	Cohen et al. 2010	Recommendations developed for Cape Hatteras National Seashore
Least tern	282 feet (86 m)	Personal watercraft	Foraging and loafing	Rodgers and Schwikert 2002	Florida
Common terns	328 feet (100m)	Personal watercraft	Nesting	Burger 1998	New Jersey
Black skimmer	>118m	Motor boats	Nesting and Unfledged chicks	Burger et al. 2010	New Jersey

[a] Buffer should be expanded as needed to prevent disturbance to incubating birds.

BUFFER DISTANCES RECOMMENDED FOR PIPING PLOVERS

The following text is from the Piping Plover Recovery Plan (USFWS 1996), Appendix G: Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the US Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act

Management of Nonmotorized Recreational Use – On beaches where pedestrians, joggers, sunbathers, picnickers, fishermen, boaters, horseback riders, or other recreational users are present in numbers that could harm or disturb incubating plovers, their eggs, or chicks, areas of at least 50 meter-radius around nests above the high tide line should be delineated with warning signs and symbolic fencing. Only persons engaged in rare species monitoring, management, or research activities should enter posted areas. These areas should remain fenced as long as viable eggs or unfledged chicks are present. Fencing is intended to prevent accidental crushing of nests and repeated flushing of incubating adults, and to provide an area where chicks can rest and seek shelter when large numbers of people are on the beach.

Available data indicate that a 50 meter buffer distance around nests will be adequate to prevent harassment of the majority of incubating piping plovers. However, fencing around nests should be expanded in cases where the standard 50 meter-radius is inadequate to protect incubating adults or unfledged chicks from harm or disturbance. Data from various sites distributed across the plover's Atlantic Coast range indicates that larger buffers may be needed in some locations. This may include situations where plovers are especially intolerant of human presence, or where a 50 meter radius area provides insufficient escape cover or alternative foraging opportunities for plover chicks. In cases where the nest is located less than 50 meters above the high tide line, fencing should be situated at the high tide line, and a qualified biologist should monitor responses of the birds to passersby, documenting his/her observations in clearly recorded field notes. Providing that birds are not exhibiting signs of disturbance, this smaller buffer may be maintained in such cases.

On portions of beaches that receive heavy human use, areas where territorial plovers are observed should be symbolically fenced to prevent disruption of territorial displays and courtship. Since nests can be difficult to locate, especially during egg-laying, this will also prevent accidental crushing of undetected nests. If nests are discovered outside fenced areas, fencing should be extended to create a sufficient buffer to prevent disturbance to incubating adults, eggs, or unfledged chicks. Pets should be leashed and under control of their owners at all times from April 1 to August 31 on beaches where piping plovers are present or have traditionally nested. Pets should be prohibited on these beaches from April 1 through August 31 if, based on observations and experience, pet owners fail to keep pets leashed and under control. Kite flying should be prohibited within 200 meters of nesting or territorial adult or unfledged juvenile piping ploversbetween April 1 and August 31. Fireworks should be prohibited on beaches where plovers nest from April 1 until all chicks are fledged.

Motor Vehicle Management – The Fish and Wildlife Service recommends the following minimum protection measures to prevent direct mortality or harassment of piping plovers, their eggs, and chicks on beaches where vehicles are permitted. Since restrictions to protect unfledged chicks often impede vehicle access along a barrier spit, a number of management options affecting the timing and size of vehicle closures are presented here. Some of these options are contingent on implementation of intensive plover monitoring and management plans by qualified biologists. It is recommended that landowners seek concurrence with such monitoring plans from either the Service or the State wildlife agency.

Protection of Nests – All suitable piping plover nesting habitat should be identified by a qualified biologist and delineated with posts and warning signs or symbolic fencing on or before April 1 each year. All vehicular access into or through posted nesting habitat should be prohibited. However, prior to hatching, vehicles may pass by such areas along designated vehicle corridors established along the outside edge of plover nesting habitat. Vehicles may also park outside delineated nesting habitat, if beach width and configuration and tidal conditions allow. Vehicle corridors or parking areas should be moved, constricted, or temporarily closed if territorial, courting, or nesting plovers are disturbed by passing or parked vehicles, or if disturbance is anticipated because of unusual tides or expected increases in vehicle use during weekends, holidays, or special events.

If data from several years of plover monitoring suggests that significantly more habitat is available than the local plover population can occupy, some suitable habitat may be left unposted if the following conditions are met:

1. The Service OR a State wildlife agency that is party to an agreement under Section 6 of the ESA provides written concurrence with a plan that:

A. Estimates the number of pairs likely to nest on the site based on the past monitoring and regional population trends.

AND

B. Delineates the habitat that will be posted or fenced prior to April 1 to assure a high probability that territorial plovers will select protected areas in which to court and nest. Sites where nesting or courting plovers were observed during the last three seasons as well as other habitat deemed most likely to be pioneered by plovers should be included in the posted and/or fenced area.

AND

C. Provides for monitoring of piping plovers on the beach by a qualified biologist(s). Generally, the frequency of monitoring should be not less than twice per week prior to May 1 and not less than three times per week thereafter. Monitoring should occur daily whenever moderate to large numbers of vehicles are on the beach. Monitors should document locations of territorial or

courting plovers, nest locations, and observations of any reactions of incubating birds to pedestrian or vehicular disturbance.

AND

2. All unposted sites are posted immediately upon detection of territorial plovers.

Protection of Chicks – Sections of beaches where unfledged piping plover chicks are present should be temporarily closed to all vehicles not deemed essential. (See the provisions for essential vehicles below.) Areas where vehicles are prohibited should include all dune, beach, and intertidal habitat within the chicks' foraging range, to be determined by either of the following methods:

1. The vehicle-free area should extend 1,000 meters on each side of a line drawn through the nest site and perpendicular to the long axis of the beach. The resulting 2000 meter-wide area of protected habitat for plover chicks should extend from the ocean-side low water line to the bay-side low water line or to the farthest extent of dune habitat if no bay-side intertidal habitat exists. However, vehicles may be allowed to pass through portions of the protected area that are considered inaccessible to plover chicks because of steep topography, dense vegetation, or other naturally-occurring obstacles.

OR

2. The Service OR a State wildlife agency that is party to an agreement under Section 6 of the ESA provides written concurrence with a plan that:

A. Provides for monitoring of all broods during the chick-rearing phase of the breeding season and specifies the frequency of monitoring.

AND

B. Specifies the minimum size of vehicle-free areas to be established in the vicinity of unfledged broods based on the mobility of broods observed on the site in past years and on the frequency of monitoring. Unless substantial data from past years show that broods on a site stay very close to their nest locations, vehicle-free areas should extend at least 200 meters on each side of the nest site during the first week following hatching. The size and location of the protected area should be adjusted in response to the observed mobility of the brood, but in no case should it be reduced to less than 100 meters on each side of the brood. In some cases, highly mobile broods may require protected areas up to 1000 meters, even where they are intensively monitored. Protected areas should extend from the ocean-side low water line to the bay-side low water line or to the farthest extent of dune habitat if no bay-side intertidal habitat exists. However, vehicles may be allowed to pass through portions of the protected area that are considered inaccessible to plover chicks because of steep topography, dense vegetation, or other naturally-occurring obstacles. In a few cases, where several years of data documents that piping plovers on a particular site feed in

only certain habitat types, the Service or the State wildlife management agency may provide written concurrence that vehicles pose no danger to plovers in other specified habitats on that site.

Timing of Vehicle Restrictions in Chick Habitat – Restrictions on use of vehicles in areas where unfledged plover chicks are present should begin on or before the date that hatching begins and continue until chicks have fledged. For purposes of vehicle management, plover chicks are considered fledged at 35 days of age or when observed in sustained flight for at least 15 meters, whichever occurs first. When piping plover nests are found before the last egg is laid, restrictions on vehicles should begin on the 26th day after the last egg is laid. This assumes an average incubation period of 27 days, and provides a 1 day margin of error. When plover nests are found after the last egg has been laid, making it impossible to predict hatch date, restrictions on vehicles should begin on a date determined by one of the following scenarios:

1. With intensive monitoring: If the nest is monitored at least twice per day, at dawn and dusk (before 0600 hrs and after 1900 hrs) by a qualified biologist, vehicle use may continue until hatching begins. Nests should be monitored at dawn and dusk to minimize the time that hatching may go undetected if it occurs after dark. Whenever possible, nests should be monitored from a distance with spotting scope or binoculars to minimize disturbance to incubating plovers.

OR

2. Without intensive monitoring: Restrictions should begin on May 15 (the earliest probable hatch date). If the nest is discovered after May 15, then restrictions should start immediately. If hatching occurs earlier than expected, or chicks are discovered from an unreported nest, restrictions on vehicles should begin immediately. If ruts are present that are deep enough to restrict movements of plover chicks, then restrictions on vehicles should begin at least 5 days prior to the anticipated hatching date of plover nests. If a plover nest is found with a complete clutch, precluding estimation of hatching date, and deep ruts have been created that could reasonably be expected to impede chick movements, then restrictions on vehicles should begin immediately.

Essential Vehicles – Because it is impossible to completely eliminate the possibility that a vehicle will accidentally crush unfledged plover chicks, use of vehicles in the vicinity of broods should be avoided whenever possible. However, the Service recognizes that life-threatening situations on the beach may require emergency vehicle response. Furthermore, some "essential vehicles" may be required to provide for safety of pedestrian recreationists, law enforcement, maintenance of public property, or access to private dwellings not otherwise accessible. On large beaches, maintaining the frequency of plover monitoring required to minimize the size and duration of vehicle closures may necessitate the use of vehicles by plover monitors. Essential vehicles should only travel on sections of beaches where unfledged plover chicks are present if such travel is absolutely necessary and no other reasonable travel routes are available. All steps

should be taken to minimize number of trips by essential vehicles through chick habitat areas. Homeowners should consider other means of access, e.g., by foot, water, or shuttle services, during periods when chicks are present. The following procedures should be followed to minimize the probability that chicks will be crushed by essential (non-emergency) vehicles:

1. Essential vehicles should travel through chick habitat areas only during daylight hours, and should be guided by a qualified monitor who has first determined the location of all unfledged plover chicks.

2. Speed of vehicles should not exceed five miles per hour.

3. Use of open 4-wheel motorized ATVs or nonmotorized all-terrain bicycles is recommended whenever possible for monitoring and law enforcement because of the improved visibility afforded operators.

4. A log should be maintained by the beach manager of the date, time, vehicle number and operator, and purpose of each trip through areas where unfledged chicks are present. Personnel monitoring plovers should maintain and regularly update a log of the numbers and locations of unfledged plover chicks on each beach. Drivers of essential vehicles should review the log each day to determine the most recent number and location of unfledged chicks.

Essential vehicles should avoid driving on the wrack line, and travel should be infrequent enough to avoid creating deep ruts that could impede chick movements. If essential vehicles are creating ruts that could impede chick movements, use of essential vehicles should be further reduced and, if necessary, restricted to emergency vehicles only.

APPENDIX B

Literature Search Process

Literature Search Process for Evaluation of Species Buffers at Cape Hatteras National Seashore

A complete, systematic literature search and review was conducted January-March 2015, using the library services of Texas A&M University, College Station, TX. Technical support to this search was provided by Jenni Simonsen, research librarian for the College of Agriculture and Life Sciences who helped create the reference database and the search strategies. Expert review of articles was conducted by NPS SER Natural Resources and Science staff Timothy Pinion, Anna Catherine Toline, and Giselle Mora-Bourgeois. Tables summarizing the key points from the literature are provided in Microsoft Excel files posted on PEPC (link).

Objectives

Conduct a systematic literature review and synthesis aimed at updating scientific information published from January 2009 to January 2015 related to ecological and biological findings and to the conservation, restoration, and management of habitat that supports T&E and special concern species at CAHA. Identify all information related to impacts of human disturbances to focus species, with special interest on new information related to beach off-road vehicle impacts.

Methodology

(1) Identify relevant reference databases to be included in the search
(2) Create a search strategy by identifying relevant terms and term associations; identify target species
(3) Run focused searches for all identified species and issues
(4) Review all abstracts in searches and identify and organize relevant articles
(5) Prioritize articles for reading by using a relevance ranking. Create a bibliography and digital reference library (PDF's) of all articles referenced in summary.
(6) Read and summarize all articles identified as highly relevant
(7) Organize summary in a fully referenced data table (Excel spreadsheet)
(8) Create a comprehensive bibliography
(9) Create a document with full documentation of process

Databases Searched

1. Wildlife & Ecology Studies Worldwide – "the world's largest index to literature on wild mammals, birds, reptiles and amphibians" (EBSCOhost, 2015a).
2. CAB Abstracts – "the leading English-language bibliographic information service providing access to the world's applied life sciences literature" (CABI, 2015).
3. Web of Science – "provides a single destination to access the most reliable, integrated, multidisciplinary research" from 9 scholarly databases, including BIOSIS, SciELO Citation Index, and Zoological Record, among others (Thomson Reuters, 2015).
4. AGRICOLA – provides access to records from the U.S. Department of Agriculture's National Agricultural Library, covering topics such as animal and environmental sciences (EBSCHOhost, 2015b). Includes more than 5 million records.
5. HathiTrust – "a digital preservation repository and highly functional access platform. It provides long-term preservation and access services for public domain and in copyright content from a variety of sources, including Google, the Internet Archive, Microsoft, and in-house partner institution initiatives" (HathiTrust, 2015).

6. ProQuest Dissertations & Theses Global – "a single access point to explore an extensive, trusted collection of 3.8 million graduate works, with 1.7 million in full text. Designated as an official offsite repository for the U.S. Library of Congress" (ProQuest, 2015a).
7. OAKTrust (Texas A&M Dissertations & Theses) – provides electronic access to digitized theses and dissertations from Texas A&M University.
8. Hospitality & Tourism Complete – "the premier collection of scholarly research and industry news relating to all areas of hospitality and tourism" (EBSCOhost, 2015c). Includes more than 1.1 million records.
9. Social Sciences Full Text – Covers "the most important English-language social science journals" (EBSCOhost, 2015d) in areas such as law, public welfare, and economics.
10. Environmental Science & Pollution Management – Provides "unparalleled and comprehensive coverage of the environmental sciences" (ProQuest, 2015b). Covers ecology, U.S. environmental impact statements, pollution, risk assessment, and more.
11. TreeSearch – searches the 43,342 records in the U.S. Forest Service's Research and Development Publications database.
12. WorldCat – provides "the world's largest network of library content" by aggregating library collections from around the world (OCLC, 2015).

Search Terms

Non-Listed Species

("colonial waterbird" OR shorebird OR "American Oystercatcher" OR "Haematopus palliatus" OR "Least Tern" OR "Sternula antillarum" OR "Common Tern" OR "Sterna hirundo" OR "Gull-billed Tern" OR "Gelochelidon nilotica" OR "Sterna nilotica" OR "Wilson's plover" OR "Charadrius wilsonia" OR "Northern Diamondback Terrapin" OR "Malaclemys terrapin terrapin") AND

(buffer OR "human disturbance" OR "off road vehicle" OR "ORV" OR "off highway vehicle" OR "OHV" OR "over-sand vehicle" OR "beach driv$" OR "night driv$") AND

(nest$ OR forag$ OR behav$ OR reprod$ OR breed$)

Limiters: Published since 2009; journal articles, ebooks, dissertations/theses, government technical reports

Search conducted 2/20/2015

Off Road & Pedestrian

("Sea turtle" OR "Caretta caretta" OR "Chelonia mydas" OR "Lepidochelys kempii" OR "Dermochelys coriacea" OR "Eretmochelys imbricate" OR "piping plover" OR "snowy plover" OR "Charadrius melodus" OR "Charadrius nivosus" OR "American oystercatcher" OR "Haematopus palliatus" OR "least tern" OR "Sternula antillarum" OR "black skimmer" OR "Rynchops niger") AND

(rut$ OR pedestrian OR "foot traffic" OR driv$ OR recreat$ OR vehicle$)

Limiters: Published since 2009; journal articles, ebooks, dissertations/theses, government technical reports

Search conducted 2/20/2015

Disturbance

("piping plover" OR "snowy plover" OR "Charadrius melodus" OR "Charadrius nivosus" OR "American oystercatcher" OR "Haematopus palliatus" OR "least tern" OR "Sternula antillarum" OR "black skimmer" OR "Rynchops niger") AND

(flush$ OR disturb$)

Limiters: Published since 2009; journal articles, ebooks, dissertations/theses, government technical reports

Search conducted 2/21/2015

Protection for Ground Nesting Species

("Sea turtle" OR "Caretta caretta" OR "Chelonia mydas" OR "Lepidochelys kempii" OR "Dermochelys coriacea" OR "Eretmochelys imbricate" OR "piping plover" OR "snowy plover" OR "Charadrius melodus" OR "Charadrius nivosus" OR "American oystercatcher" OR "least tern" OR "Sternula antillarum" OR "black skimmer" OR "Rynchops niger") AND

(fenc$ OR buffer OR closure)

Limiters: Published since 2009; journal articles, ebooks, dissertations/theses, government technical reports

Search conducted 2/20/2015

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APPENDIX C

Correspondence from North Carolina Wildlife Resources Commission

North Carolina Wildlife Resources Commission

Gordon S. Myers, Executive Director

April 15, 2015

Mr. David Hallac
Superintendent, Cape Hatteras National Seashore
1401 National Park Drive
Manteo, NC 27954

Dear Dave:

I am writing to provide information to the National Park Service (NPS) to help meet the legal mandate given in Section 3057 of HR 3979. This letter provides our current thoughts on appropriate buffers for listed species conservation. My staff continues to review relevant scientific publications and data and may suggest adjustments to these recommended buffer sizes in the future. We are also prepared to provide comments later on nighttime driving, the availability of seasonal vehicle routes, and the locations of vehicle-free areas.

North Carolina lists several species that nest on Cape Hatteras National Seashore (see appendix). The state's endangered species law is fundamentally different from the federal law in defining take and authorizing the listing of Special Concern Species. For example, Special Concern Species such as the American Oystercatcher require monitoring but may be incidentally taken under provisions of state law.

Peer-reviewed scientific data show human disturbance can cause abandonment of nesting territory, nest failure, and mortality of young. Although state law does not include disturbance in the definition of take, it is our goal to conserve state-listed species by increasing their survival and reproduction. Therefore, the Wildlife Resources Commission (WRC) recommends buffer protections for state listed species that nest on Cape Hatteras National Seashore. Additionally, there is a need to modify buffer areas on occasion to maintain public access while reducing disturbance to nesting birds and sea turtles. Use of an iterative decision model to modify buffer areas can help balance wildlife conservation and public access needs. One generalized approach to such an iterative decision model is provided as follows:

Mailing Address: Director's Office • 1701 Mail Service Center • Raleigh, NC 27699-1701
Telephone: (919) 707-0010 • Fax: (919) 707-0020

Step[a]	Condition	Action	Result
1	Nesting detection	Optimum buffer applied	Public access provided by existing route
2	Existing route blocked by buffer	Optimum buffer applied	Public access provided by alternate route
3	Alternate route not available	Modified buffer applied	Public access provided by existing route
4	Existing route blocked by modified buffer	Nest relocated per FWS policy[b]	Public ccess provided by existing route
5	Nest not relocated	Access closed	Public access not provided

[a]See appendix for flowchart

[b]Sea turtle nests

The following table presents our recommendations for buffer distances for vehicular traffic given a robust monitoring effort that detects nests soon after eggs are laid, hatching events, and movement of young. Modified buffer distances should approach the optimum buffer while continuing to maintain public access.

Species	Modified Buffer[a]	Optimum Buffer[b]	Start Time	End Time
AMOY[c] (breeding behavior, nesting)	50-m	150-m	Behavior seen	Hatching or loss
AMOY (unfledged chicks)	150-m	200-m	Hatching	Fledging or loss
WIPL[c] (breeding behavior, nesting)	50-m	75-m	Behavior seen	Hatching or loss
WIPL (unfledged chicks)	150-m	200-m	Hatching	Fledging or loss
LETE[c] (breeding behavior, nesting)	50-m	100-m	Behavior seen	Hatching or loss
LETE (unfledged chicks)	50-m	200-m	Hatching	Fledging or loss
COTE, GBTE, BLSK[c] (breeding behavior, nesting)	50-m	200-m	Behavior seen	Hatching or loss
COTE, GBTE, BLSK (unfledged chicks)	50-m	200-m	Hatching	Fledging or loss
PIPL[c] (breeding behavior, nesting)	50-m	75-m	Behavior seen	Hatching or loss
PIPL (unfledged chicks)	200-m	1000-m	Hatching	Fledging or loss
Sea Turtles (incubation)	3-m	10-m	Nest found	Hatching emergence
Sea Turtles (post-emergence)	25 to 75-m (seaward)	25 to 75-m (seaward)	Emergence	Dispersal

[a]Buffer less than the modified buffer radius set at discretion of Superintendent

[b]Modification less than the optimum buffer radius would allow pass-through access only

[c]American Oystercatcher (AMOY), Wilson's Plover (WIPL), Least Tern (LETE), Common Tern (COTE), Gull-billed Tern (GBTE), Black Skimmer (BLSK), Piping Plover (PIPL)

Appendix

NC's protected animal lists include American Oystercatcher (SC), Black Skimmer (SC), Common Tern (SC), Gull-billed Tern (T), Least Tern (SC), and Wilson's Plover (SC), none of which are listed under the ESA. All of these species regularly occur on Cape Hatteras National Seashore. Several relevant laws protecting wildlife resources are found in Chapter 113 of the NC General Statutes. Section 113-331 (8) defines special concern species (SC) as "any species of wild animal native or once-native to North Carolina which is determined by the Wildlife Resources Commission to require monitoring but which may be taken under regulations adopted under the provisions of this Article." Section 113-331 (9) defines threatened species (T) as "any native or once-native species of wildlife animal which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range". "Take" of wildlife resources under Section 113-130 (7) requires intent in "all operations during, immediately preparatory to, and immediately subsequent to an attempt, whether successful or not, to capture, kill, pursue, hunt or otherwise harm or reduce to possession any fisheries resources or wildlife resources." This definition of take also applies to other statutes in Chapter 113. Section 113-337 (a) (1) prohibits the take of wildlife resources on a protected wild animal list. Section 113-291.3 (a) prohibits the take of live wildlife and the nests and eggs of wild birds except as provided by law. Although NC law does not include disturbance in the definition of take, it is our goal to conserve these wildlife resources by increasing survival and reproduction. Peer-reviewed scientific data show that human disturbance can cause abandonment of nesting territory, nest failure, and mortality of young. Therefore, the NCWRC recommends buffer protections for state-listed species that nest on Cape Hatteras National Seashore. NCWRC also supports appropriate buffer protections for federally listed species as determined by the US Fish and Wildlife Service (FWS).

Following are examples of applications of NCWRC's recommended iterative decision model. A decision model flowchart is included.

When American Oystercatcher pre-nesting behavior is observed, the NPS would consider establishment of the optimum buffer of 150-m. If this action would prevent use of the existing public access route, the NPS would consider use of an alternate route. If no alternate route exists, the NPS would reduce the buffer size to the distance necessary to allow public passage with appropriate controls in place to reduce disturbance to territorial and nesting birds. Appropriate controls include the requirement that vehicular traffic pass slowly through the established buffer without stopping and pedestrian traffic remain below the high tide line. The Superintendent could review and approve an American Oystercatcher pre-nesting or nesting buffer of less than 50-m. When chicks leave a nest, the NPS would consider establishment of the optimum buffer of 300-m. If this action would prevent use of the existing public access route, the NPS would consider use of an alternate route. If no alternate route exists, the NPS would reduce the buffer size to the distance necessary to allow public passage with appropriate controls in place to reduce disturbance to pre-flight chicks. Appropriate controls include application of modified buffers based on continuous monitoring of chick locations, changes in chick foraging behavior in response to tides, or other factors. The Superintendent could review and approve an American Oystercatcher pre-flight buffer of less than 200-m.

In the application of appropriate buffer protections, the NPS should use adaptive management practices to refine its management strategies. Both the adaptive management process and successful application of the proposed decision model depend upon active efforts to monitor reproductive behavior, effect appropriate controls to reduce disturbance, and evaluate the effects of management on listed species and public access. If the decision is made to allow access with less than the modified buffer, NPS could provide guardians to monitor and protect listed bird chicks and sea turtle hatchlings. Given active monitoring and management by guardians, the NCWRC is not opposed to modifying nest and chick protection buffers or to relocating sea turtle nests (this includes nests between Ramp 43 and Cape Point and nests laid after August 18th) in accordance with Fish and Wildlife Service policy. Furthermore, NPS can always continue public access with the chicks of state-listed bird species present. Beach access closure should always be the last option and is at the sole discretion of the Superintendent.

I sincerely believe that we can meet our legal mandates by working together with all stakeholders. WRC can provide funds to support research or other adaptive management actions that conserve wildlife resources. I look forward to publication of your draft environmental assessment and the ensuing public meetings. Please contact me directly if you have any questions.

Sincerely,

Gordon Myers
Executive Director
NC Wildlife Resources Commission

APPENDIX D

Cumulative Effects Assessment

Assessment of Cumulative Effects

According to CEQ implementing regulations for NEPA at 40 CFR 1508.7, “Cumulative impact" is 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Past, present and reasonably foreseeable future actions at Cape Hatteras National Seashore that were considered in evaluating the potential cumulative impacts of the proposed buffer modifications and additional corridors are listed here. The park issues about 200 special use permit annually for all types of one-time events. These events would fall into the present actions and future actions categories. Hurricanes and other storms and weather events can and have significantly affected Cape Hatteras and would be expected to occur according to seasonal patterns into the future. Because these weather events are not the actions of any public or private entity and because their effects are impossible to predict, they are not listed here. Storm recovery efforts that have occurred or that are underway are part of the set of actions considered. The following past, present, and future actions were considered:

Past Actions

- Hurricane and Other Storm Recovery
- Berm Construction by Civilian Conservation Corps and berm maintenance
- USFWS: species recovery plans
- USFWS: Pea Island National Wildlife Refuge Comprehensive Conservation Plan
- NPS: Resource Management Plan
- NPS: 2007 Cape Hatteras National Seashore Long-Range Interpretive Plan
- NPS: Cape Hatteras National Seashore General Management Plan
- NPS: Previous attempts to complete ORV plans
- NPS: Concession permits/operations
- NPS and USDA-APHIS: Predator Control Program for Protected Species Management
- NPS: Species management at Cape Lookout National Seashore
- Species research efforts
- NPS: Multi-use trail on Ocracoke Island
- NPS: Relocation of Bodie Island U.S. Coast Guard Station Complex
- NPS: NC-12 Improvements
- U.S. Coast Guard: Construction of a Remote Fixed Facility (RFF) Buxton, Dare County, N.C.
- U.S. Coast Guard: Removing Facilities at the Former Buxton Coast Guard Station
- N.C. Department of Transportation: Herbert C. Bonner Bridge Repair Work
- N.C. Department of Transportation: NC-12 Recovery Efforts- NC-12 Sandbag and Dune Rebuilding
- Dare and Hyde Counties: County Land Use Development Plan for Dare and Hyde counties

- Commercial Fishing
- Dare County: Designation of Outer Banks Scenic Byway
- Outer Banks Scenic Byway Committee: Multi-Use Path(s) paved pathways on Hatteras Island

Present Actions

- Hurricane and Other Storm Recovery
- Berm maintenance
- USFWS: species recovery plans
- USFWS: Pea Island National Wildlife Refuge Comprehensive Conservation Plan
- NPS: Resource Management Plan
- NPS: 2007 Cape Hatteras National Seashore Long-Range Interpretive Plan
- NPS: Cape Hatteras National Seashore General Management Plan
- NPS: Concession permits/operations
- Increased vehicle traffic and village events
- NPS and local government: Ongoing law enforcement
- NPS: Predator Control Program for Protected Species Management
- Species research efforts
- NPS: Ongoing resource surveying
- U.S. Army Corps of Engineers: Dredging Walter Slough
- N.C. Department of Transportation: Herbert C. Bonner Bridge Repair Work
- N.C. Department of Transportation: Herbert C. Bonner Replacement Project
- N.C. Department of Transportation: Long-term Solutions for NC-12 Breaches, Phase II of Herbert C. Bonner Bridge Replacement Project
- N.C. Department of Transportation: NC-12 Improvement Projects South of Rodanthe
- Dare and Hyde Counties: County Land Use Development Plan for Dare and Hyde counties
- Town of Nags Head: Stormwater management / flood control
- Commercial Fishing
- NPS: Silver Lake Docks at Ocracoke

Future Actions

- Hurricane and Other Storm Recovery
- Berm maintenance
- USFWS: species recovery plans
- USFWS: Pea Island National Wildlife Refuge Comprehensive Conservation Plan
- NPS: Resource Management Plan
- NPS: 2007 Cape Hatteras National Seashore Long-Range Interpretive Plan
- NPS: Concession permits/operations

- NPS: Predator Control Program for Protected Species Management
- NPS: Species management at Cape Lookout National Seashore
- Species research efforts
- Increased vehicle traffic and village events
- NPS and local government: Ongoing law enforcement
- NPS: Ongoing Seashore Maintenance Projects
- NPS: Update of the 1984 Cape Hatteras National Seashore General Management Plan
- Implementation of the 2010 Cape Hatteras National Seashore ORV Management Plan/EIS
- Development of the Cape Lookout National Seashore ORV Management Plan/EIS
- Cape Hatteras Electric Cooperative: Pole Improvement Project (Beach Nourishment or Moving Poles Closer to NC-12). Description: The Cape Hatteras Electric Cooperative would replace damaged and old poles along NC-12
- NPS: Repairing Oregon Inlet Public Boat Ramps
- NPS: Removing or Rebuilding the Frisco Pier
- NPS and Dare County: Building of a bulkhead around the Salvo Cemetery to protect it from storm damage
- NPS: Permanent Offices for the ORV permits
- USFWS & SHPO: Removal of "The Sand Castle" at North end of Coquina Beach
- NPS: Placing Water Line from NC-12 to Frisco Campground
- Wildlife Resources Commission: Public Boating Access Area at Hatteras
- DOD: Potential for military training operations, overflights
- U.S. Coast Guard: Building Fee Kiosks at the Ocracoke Ferry
- U.S. Coast Guard: Hatteras Island Coast Guard Station
- U.S. Coast Guard: Expanding Boat Ramp at Hatteras Inlet
- U.S. Army Corps of Engineers/Dare County: Dredging and Repairing Bulkheads at Oregon Inlet Fishing Center
- N.C. Department of Transportation: NC-12 Improvements
- Dare and Hyde Counties: County Land Use Development Plan for Dare and Hyde counties
- Commercial Fishing
- Hatteras Island Ocean Center, Inc.: Hatteras Island Ocean Center and Pier
- Avon Pier Safety Concerns
- New Proposed Water Line from Avon to Little Kinnakeet Historical District (If Historical District Goes Through)
- Putting jetties in at Oregon Inlet
- NPS: Prescribed Burn on 2,061 acres within Cape Hatteras National Seashore
- Bonner Bridge wetland mitigation
- Possible special use permit to allow beach nourishment along an approximately 4.8 km-long (3 m) section of beach in Buxton for the purpose of protecting NC Highway 12

End of Document