Fox, Lori CAHA# 1780

From: Wetmore, Doug
Sent: Friday, December 11, 2009 11:08 AM
To: Mike_Murray@nps.gov; Fox, Lori
Cc: Sandra_Hamilton@nps.gov; Thayer_Broili@nps.gov
Subject: RE: CAHA Chapter 4 with SBA revisions

Hi Mike.

I have a question about non-breeding surveys for state-listed species. I noticed that under alternatives A and B, an impact of moderate adverse was assigned to CWB due to the lack of wintering surveys and accompanying lack of data for the species. However, this impact is not carried through in the action alternatives. Will there be non-breeding surveys for CWB under the action alternatives? The SM tables indicate that the SECN protocol will be used, but I wasn't aware that it applied to CWB. Also, are migrating REKN going to be surveyed as part of the protocol, because they aren't mentioned in the SM tables.

Speaking of REKN, alt A states min adverse impacts due to the lack of wintering closures, alt B considers impacts to be minor-moderate for the same reason, and alt-C indicates negligible adverse impacts from non-breeding shorebird SMAs. Intuitively, this seems backwards to me. A and B should be the same, no? Shouldn't C have some sort of beneficial impact from non-breeding SMAs?

Sorry for all the questions. Just trying to ensure that the analysis is logical.

Thanks.

~Doug

-----Original Message-----
From: Mike_Murray@nps.gov [mailto:Mike_Murray@nps.gov]
Sent: Friday, December 11, 2009 10:33 AM
To: Fox, Lori
Cc: Wetmore, Doug; Sandra_Hamilton@nps.gov; Thayer_Broili@nps.gov
Subject: Re: CAHA Chapter 4 with SBA revisions

Lori,

Attached are park comments on Chapter 4, Part 2 Revised. It contains our comments for all of Ch 4, Part 2 (not just for SBA). I submitted comments already on Part 1, which at the time contained our comments on Wildlife and Wildlife Habitat, so I've deleted that section from the attached Part 2 Revised comments.

In reviewing Part 2 Revised, I noticed a couple of mileages in various text sections for E and F that were incorrect (turtles and SBA), which had the combined non-ORV mileages (during the breeding season) for E (34.7) and F
(39) transposed. It seemed to be primarily when year-round non-ORV area miles were combined with seasonal non-ORV miles (such as for SMAs and village beaches) to make a statement about the total number of miles that would be closed to ORV during the breeding season. In any case, I don't know if there may be other impact topics (e.g., in Chapter 4, Part 1) that have the same issue, so it would be good for Doug to take a quick look throughout Chapter 4

wherever "total miles closed to ORV use" are mentioned for alternatives E and F to be sure that there are not errors I missed.

I've asked Sherri Fields to confirm that the USGS protocols will actually be re-released before the end of the year. We currently refer to them as "Cohen, 2009" throughout the text, but I want to avoid listing an erroneous date if USGS is not actually going to get it published until January. When they advised us of the correct reference title some weeks ago, it sounded like it would be published soon, but they also indicated that until it is published we should use "in press" in lieu of a date. Since that was a while ago we expected they would get it published in 2009; but now I'm not so sure. In any case, Sherri will check on it and we should know early next week whether to leave it as "Cohen, 2009" or change it to "Cohen, in press."

Lastly, I'll be around next week, before taking leave Dec 20 - Jan 3, but my availability and email access next week will be sporadic (we're moving to the new offices starting Tuesday and I'm booked with out-of-office meetings Tues and Wed). Feel free to email clarification questions, if needed, and I'll respond to them when I can.

Have a good weekend!

(See attached file: Chapter 4_120709_Part II_REVISED.mbm edits.doc)

Mike Murray
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"Fox, Lori" <lfox@louisberger.com>
12/08/2009 12:29 PM

To <Sandra_Hamilton@nps.gov>, <Mike_Murray@nps.gov>
cc "Wetmore, Doug" <dwetmore@louisberger.com>
Subject CAHA Chapter 4 with SBA revisions

Hi Sandy and Mike,

Per Sandy's comments on the SBA section, attached is the Part II file with those items addressed. I highlighted them in blue so you could easily see what was changed from the version I sent this weekend.

Also, I noticed that wildlife and wildlife habitat was in part I and II, it should only be in Part II. When you receive a revised Part I later today (with the sensitive species section done), it will not have the wildlife section in it.

I think that does it for now. Please let me know if you have any questions.

Take care,
Lori

Lori Fox
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[attachment "Chapter 4_120709_Part II_REVISED.doc" deleted by Mike Murray/CAHA/NPS]

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

FEDERALLY LISTED THREATENED OR ENDANGERED SPECIES

GUIDING REGULATIONS AND POLICIES

The Endangered Species Act (16 USC 1531 et seq.) mandates that all federal agencies consider the potential effects of their actions on species listed as threatened or endangered. If the NPS determines that an action may affect a federally listed species, consultation with the USFWS is required to ensure that the action would not jeopardize the species' continued existence or result in the destruction or adverse modification of critical habitat. NPS *Management Policies 2006* state that the NPS will survey for, protect, and strive to recover all species native to NPS units that are listed under the ESA, and proactively conserve listed species and prevent detrimental effects on these species (NPS 2006c, sec. 4.4.2.3). NPS *Management Policies 2006* also state that "[the NPS will] manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible" (NPS 2006c, sec. 4.4.2.3).

ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS

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

1. ~~which~~ species ~~are~~ found in areas likely to be affected by actions described in the alternatives;
2. habitat loss or alteration caused by the alternatives; and
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, sea turtles, or seabeach amaranth are described under the relevant descriptions in the following text.

When examining the impacts of artificial light on threatened and endangered species (primarily sea turtles), the lighting zones developed for Cape Hatteras National Seashore by the NPS Night Skies Team were considered. In these zones, special consideration is given to areas with sensitive wildlife and alternate guidance is provided to enhance the protection of nocturnal habitat. These special lighting zones represent the conditions that should be present at the Seashore, not necessarily actual current conditions, and create a buffer when two varying zones abut each other.

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

> An indirect impact from recreation use is the attraction of mammalian and avian ~~bird~~ predators to trash associated with recreation use (USFWS 1996a). 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

Comment [mbm 1]: Need to decide on whether or not to use commas or "and" in impact descriptions, then be consistent throughout the chapter. Is it "long-term minor adverse" or "long-term, minor, adverse" or "long-term, minor, and adverse"? (Doesn't matter to me, as long as we use a consistent format.) MBM

Seashore (see "Chapter 3: Affected Environment"). Recreational use that brings humans into areas where plovers 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.

The ESA defines the terminology used to assess impacts to the piping plover, sea turtles, and seabeach amaranth 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) not 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 park boundaries.

Comment [MSOffice2]: I'm not familiar with the ESA language, so someone needs to confirm that moving "not" to this location is a correct fix. MBM

Comment [dw3]: JH - All of the negative's make this confusing.

The EIS will serve as the biological assessment in compliance with Section 7 consultation requirements and analyzes impacts using the above terminology. Each alternative includes 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.

Study Area

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

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. Information about habitat and species occurrence within the Seashore and potential impacts on sea turtles from recreation and other activities was acquired from ~~park~~ staff at Cape Hatteras National Seashore, the USFWS, the North Carolina Wildlife Resource Commission, and available literature.

Although five threatened or endangered sea turtle species occur in the waters of North Carolina, only three species, the loggerhead, green, and leatherback, are known to nest at the Seashore. The other two species, Kemp's ridley and hawksbill, are only known to occur at the Seashore through occasional stranding, usually due to either prior death or incapacitation from hypothermia. Therefore, the analysis focuses only on the three species that nest at the Seashore. For these three 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. 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 overlap~~s~~ protected bird species and seabeach amaranth 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 and seabeach amaranth closures are beneficial to the turtles depends on the location, size, and duration of the closures. In the analysis, it is assumed that compliance with closures and other regulations such as leash ~~laws~~requirements, disposal of bait and fish carcasses, etc., would increase from current levels where alternatives increase the natural resource and law enforcement staff.

When examining the impacts of artificial light on sea turtles, the lighting zones (see "Visitor Use and Experience")—developed for the Seashore by the NPS Night Skies Team—were considered. In these zones, special consideration is given to areas with sensitive wildlife, and alternate guidance is provided to enhance the protection of nocturnal habitat. These special lighting zones represent the conditions that should be present at the Seashore, not necessarily actual current conditions, and create a buffer when two varying zones abut each other.

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

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.

Sea Turtle Impact Thresholds

A summary of sea turtle impacts under all alternatives is provided in table 46 at the end of this section. 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.

Minor Beneficial: Impacts on sea turtles, their habitats, or the natural processes sustaining them would be detectable, but would not be outside the natural range of variability. Improvements to key characteristics of habitat and/or protection to key life history stages in the park would sustain or slightly improve existing population levels, population structure, or other factors and maintain a sustainable population in the Seashore.

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 park would remain functional to maintain a sustainable population in the Seashore.

Moderate Beneficial: Impacts on sea turtles, their habitats, or the natural processes sustaining them would be detectable and could be outside the natural range of variability. Changes to key characteristics of habitat in the park and/or protection to key life history stages would minimize or prevent harassment or injury to individuals and improve the sustainability of the species in the Seashore.

Major Adverse: Impacts to sea turtles, their habitats, or the natural processes sustaining them would be detectable, 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 park 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.

Major Beneficial: Impacts on sea turtles, their habitats in the park, or the natural processes sustaining them during key life history stages would be detectable, would be expected to be outside the natural range of variability. Changes to key characteristics of habitat in the park and/or protection to key life history stages would substantially lessen mortality or loss of habitat and would result in notable increases in Seashore population levels.

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

Long-term effects would be continue beyond two ~~years~~seasons.

Study Area

The study area for assessment of the various alternatives is the Seashore. Based on the fact that the loggerhead sea turtle is the primary nester within the Seashore (94% of all nests [NPS 2006e, 2007e, 2008a; Baker 2009]) and is the only sea turtle for which recovery criteria is designated for the state of North Carolina in its recovery plan (NMFS and USFWS 2008, 1992xx, 1991), the study area for the cumulative impacts analysis is the state of North Carolina.

Impacts of Alternative A: No Action—Continuation of Management under the Interim Protected Species Management Strategy

Resources Management Activities. Under alternative A, Seashore staff would ~~continue to~~ survey the entire park daily for turtle crawls and nests from May 1 to September 15. Daily surveys would be conducted in the morning prior to the onset of heavy public ORV use. This period encompasses the nesting season for loggerhead sea turtles (mid-May to mid-August), the most prevalent nesters at the Seashore, and the vast majority of the nesting season for the green and leatherback sea turtles, which are infrequent nesters at the Seashore. Prior to May 1, the leatherback sea turtle is the only species likely to nest at the Seashore. Although turtle surveying would not occur prior to May 1, turtle crawls may be detected by bird ~~observers~~ monitors as evidenced by single leatherback nests being detected in April during two previous years (NPS 2001c, 2008a). Additionally, turtle crawls were often detected by bird ~~observers~~ monitors in May during years when daily turtle surveys did not begin until June 1 (Hamilton 2008a).

From September 16 to November 15, Seashore staff would ~~continue to~~ conduct periodic monitoring (e.g., every two to three days) for hatchlings ~~unknown nesting and~~ emerging ~~hatchlings~~from previously undetected nests, especially in areas of high visitation. Between 1998 and 2009, 4 nests have been found after August 31st, three of which were found on September 15th or later. However, prior to 2007, morning nest surveys ended on August 31st, so any nests laid after that time were unlikely to be located and protected. Since 2007, nest surveys have continued to September 15th (Baker-Bogardus, 2009?). ~~Since 1998 only one nest has been recorded after mid-September; it was a nest found on October 12, 1998 (Hamilton 2008a).~~

Although regular monitoring occurs, some nests on a rare occasion may be missed due to human error or from evidence of the nest being covered up by nighttime ORV use (NPS 2005c; NPS 2004d). Nests that go undetected would not be subject to management by the Seashore staff and would result in long-term, minor to moderate, adverse impacts because the nests would be subject to multiple potential threats such as being run over by ORVs, depredation by foxes or other predators, and loss due to erosion or frequent flooding. Hatchlings emerging from unprotected nests would be at a greater risk from light pollution

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because there would be no light management measures enacted. If an undetected nest were located in an ORV or day-use area, hatchlings would be subjected to impacts associated with tire tracks and footprints because these would not be raked smooth by Seashore staff. If tracks are not raked smooth, hatchlings can become easily trapped and disoriented in the ruts/footprints, leading to an increased risk of death by predation, being run over by ~~additional~~ subsequent ORV traffic, or exhaustion prior to reaching the ocean.

Seashore staff would ~~continue to~~ use ATVs/UTVs and occasionally ORVs to survey for turtle crawls and nests. Throughout the Seashore, essential vehicle use would not exceed 10 mph and would avoid driving within turtle nest ~~not occur within turtle nest cc~~losures. ~~Staff using vehicles would be required to park the vehicle and enter the turtle closures on foot.~~ The use of ATVs/UTVs and ORVs during turtle ~~surveying~~ surveys would provide long-term, moderate benefits by allowing Seashore staff to cover the entire length of the shoreline each morning in search of turtle crawls and nests prior to the onset of heavy public use during the daytime hours. Without the use of these vehicles, staff would not be able to cover the entire Seashore or bring the necessary supplies with them to ~~erect~~ install closures around located nests. NPS staff using vehicles would not leave tire ruts behind in nesting areas. Using ATVs/UTVs and ORVs during ~~surveying~~ surveys would cause a slight risk of crushing a nest or hatchlings or disturbing nesting turtles, potentially causing long-term, minor to moderate, adverse impacts. However, these risks would be minimized by the fact that ~~surveying~~ surveys would occur during the morning, while nesting and hatching typically occur at night, as well as the precautions taken by the experienced staff conducting the ~~surveying~~surveys. On the rare occasion when nesting or hatching activities occur during daylight hours, as happened in 2005 (Sayles 2005), abiding by the speed and closure limits would allow observers to see and avoid impacting the turtles and their nests.

Daily ~~surveying~~ surveys for nests would provide long-term, minor to moderate, beneficial impacts. It would allow the timely detection of closure violations and repair of damage (e.g., broken signs or string) caused by ORVs or pedestrians and allow for an assessment of whether any damage to a nest occurred. Tracks left behind by ORVs and/or pedestrians that are detected would be raked smooth. Predator activity and hatching events would also be detected. In the case of predator activity, daily survey~~sing~~ would allow staff to protect those nests with predator exclosures.

During periods following severe storm events or when large quantities of seaweed are washed ashore, monitoring for post-hatchlings washbacks would occur. This monitoring would provide long-term, minor benefits to hatchling washed ashore by helping prevent them from being run over by vehicles or disturbed by pedestrians or their pets, and by protecting them from potential predation.

Under alternative A, the Seashore ~~would continue to erect~~would install a 30-foot (9.1-meter) by 30-foot (9.1-meter) buffer around each turtle nest found. This buffer would continue to help protect turtle nests from being run over by ORVs or disturbed by pedestrians or pets. The buffers would also protect the nests from potential erosion impacts caused by multiple ORV passes. After approximately 50 to 55 days, the turtle closure would be expanded to the surf line, with varying widths based on the level and type of recreational use in the area. In vehicle-free areas with little or no pedestrian traffic, the total width would be 75 feet (22.9 meters); on village beaches or other areas with high levels of pedestrian and other non-ORV use, the total width would be 150 feet (45.7 meters); and in ORV traffic areas, the total width would be 350 feet (106.7 meters). Additionally, the closed area would be expanded by 30 feet (9.1 meters) to 50 feet (15.2 meters) on the landward side of the nest. By protecting all of the detected turtle nests in the Seashore during the incubation and hatching periods, these buffers would provide long-term, moderate to major, beneficial impacts to the sea turtles.

As nests near their hatching date, Seashore staff would continue to install U-shaped light-filter fencing around the nests, with the open face of the "U" oriented toward the water, to block light pollution from the villages, beach fires, any vehicles operating on the beach after dark, or other sources of light pollution.

Comment [MSOffice4]: Staff do drive at times in the intertidal zone below the nest, but they don't drive inside the closure around the nest. The writer has interpreted the language too literally.

Filter fencing requires high maintenance because it is often washed out by incoming tides, buried by winds, and/or completely uprooted by storm activity. If not properly maintained, hatchlings may become entangled in the fencing. However, since 2005 when filter fencing was first employed for all turtle nests, no occurrences of hatchlings becoming entangled in fencing have been recorded (NPS 2007e, 2008a, 2009c). Although it does not eliminate light impacts completely, the installation of filter fencing would provide long-term, moderate to major, beneficial impacts to sea turtles~~, as evidenced by two separate incidents, one in 2007 and one in 2008. In 2007, filter fencing was installed in the wrong location for a nest in front of Hatteras Village. When hatchlings emerged from the nest, they became disoriented by the village lights because the nest was outside of the filter fencing, and tracks indicated that they nearly all were predated by ghost crabs and a domestic cat while moving in circles on the sand (NPS 2008a). In 2008, in the approach of Tropical Storm Hannah, filter fencing was removed from several nests, one of which hatched during this time, and approximately 60 hatchlings became disoriented by village lights and crawled over the primary dune into a motel parking lot. This resulted in at least one hatchling being hit by a car and others being predated by ghost crabs (NPS 2009c)~~.

If it is determined that expanding the buffer around a nest prior to hatching would disrupt ORV access along the beach, the Seashore staff would immediately determine if an alternate route is available or if a reasonable bypass route could be established during ~~hatching~~the hatch window. ~~In accordance with NCWRC guidelines, relocation would be considered as a last resort since relocation carries the risk of either damaging the eggs or the embryonic development process.~~ The use of bypasses or alternate routes around sea turtle nests would protect the nests and hatchlings by diverting recreation-users away from the sensitive area and result in long-term, minor, beneficial impacts. Relocation of nests solely to resolve recreational access issues would not be considered.

In accordance with NCWRC guidelines, relocation for environmental reasons would be considered as a last resort since relocation carries the risk of either damaging the eggs or the embryonic development process. When a nest is found, under alternative A, staff would assess the need to relocate the nest away from areas prone to erosion or frequent flooding. If relocation is necessary, procedures for relocating nests provided in the NCWRC handbook (NCWRC 2006) would continue to be followed. Relocating nests would have both beneficial and adverse impacts. Historically, the single greatest impact on hatching success has been weather-related events, such as hurricanes or other storms, which can uncover nests through erosion, frequently flood and inundate nests, or bury nests under feet of sand (NPS 2009c, 2008a, 2007e, 2005c, 2004d, 2003e, 2002c, 2001c, 1999a). Relocating nests prone to these events to areas higher on the beach increases the likelihood that these nests would not be lost, resulting in long-term, moderate to major, beneficial impacts. However, relocation does have some negative impacts that would result in long-term, minor to moderate, adverse impacts. Six hours after deposition, the egg embryo becomes attached to the top of the eggshell. After this time, the embryo becomes very sensitive to movement and can be dislodged if the egg is rotated. This would result in the death of the embryo. In addition, relocating nests higher on the beach could alter the natural sex ratio of the nest by altering the incubation temperature. Temperatures warmer than 84.6°F produce more females, while colder temperatures produce more males. Because North Carolina is near the northern limit of loggerhead nesting, it is believed that North Carolina contributes more males to the population (Mrosovsky 1988). However, there is currently not enough temperature or sex ratio data to determine if sex ratios are being altered due to relocation efforts.

Sea turtles would continue to experience long-term, minor benefits from periodic night patrols by law enforcement for the purpose of enforcing compliance with regulations and closures. Night patrol rangers have been known to place make-shift fencing around nests to protect them until turtle observers arrive in the morning (Meekins 2005). However, night patrols would be conducted using ORVs and could contribute to the number of false crawls that exist at the Seashore, resulting in long-term, minor to

moderate, adverse impacts (see discussion of night driving and false crawls below under "Recreation and Other Activities").

Under alternative A, the Seashore would ~~continue to~~ use turtle-friendly lighting for all park structures and would continue to encourage all concessionaires to install turtle-friendly lighting as well. These actions would ~~continue to~~ provide long-term, minor benefits to sea turtles by reducing the amount of light pollution on the beaches that could disorient emerging hatchlings or cause nesting females to abort their nesting attempts.

Under alternative A, the public would continue to receive information at the visitor centers about nesting sea turtles and the measures the park is taking to protect the nests and hatchlings. The public would also continue to be notified about temporary closures that would limit ORV traffic, as well as when th~~ese~~ closures ~~reopen~~are removed. Such public outreach is beneficial to the species because it educates the public about the specific needs of the species and alerts the public ahead of time to areas where they cannot ~~go~~ drive due to potential impacts to the species. Therefore, public outreach under alternative A would have long-term, minor, beneficial impacts.

To help better understand the biology of sea turtles under alternative A, the Seashore would support research efforts studying the sex ratio of sea turtles at the park. Depending upon the methodology used in conducting the research, there could be a slight risk of disturbing or~~,~~ injuring~~, or destroying turtles, hatc~~ hatchlings~~,~~ or eggs. However, ~~the park staff~~Seashore staff would take precautions to minimize disturbance, and information obtained from the research would be beneficial in making long-term decisions regarding nest relocation policies. Overall, sea turtle research would have long-term, minor, beneficial impacts.

Overall, resource~~s~~ management activities under alternative A would have long-term, moderate benefits due to the protection provided to the sea turtles.

ORV and Other Recreational Use. Under alternative A, the Seashore would continue to provide sea turtles with protection from human disturbance, although there would be no restriction on night-driving. Although all of the species management actions would provide some measure of protection to sea turtles, there would still be a risk of disturbance or injury to adult nesting females, hatchlings, and live stranded sea turtles due to ORV use and other activities (i.e., pedestrian use, pets). Sea turtles nest along all of the Seashore ocean beaches. Although the process of nest site selection is not well understood, and there is a lack of data describing the characteristics of nesting sites at the Seashore, 24-hour-per-day ORV use may affect the beach profile and substrate characteristics in a way that reduces suitability for nesting and hatching success (~~Cohen 2005c~~Cohen et al. 2009). Vehicle traffic on beaches contributes to erosion, especially during high tides or on narrow beaches, where driving is concentrated higher on the beach, which may make some areas unsuitable for nesting (NMFS and USFWS 2008). Vehicle driving also compacts the sand, making it more difficult for females to dig their nest cavities. Although the ORV corridor protects some of the beach from ORV use, the protected area is fairly narrow, and it is unknown if the protected areas are more suitable for nesting than the unprotected areas, or what percentage of historical nests are located within the protected area as compared to unprotected areas. Vehicles also leave ruts in the sand, and although these ruts would be raked smooth approximately 50 to 55 days into the incubation period when nest closures are expanded, closure violations do occur, leaving ruts, which can trap hatchlings attempting to reach the ocean (Hosier et al. 1981). Over the years, closure violations and vandalism of closures and nests has continued to occur (NPS 2009c, 2008a, 2007e, 2005c, 2004d, 2003e, 2002c, 2001c, 1999a), and with no increase in law enforcement or resource staffing levels under alternative A, the closure violations and vandalism would be expected to continue. Under alternative A, ~~the impacts from~~ ORVs would have long-term, minor to moderate, adverse impacts because of these potential disturbances.

Recreational driving, commercial fishing vehicles, and beach fires would continue to be allowed at night within the Seashore under alternative A, resulting in long-term, moderate to major, adverse impacts. The presence of ORVs on the beach at night during the sea turtle nesting season could have adverse impacts by disrupting the nesting process and causing nesting attempts to be aborted. Because visibility is reduced at night, there is also the potential for nesting, live stranded, or hatchling turtles to be hit by ORVs operating at night. The adverse impacts on nesting females in the surf zone may be particularly severe (NMFS and USFWS 1993; ~~Cohen 2005c~~Cohen et al. 2009). Cape Hatteras and Cape Lookout National Seashores are listed in the USFWS Loggerhead Recovery Plan as the only federal agencies within the nesting range allowing nighttime driving on beaches. Though actual vehicle counts are scant, patrol rangers noted substantial vehicle driving on the beaches at night in 2005 when there were no night driving restrictions~~night driving was permitted~~ (Henson 2005). Night driving and heavy pedestrian use at night may also obscure turtle crawls prior to the morning turtle patrol, causing the Seashore staff to miss a turtle nest and therefore not protect it (NPS 2007e, 2004d, 2003e). Impacts to unprotected nests would be the same as discussed ~~under~~ above under Species Management Activities, resulting in long-term, major, adverse impacts.

False crawls (aborted turtle crawls that do not result in a nest, also often referred to as non-nesting crawls) can be detrimental to sea turtles and can be caused by, among other things, suboptimal sand conditions; encounters with roots, debris, or rocks while digging a nest; encounters with obstacles while crawling up a beach; disturbance from lights, noise, or other unusual activities; or other reasons that are not known. If too many false crawls occur for one individual, turtles can shed their eggs in the water and, thus, those eggs would be lost. Although turtles may attempt to nest again that same night or on subsequent nights, causing a turtle to abort a nesting attempt is considered an incidental take under Section 7 of the ESA, and it may cause the turtle to nest in another location that is less optimal.

Under normal, undisturbed conditions, there is generally a one to one ratio between the number of nests and the number of false crawls in a given area (Godfrey 2005a). Based on numbers contained in the 2000–2008 sea turtle annual reports provided by the Seashore, since 2000, an average of 49.1% of all turtle activity at the Seashore each year were false crawls, with individual years ranging from 35.5% to as high as 64.5%. Although it is not known how many false crawls have been caused directly by ORVs, specific incidents have been documented where it was known that an ORV caused the false crawl (NPS 2005d). However, it is important to note that many different factors can contribute to false crawls, and no definitive assessment exists of how the level of ORV use, or any other recreational use, may influence sea turtle nesting activity. For example, within areas open to ORV use on Hatteras Island during 2008, false crawls made up 47.5% of the total known nesting activity (19 false crawls versus 21 nests) (NPS 2009c).

The sea-finding mechanisms in emerging hatchlings are complex and involve cues from both brightness and shape. However, studies indicate that strong brightness stimuli can override competing cues (Witherington and Martin 1996). Hatchlings tend to orient toward the brightest direction over a broad horizontal direction, which on an undeveloped beach is often toward the open horizon of the ocean. However, light pollution, such as that from ORV headlights, beach fires, or lights from nearby residences or other developments, can cause emerging hatchlings to become disoriented (meander or circle) or misoriented (led in the wrong direction). Depending on the location of the artificial lights with respect to a hatching nest, hatchlings may move toward the artificial light in a direction that is away from or parallel to the ocean. This can result in the hatchlings never finding their way to the ocean. It can also cause the hatchlings to expend more energy than necessary to find the ocean, leading to exhaustion and an increased risk of predation or desiccation. Installing light filter fencing approximately 50 to 55 days into the incubation period decreases this impact somewhat by helping to shelter the emerging hatchlings from light emanating from ORV headlights, beach fires, or nearby development, but it does not eliminate the impact completely.

Beach fires are also associated with the presence of ORVs and nighttime use at the Seashore (Meekins 2005). As a result, both adult nesting turtles and hatchlings would be subject to long-term, moderate to major, adverse impacts associated with light pollution from beach fires. In 2006, a turtle crawl was discovered going into the coals of a beach fire (NPS 2007e), and in 2007, a nest was discovered 2 feet from a beach fire. In this instance, visitors relayed to the Seashore staff that they extinguished the fire when they saw an adult turtle crawling towards the fire (NPS 2008a), and in 2008, hatchlings emerging from a nest crawled approximately 984 feet (300 meters) into a campfire to the south of the nest (NPS 2009c).

Overall, ORV and other recreational use would have long-term, major, adverse impacts due to the amount of Seashore available for ORV use and by allowing night driving on the beach and the potential impacts from these activities.

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 burying nests under feet of sand. 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~~caused sand accretions that create~~s~~ 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 indirectly affect sea turtles because of their impact on staff resources. Recovery efforts that detract staff from ~~resource management (and presumably~~ surveying~~)~~/monitoring 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~~inability to survey.

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~~area are currently relocated by ~~Department of Interior~~Refuge personnel because of the severely eroded nature of some beach areas and the possibility of nest overwash by high tides. However, because ~~encroaching~~ encroo~~r~~achment 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~~surveys 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

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Pea Island. Heavy equipment use could lead to increased erosion or soil compaction, making the habitat less suitable for nesting.

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 Park Interim Protected Species Management Plan provides long-term, moderate beneficial impacts to all three 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 not likely to jeopardize the continued existence of listed sea turtles (FHWA 2007).

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, ~~surveying~~ surveys and management activities would provide long-term, moderate ~~to major~~ beneficial impacts. Because alternative A~~a~~ lacks night driving restrictions during sea turtle breeding season, adult turtles may be killed or caused to abort nesting attempts, nests may be run over or disturbed, and hatchlings may be run over or disoriented by light pollution from vehicles and associated activities, such as recreational and commercial fishing, ORV activities occurring under alternative A would have long-term, major, adverse impacts. Past,

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

Impairment of sea turtles would not occur under alternative A because implementing the protective measures under this alternative would afford a reasonable opportunity for successful nesting of sea turtles to occur annually and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative A, resource management activities would result in long-term moderate benefits due to the protection provided to sea turtles from daily ~~surveying~~ surveys for nests during the sea turtle nesting season (May 1 – September 15) and ~~erecting~~ installing closures~~buffers~~ around each nest found, expanding the ~~buffers~~ closures and installing light filter fencing around the nests during the hatch~~ing~~ window, relocating nests from areas prone to erosion or frequent flooding, conducting ~~period~~ periodic night patrols to enforce compliance regulations, and installing turtle friendly lighting ~~in~~ on the Seashore.

ORV and other recreation use would have long-term major adverse impacts on sea turtles due to the amount of Seashore available for ORV use and by allowing nighttime driving on the beach. 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, likely continued closure violations and vandalism, and impacts caused by night driving and beach fires. Under the ESA these impacts 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: No Action—Continuation of Management under Terms of the Consent Decree

Resource Management Activities. ~~Surveying/monitoring activities~~Surveys for sea turtle nests/crawls and monitoring for evidence of hatching ~~s~~ under alternative B and the impacts of these activities would be the same as under alternative A.

Management activities and impacts under alternative B would be similar to alternative A with several exceptions that would enhance the protection of sea turtles and their habitat as compared to alternative A. Similar to alternative A, the Seashore would continue to ~~erect~~ install a 30-foot (9.1-meter) by 30-foot (9.1-meter) buffer around each turtle nest found, and after approximately 50 to 55 days, when the nest is approaching its hatch ~~date~~window, the turtle closure would be expanded to the surf line with varying widths based on the level and type of recreational use in the area. The widths would be the same as alternative A; however, under alternative B, full beach closures would be enacted after September 15 when a nest enters its "hatch window" (50 to 55 days). These full beach closures would be put into place to mitigate impacts to hatchlings from night driving. By protecting all of the detected turtle nests in the Seashore during the incubation and hatching periods, these buffers would provide long-term, moderate to major, beneficial impacts to the sea turtles.

In accordance with the consent decree, under alternative B, if a deliberate act of vandalism ~~in violation of~~occurs to a resource closure ~~occurs~~, the buffers would be expanded by 150 feet for the first violation, 300 feet for a second violation, and 1,500 feet or more for a third violation. During 2009, two violations occurred to turtle closures that were deemed deliberate and resulted in the expansion of buffers by 150 feet (NPS 2009d). One violation occurred in an area open to ORVs, and the other was in an area open to

pedestrians only. Expanding buffers in response to violations would be used as a deterrent to future deliberate acts of vandalism to protect turtle nests and hatchlings. Although some violations may still occur, as evidenced by the violations occurring in 2009, it is assumed that as a result of the impacts that expanded buffers would have on ORV and pedestrian use of the beaches, the number of violations in the future should decrease. Therefore, expanding buffers as a result of violation would have a long-term, minor to moderate, beneficial impact. These impacts would be the same prior to and after the June, 2009 modifications to the consent decree.

If it is determined that expanding the buffer around a nest prior to hatching would disrupt ORV access along the beach, the Seashore staff would immediately assess if an alternate route is available or if a reasonable bypass route could be established at hatching time. The use of bypasses or alternate routes around sea turtle nests would protect the nests and hatchlings by diverting ~~recreation users~~ORVs and pedestrians away from the sensitive area and result in long-term, minor, beneficial impacts. Relocation of nests solely to resolve recreational access issues would not be considered.

Overall, management activities under alternative B would have long-term, moderate benefits due to the protection provided the sea turtle.

ORV and Other Recreational Use. In general, impacts under alternative B would be the similar to alternative A, but would offer more benefits to the species due to several changes that would result in additional protection of sea turtles and hatchlings.

ORV use on beaches can impact the beach profile and substrate characteristics in a way that may deteriorate the quality and quantity of suitable turtle nesting habitat. Under alternative B, in all locations open to ORV use that are not in front of villages, a 10-meter (30-foot) wide ORV-free zone would be created in the ocean backshore wherever there is sufficient beach width to allow an ORV corridor of at least 20 meters (60 foot) above the mean high tide line. This ORV-free corridor would protect some of the beach from ORV use and reduce impacts that may eventually alter the suitability of turtle nesting habitat. However, the area would be fairly narrow, and it is unknown if the areas to be protected are more suitable for turtle nesting than the unprotected areas, or what percentage of historical nests are located within the protected area as compared to unprotected area. Because of the relative narrow section of beach being protected from ORV use impacts, the impacts would be long-term, minor, and beneficial. Speed limits under alternative B would be 15 mph, unless otherwise posted, from May 15 through September 15; and 25 mph, unless otherwise posted, from September 15 to May 15. The 15 mph speed limit during the majority of the turtle nesting season is slower than the general 25 mph speed limit under alternative A (except where an ORV corridor is less than 100 feet wide when the speed limit under alternative A is 10 mph). This slower speed limit would likely help ORV operators better see and potentially avoid turtles and hatchlings as they are driving, resulting in long-term, negligible, beneficial impacts.

Under alternative B, all potential sea turtle nesting habitat (ocean intertidal, ocean backshore, and dunes) would be closed to all nonessential ORV use, including commercial fishermen, from 10 p.m. until 6 a.m. (5 a.m. for commercial fishermen) from May 1 to September 15. For the period from September 16 through November 15, night driving would be allowed with a permit, although there would be no restriction on the number of permits issued. A permit could be revoked, however, for violation of applicable park regulations or terms and conditions of the permit. Turtle nesting and hatching occurs mostly during nighttime hours. Only on rare occasions do these events take place during daylight hours (NPS 2005c). Therefore, prohibiting driving during the majority of the nighttime during the turtle nesting and hatching season would provide additional protection from ORV impacts, such as causing false crawls, disorienting or misorienting nesting turtles and hatchlings, running over hatchlings and/or nests, leaving behind tire ruts that can trap hatchlings, or running over turtle crawls and obscuring the tracks that help the Seashore staff identify and protect nests. While this would provide some long-term beneficial impacts

to turtles, adverse impacts from night driving could still occur between the hours of sunset and 10 p.m.; therefore, overall, the impacts would be long-term, minor to moderate, and adverse.

Although additional restrictions and regulations would help lessen some of the impacts from ORV use and other recreational activities, overall, the impacts would be long-term, moderate, adverse.

Cumulative Impacts. Cumulative impacts to sea turtles under alternative B would be very similar to those described for alternative A. Although alternative B would provide some additional protection, the adverse effects on sea turtles from other actions occurring in the region would still exist and would not be ~~significantly~~ greatly offset by the additional protection afforded under alternative B. Therefore, the effects of these other actions—added to the effects of actions under alternative B—would result in long-term, moderate, adverse impacts.

Conclusion. Through early morning surveys and monitoring activities, the protection of ~~adult~~ nests and hatchling sea turtles, ~~surveying and management activities,~~ and restrictions on night-driving during the sea turtle ~~breeding~~ nesting season, alternative B would provide long-term, moderate ~~to major~~, beneficial impacts that may affect/are not likely to adversely affect sea turtles. Because ORVs would be restricted between the hours of 10 p.m. and 6 a.m. during sea turtle breeding season, the chances are reduced that: 1) adult turtles may be killed or caused to abort nesting attempts, 2)nests may be run over or disturbed, and 3)hatchlings may be killed or disoriented by light pollution from vehicles and associated recreational activities~~,~~. ORV use and other recreational activities occurring under alternative B would have long-term, 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~~ surveys and management activities, ORV use, and other recreational activities expected under this alternative—would continue to result in long-term, moderate, adverse impacts

Impairment of sea turtles would not occur under alternative B because implementing the protective measures under this alternative would afford a reasonable opportunity for successful nesting of sea turtles to occur annually, and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative B, resource management activities would result in long-term moderate benefits due to the protection provided to sea turtles from daily ~~surveying~~ surveys for nests during the sea turtle nesting season (May 1 – September 15) and ~~erecting buffers~~installation of closures around each nest found, expanding the ~~buffers~~ closures and installing light filter fencing around the nests during the hatch~~ing~~ window, relocating nests from areas prone to erosion or frequent flooding, and installing turtle friendly lighting o~~f~~n the Seashore.

ORV and other recreational use would have long-term moderate adverse 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. While there would still be some impacts caused by night driving, these impacts would be lessened by ~~to~~ restricting night driving between the hours of 10 p.m. and 6 a.m. (5 a.m. for commercial fisherman) from May 1 to September 15 and requiring night driving permits from September 16 through November 15. Under the ESA these impacts 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 and restrictions on nonessential ORV nighttime driving, the actions under alternative B would also likely cause adverse effects.

Impacts of Alternative C: Seasonal Management

Resource Management Activities. Under alternative C, the Seashore staff would begin surveying the entire park daily for turtle crawls and nests on May 1 and continue until September 15 or 2 weeks after the last sea turtle nest or crawl is found, whichever is later. Survey~~sing activities~~ would be conducted in the morning using ATVs/UTVs and possibly ORVs prior to the onset of heavy public ORV use. Similar to alternatives A and B, the daily monitoring period would encompass the nesting season for the loggerhead sea turtle (mid-May to mid-August), the most prevalent nester at the Seashore, and the vast majority of the green and leatherback sea turtles' nesting seasons. Prior to May 1, the leatherback is the only species likely to nest at the Seashore, and their nests are often detected by the Seashore staff conducting bird monitoring, which would begin March 15. If a leatherback turtle nest has been reported in the state of North Carolina prior to May 1, the Seashore would follow the direction of NCWRC regarding the start of turtle patrols. From the date that daily monitoring ends to November 15, periodic monitoring (e.g., every two to three days) for nesting and emerging hatchlings would continue.

Conducting daily and periodic surveys for turtle crawls and nests during these time frames would provide long-term, minor to moderate, beneficial impacts because similar to alternatives A and B, they would allow nests to be identified for protection; closure violation and damage caused by ORVs or pedestrians would be detected and repaired in a timely manner and an assessment made as to whether or not any damage was done directly to a nest; tracks left behind by ORVs and/or pedestrians that are detected would be raked smooth in expanded closures; predator activity would be detected and nests protected with predator exclosures as necessary; and during periods following severe storm events or when large quantities of seaweed are washed ashore, monitoring for post-hatchling washbacks would help protect them from being run over by vehicles, disturbance by pedestrians or their pets, and potential predation. Precautions would be taken by ~~the trained survey~~ staff to avoid potential incidental take of sea turtles as described under alternative A.

Under alternative C, turtle nest closures would be the same as for alternatives A and B with 30-foot (9.1-meter) by 30-foot (9.1-meter) ~~buffers~~ closures around each turtle nest found. This ~~buffer~~ closure would help protect nests from being run over by ORVs or disturbed by pedestrians and/or their pets, and against erosion impacts caused by multiple ORV passes. After approximately 50 to 55 days, the turtle closure would be expanded to the surf line, with varying widths based on the level and type of recreational use in the area. In vehicle-free areas with little or no pedestrian traffic, the total width would be 75 feet (22.9 meters); on village beaches or other areas with high levels of pedestrian and other non-ORV use, the total width would be 150 feet (45.7 meters); and in ORV traffic areas the total width would be 350 feet (106.7 meters). Additionally, the closed area on the landward side of the nest would be expanded from 30 feet (9.1 meters) to 50 feet (15.2 meters) ~~on the landward side of the nest~~. A difference under alternative C from alternatives A and B is that if multiple nests are located near each other (within 150 feet [45.7 meters]) and have similar hatch dates (within 14 days of each other), the closures would encompass all nests and would not be removed until all nests within the closure have hatched. By protecting all of the detected turtle nests in the Seashore during the incubation and hatching periods, these buffers would provide long-term, moderate to major, beneficial impacts to the sea turtles.

Similar to alternatives A and B, when a nest is found under alternative C, ~~the~~ Seashore staff would determine if the nest should be relocated to move it out of areas that are prone to erosion or frequent flooding. If relocation is necessary, procedures for relocating nests provided in the NCWRC handbook (NCWRC 2006) would be followed. A difference under alternative C from alternatives A and B is that prior to the turtle nesting season, areas in the Seashore deemed unsuitable for turtle nests (i.e., high erosion areas) would be identified by April 15, with maps and descriptions of the areas analyzed by NCWRC. This process would expedite decisions about relocating nests, which would be beneficial in making sure that all morning survey activities are completed in a timely manner. As indicated under

alternative A, relocating nests results in long-term, moderate to major, beneficial impacts by increasing the likelihood that the nests will hatch successfully instead of being lost to storm or erosion related events. However, similar to alternatives A and B, relocating nests does have some adverse impacts including possibly altering the natural sex ratio of the nest by altering the incubation temperature, killing the embryo by dislodging it during movement, or potentially decreasing the successful hatch rate of the nest by improperly constructing the nest pit. These negative impacts would result in long-term, minor to moderate, adverse impacts.

Similar to alternatives A and B, as nests near their hatching date, the Seashore staff would install U-shaped light filter fencing around the nests, with the open face of the "U" oriented toward the water, to block light pollution from the villages, beach fires, any vehicles operating on the beach after dark, or other sources of light pollution. Although it would not eliminate light impacts completely, installing filter fencing would provide long-term, moderate to major, beneficial impacts to sea turtles.

Under alternative C, by May 1, 2012, the Seashore would install turtle friendly lighting fixtures on all the Seashore structures visible from the ocean beach except where prevented by overriding lighting requirements, such as lighthouses and fishing piers operated by NPS concessionaires. These actions would provide long-term, minor benefits to sea turtles by reducing the amount of light pollution on the beaches that could disorient emerging hatchlings or cause nesting females to abort their nesting attempts. The Seashore would also work with USFWS, NCWRC, and Dare County to encourage the development of a turtle friendly lighting educational program or a turtle friendly lighting ordinance for villages within the Seashore on Hatteras Island. If the Seashore is able to work with these agencies to enact a turtle friendly educational program or lighting ordinance in the villages, this would result in long-term, moderate to major, beneficial impacts because lighting on beaches from the villages may deter turtles from coming ashore and nesting on beaches of their first choice, forcing them to lay eggs at a less optimal site. In addition, hatchlings can become disoriented by the lights and move inland toward the villages and away from the beach, resulting in mortality (NPS 2008a; NPS 2009c).

Besides management activities targeted toward turtles, management activities targeted toward birds and seabeach amaranth under alternative C at the Seashore would also protect turtles and their nesting habitat because their habitats overlap in areas seaward of the primary dune line. Under alternative C, through the establishment of SMAs for birds and seabeach amaranth, combined with other areas that would be closed to ORVs use such as the village beaches, ~~-~~would close~~along with year-round ORV closures,~~ approximately 40.6 miles of beach ~~would be closed~~ to ORV use from March 15 to October 14, which encompasses the turtle nesting season. Although some of these closed areas are not historically popular turtle nesting sites (e.g., Bodie Island spit), other areas such as Cape Point are. Closing approximately 40.6 miles of beach to ORV use during this period would minimize potential impacts to sea turtles and would result in long-term, moderate to major, beneficial impacts. The extent of the benefits would depend on the location and size of the closures, which would be reevaluated and re-designated every five years or after major hurricanes.

Under alternative C, and similar to alternatives A and B, the public would continue to receive information at the visitor centers about nesting sea turtles and the measures the park is taking to protect the nest and hatchlings. The public would also ~~continue to~~ be notified about temporary closures that would limit ORV traffic, as well as when these closures reopen. Such public outreach is beneficial to the species because it educates the public to the specific needs of the species and alerts the public ahead of time to areas where they can and cannot go due to potential impacts to species. Similar to alternatives A and B, this aspect of public education would have a long-term, minor, beneficial impact. In addition, under alternative C, ORV users would be required to obtain an annual ORV users permit valid for 12 months from the date of purchase. To obtain the permit, an ORV user would need to complete a short educational program and pass a basic knowledge test showing that the person understands the rules and regulations governing ORV

use at the Seashore. The permit may be revoked for violation of applicable park regulations or terms and conditions of the permit. This educational requirement, with the potential deterrent of losing driving privileges on the Seashore, would have an additional long-term, minor to moderate, beneficial impacts, with the extent of the impacts based on the ability to enforce the regulations and apprehend violators.

To help better understand the biology of sea turtles or improve resource protection within the Seashore, under alternative C, the Seashore may authorize qualified researchers associated with recognized academic or research institutions to conduct additional scientific research on turtle species. Depending upon the methodology used in conducting the research, there could be a slight risk of disturbing, injuring, killing, or destroying turtles, hatchlings, or eggs. However, the information obtained from the research would be beneficial to the long-term survivability of the individual sea turtle species and in making long-term decisions regarding their protection within the Seashore and in other areas. Research would provide long-term, minor to moderate, beneficial impacts and may affect/is not likely to adversely affect all species of nesting sea turtles at the Seashore.

Overall, resource management activities under alternative C would have long-term, moderate to major, beneficial impacts due to the added protection provided to sea turtles ~~with adverse impacts~~.

ORV and Other Recreational Use. Under alternative C, the overall impact on and number of incidental takes of sea turtles due to ORV use would be substantially reduced when compared to the no-action alternatives by closing approximately 40.6 miles of beach to ORV use during the nesting season and by closing ORV routes in potential sea turtle nesting habitat (ocean intertidal zone, ocean backshore, and dunes) to nonessential recreational ORV use from 7:00 p.m. to 7:00 a.m. between the dates of May 1 and November 15.

As described under alternative A, vehicle traffic on beaches contributes to erosion, which may eventually deteriorate the quality and quantity of nesting habitat, especially during high tides or on narrow beaches where driving is concentrated higher up on the beach. Vehicle traffic also compacts the sand, making it more difficult for females to dig their nest cavities, forcing them to expend more energy, or even causing them to abort the nesting attempt. Under alternative C, these impacts would be eliminated from approximately 40.6 miles of beach, although not all of this area is necessarily optimal nesting habitat.

Vehicles also leave ruts in the sand and pedestrians leave footprints, and although these ruts and footprints would be raked smooth approximately 50 to 55 days into the incubation period when nests closures are expanded, closure violations do occur, leaving ruts and footprints that can trap hatchlings attempting to reach the ocean (Hosier et al. 1981; NPS 2007e; NPS 2008a; NPS 2009c). However, with increased education through an ORV permit program and the threat of having the permit revoked as a result of violating the Seashores rules and regulations, it is assumed that the number of violations occurring under alternative C would decrease. While the existing level of impacts from ORVs would be expected to decrease under alternative C because there would still be adverse impacts and some level of incidental take, the above impacts from ORV use would have long-term, minor to moderate, adverse impacts.

As described under alternative A, turtle nesting and hatching occurs mostly during nighttime hours, and this activity can be impacted by ORVs through disorientation by light or direct mortality (NPS 2005c; NPS 2008a). Prohibiting nonessential recreational ORV nighttime driving would virtually eliminate these potential impacts, creating long-term, moderate to major, beneficial impacts. However, some risk of long-term, minor adverse impacts would still exist from the use of essential vehicles at night, as well as allowing ~~possible~~ night driving in area outside of existing resource closures by commercial fishermen who are actively engaged in authorized commercial fishing activities.

As described under alternative A, both nesting turtles and hatchlings are impacted by light pollution from beach fires, and many beach fires are associated with the presence of ORVs (Meekins 2005). Although beach fires would not be prohibited under alternative C, prohibiting ORV use during nighttime hours would likely greatly reduce the number of beach fires that occur at the Seashore, providing long-term, minor to moderate, beneficial impacts. Without nonessential ORV use at night, any beach fires would likely be limited to those areas in front of the villages to which people can more easily carry firewood. Even though the ability to have beach fires would require a non-fee educational permit, allowing these beach fires would impact (misorientation, disorientation, injury, and death) nesting turtles and hatchlings, resulting in long-term, minor to moderate, adverse impacts.

Under alternative C, portable lanterns, auxiliary lights, and powered fixed lights of any kind shining for more than 5 minutes at a time would be prohibited on the Seashore's ocean beaches. This would help eliminate point sources of light that provide additional light pollution on the beaches and minimize impacts to turtles and hatchlings, resulting in long-term, minor to moderate, beneficial impacts.

Restrictions placed on nonessential, recreational ORV use under alternative C would provide substantial long-term benefits to sea turtles, including seasonal night driving restrictions that close the beach before dark (7:00 pm), some adverse impacts and incidental takes would still occur in areas where their use is allowed. Therefore, overall, ORV and other recreational use would have long-term, minor adverse impacts~~,~~.

Cumulative Impacts. Cumulative impacts to sea turtles under alternative C would be very similar to those described for alternative A. Although alternative C would provide additional protection that would be beneficial to the regional sea turtle population, the adverse effects on sea turtles from other actions occurring in the region would still exist. Therefore, the overall cumulative impact of these past, current, and futures actions—added to the effects of actions under alternative C—would result in long-term, minor to moderate, adverse cumulative impacts.

Conclusion. Through surveys and monitoring activities, the protection of nests and hatchling sea turtles, restrictions on night driving during the sea turtle season, and limiting of ORV to designated use areas, ~~the protection of adult and hatchling sea turtles, surveying and management activities, limiting of ORVs to designated use areas, and restricting night driving therein during sea turtle breeding season~~, alternative C would provide long-term, moderate to major, beneficial impacts~~ and may affect/are not likely to adversely affect sea turtles~~. Because ORVs would be restricted between the hours of 7 p.m. and 7 a.m. during sea turtle nesting season, the chances are reduced that: 1) adult turtles may be killed or caused to abort nesting attempts, 2) nests may be run over or disturbed, and 3) hatchlings may be killed or disoriented by light pollution from vehicles and associated recreational activities. ORV use and other recreational activities occurring under alternative C would have long-term, minor, adverse impacts.

~~Because beach driving would be prohibited in designated ORV areas between 7 p.m. and 7 a.m. during sea turtle breeding season, the chances are greatly reduced of impacts to sea turtles from night driving. Because adult turtles being killed or caused to abort nesting attempts, nests being run over or disturbed, and hatchlings being run over or disoriented by light pollution from vehicles and associated recreational activities, ORV activities occurring under alternative C would have long-term, minor, adverse impacts and may affect/are likely to adversely affect sea turtles.~~

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

Impairment of sea turtles would not occur under alternative C because implementing the protective measures under this alternative would afford a reasonable opportunity for successful nesting of sea turtles to occur annually and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative C, resource management activities would result in long-term moderate to major benefits due to the protection provided to sea turtles from daily surveying for nests during the sea turtle nesting season (May 1 – September 15) and ~~erecting buffers~~installing closures around each nest found, expanding the ~~buffers~~ closures and installing light filter fencing around the nests during the hatching window, relocating nests from areas prone to erosion or frequent flooding, installing turtle friendly lighting ~~in~~ on the Seashore and working with the USFWS, NCWRC and Dare County to encourage the development of a turtle friendly lighting educational program or a turtle friendly lighting ordinance. Establishing SMAs for birds and seabeach amaranth, combined with other areas that would be closed to ORV use such as the village beaches, ~~along with other year-round closures~~ would close approximately 40.6 miles of beach to ORV use from March 15 through October 14. These closures would minimize potential impacts to ~~nesting and hatching~~nesting turtles, turtle nests and turtle hatchlings ~~sea turtles~~ in these areas.

ORV and other recreational use would have long-term minor adverse 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. Prohibiting nonessential recreational ORV nighttime driving from 7 p.m. to 7 a.m. between the dates of May 1 and November 15 would virtually eliminate potential impacts to adult and hatchling turtles caused by night driving. Beach fires would still be allowed, and though they would likely only occur in front of the villages due to the night driving restrictions, they would still cause adverse impacts to turtles through light pollution. Under the ESA these impacts 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 and the prohibition on nonessential recreational ORV nighttime driving during the turtle nesting season, the actions under alternative C would also likely cause adverse effects.

Impacts of Alternative D: Increased Predictability and Simplified Management

Species Management Activities. Surveying activities for sea turtles under alternative D would be the same as under alternative C, resulting in long-term, minor to moderate, beneficial impacts.

Management activities for sea turtles under alternative D would be the same as under alternative C with one exception that would enhance the protection of the sea turtle habitat. Under alternative D, SMA~~area~~s for bird species and seabeach amaranth would be designated as non-ORV areas year-round, instead of just seasonally from March 15 through October 14 as under alternative C, and would be managed under ML1 procedures during the breeding season.~~year-round instead of just seasonally from March 15 through October 14.~~ This, along with all village beaches being designated as non-ORV year-round, ~~ese management procedures~~ would protect approximately 40.8 miles of the Seashore beach habitat from ORVs year-round. Prohibiting ORV use in these areas ~~n SMAs managed as ML1 areas~~ for the additional time from October 15 through March 14 would protect this habitat from additional erosion and sand compaction impacts that could eventually deteriorate the quality and quantity of turtle nesting habitat in these areas, resulting in long-term, moderate to major, beneficial impacts. The extent of the impact would depend on the location and size of the SMAs, which would be reevaluated and re-designated every five years, or after major hurricanes.

Overall, similar to alternative C, management activities under alternative D would result in long-term, moderate to major, beneficial impacts~~, and the potential for incidental take would be minimized by the staff used and precautions taken~~.

ORV and Other Recreational Use. Impacts under alternative D would be the same as under alternative C, with the overall impact on the number of incidental takes of sea turtles due to ORV use substantially reduced by closing approximately 40.8 miles of the Seashore beach to ORV use year-round and due to closing ORV routes in potential sea turtle nesting habitat to nonessential recreational ORV use from 7:00 p.m. to 7:00 a.m. between the dates of May 1 and November 15.

While restrictions placed on ORV use under alternative D would provide long-term, moderate to major, beneficial impacts, similar to alternative C, there would still be some level of incidental take in areas where ORV use and beach fires are allowed; therefore, the overall impacts for recreation and other activities would be long-term, minor adverse.

Cumulative Impacts. Cumulative impacts to sea turtles under alternative D would be very similar to those described for alternative A. Although alternative D would provide additional protection that would be beneficial to the regional sea turtle population, the adverse effects on sea turtles from other actions occurring in the region would still exist. Therefore, the overall cumulative impact of these past, current, and futures actions—added to the effects of actions under alternative D—would result in long-term, minor adverse impacts.

Conclusion. Through the protection of adult and hatchling sea turtles, ~~surveying~~ surveys and management activities, limiting ORVs to designated use areas and restricting night driving therein during the sea turtle ~~breeding~~ nesting season, alternative D would provide long-term, moderate to major, beneficial impacts. Because beach driving would be prohibited in designated ORV use areas between 7 p.m. and 7 a.m. during the sea turtle ~~breeding~~ nesting season, the chances are greatly reduced that: 1)~~of~~ adult turtles may be~~being~~ killed or caused to abort nesting attempts,2) nests ~~being~~ may be run over or disturbed, and 3) hatchlings ~~being run over or~~ may be killed or disoriented by light pollution from vehicles and associated recreational activities. ORV activities occurring under alternative D would have long-term, minor, adverse impacts.

Past, present, and future activities both inside the Seashore and within the state of North Carolina—when combined with the impacts of ORV use, ~~surveying~~ surveys and management of species expected under this alternative~~—would continue that may affect/are likely to adversely affect the sea turtles~~ would have long-term minor adverse cumulative impacts.

Impairment of sea turtles would not occur under alternative D because implementing the protective measures under this alternative would afford a reasonable opportunity for successful nesting of sea turtles to occur annually and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative D, resource management activities would result in long-term moderate to major benefits due to the protection provided to sea turtles from daily surveying for nests during the sea turtle nesting season (May 1 – September 15) and ~~erecting buffers~~installation of closures around each nest found, expanding the ~~buffers~~ closures and installing light filter fencing around the nests during the hatch~~hing~~ window, relocating nests from areas prone to erosion or frequent flooding, installing turtle friendly lighting ~~in~~ on the Seashore and working with the USFWS, NCWRC and Dare County to encourage the development of a turtle friendly lighting educational program or a turtle friendly lighting ordinance. Establishing SMAs for birds and seabeach amaranth ~~closures that~~, combined with other areas such as the village beaches that ~~would be~~ designated as non-ORV, ~~managed under ML1 procedures~~ would close approximately 40.8 miles of Seashore beach to ORV use year-round. These closures would

Comment [mbm 7]: Why do we mention "incidental take" here but not for management activities under A, B, or C? Should include it in all alternatives or in none. Isn't "ORV use and recreation" (i.e., how it is managed) more likely to cause incidental take, so why isn't it mentioned there (if it is going to be mentioned for management activities)? My point is we should be consistent across alternatives in mentioning incidental take or not. MBM

minimize potential impacts to nesting ~~and hatching sea turtles in these areas~~turtles, turtle nests, and turtle hatchlings in these areas.

ORV and other recreation use would have long-term minor adverse 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. Prohibiting nonessential recreational ORV nighttime driving from 7 p.m. to 7 a.m. between the dates of May 1 and November 15 would virtually eliminate potential impacts to adult and hatchling turtles caused by night driving. Beach fires would still be allowed, and though they would likely only occur in front of the villages due to the night driving restrictions, they would still cause adverse impacts to turtles through light pollution. Under the ESA these impacts would result in a finding of may affect/are likely to adversely affect to 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 and the prohibition on nonessential recreational ORV nighttime driving during the turtle nesting season, the actions under alternative D would also likely cause adverse effects.

Impacts of Alternative E: Variable Access and Maximum Management

Species Management Activities. Surveying activities for sea turtles under alternative E would be the same as under alternatives C and D, resulting in long-term, minor to moderate, beneficial impacts.

Management activities for sea turtles under alternative E would be the same as under alternatives C and D with the exception that SMA areas would be closed to ORV use for 5.5 months from March 15 through August 31, and SMAs under ML2 procedures at Bodie Island spit, Cape Point, and South Point ~~Ocracoke~~ would have ORV pass-through corridors, subject to resource closures. While not all closed areas are necessarily historically popular nesting sites, the SMAs, combined with other areas that would be closed to ORV use such as the village beaches, would protect~~ing~~ approximately ~~40.6~~34.7 miles of the Seashore from ORV use during the majority of the sea turtle nesting season and ~~would~~ provide long-term, moderate to major, beneficial impacts. The extent of the impact would depend on the location and size of the closures, which would be reevaluated and redesigned every 5 years or after major hurricanes. The beneficial impacts in SMAs under ML2 procedures would be tempered slightly with pass-through corridors subject to potential deterioration of nesting habitat due to the compaction of sand and contributing factors to erosion that result from ORV use. While SMAs would reopen after August 31, this would have only negligible to minor adverse impacts directly on nesting sea turtles, because since 1998, there has been minimal nesting activity at the Seashore after August 31, with only two nests and no false crawls recorded (NPS 2005d, 2007e, 2008a, 2009c).

Management activities would provide long-term, moderate to major, beneficial impacts to sea turtles. ~~and the risk of incidental take would be minimal.~~

Comment [MSOffice8]: The total of 34.7 miles of non-ORV area comes from the SMAs + the "village beaches", etc. MBM

Comment [mbm 9]: See previous comment about "incidental take" in D. Be consistent in mentioning it across all alternatives (or not)! MBM

ORV and Other Recreational Use. The majority of impacts under alternative E would be the same as under alternatives C and D with the following exceptions due to differences in nighttime driving and overnight camping restrictions.

Under alternative E, designated ORV routes in potential sea turtle nesting habitat (ocean intertidal zone, ocean backshore, and dunes) would be closed to nonessential ORV use from 10:00 p.m. to 6:00 a.m. from May 1 through November 15. For the period from September 16 through November 15, selected ORV routes with no or a low density of turtle nests would reopen to ORV use between 10:00 p.m. and 6:00 a.m., subject to terms and conditions of a permit. Turtle nesting and hatching occurs mostly during

nighttime hours. Only on rare occasions do these events take place during daylight hours (NPS 2005c). Therefore, prohibiting driving during the majority of the nighttime during the turtle nesting and hatching season would provide additional protection from ORV impacts such as causing false crawls, misorienting or disorienting nesting turtles and hatchlings, running over hatchlings and/or nests, leaving behind tire ruts that can trap hatchlings, or running over turtle crawls and obscuring the tracks that help Seashore staff identify and protect nests. Although this would provide some long-term beneficial impacts to turtles, adverse impacts from night driving could still occur between the hours of sunset and 10 p.m. Additionally, in those areas reopened to ORV use at night after September 15, hatchlings would be subjected to nighttime impacts from ORVs, but the potential for adverse impacts would be reduced by limiting it to areas where there are no nests or a very low density of nests. Therefore, while some beneficial impacts from limiting night driving would occur, night driving impacts under alternative E would be long-term, minor to moderate, and adverse. These impacts would be less than alternatives A and B, but more than alternatives C and D.

In addition, allowing night driving until 10 p.m. would likely increase the number of beach fires that occur throughout the Seashore as compared to alternatives C and D because the ability to easily carry firewood would not be restricted to areas in front of the villages. Therefore, impacts from light pollution resulting from beach fires would be more widespread under alternative E, similar to alternatives A and B, resulting in long-term, minor to moderate, adverse impacts.

Under alternative E, a limited number of ORVs would be allowed to "park-and-stay" overnight with a permit at selected spits and points, if not otherwise closed to protect resources. Fifteen vehicles would be allowed to stay at each inlet spit while 25 vehicles would be allowed to stay overnight at Cape Point and South Point ~~Ocracoke~~. Limitations on night driving and lighting restrictions (i.e., portable lanterns, auxiliary lights, and powered fixed lights of any kind shining for more than 5 minutes at a time would be prohibited, similar to all action alternatives) would help limit the amount of impacts created by these "park-and-stay" vehicles; however, they would still pose potential obstacles to turtles coming ashore to nest, possibly causing false crawls and turtles to expend more energy to find another nesting location that may be less optimal. This would result in long-term, minor, adverse impacts.

Under alternative E, a 10-meter (30-foot) wide ORV-free zone would be designated in the ocean backshore wherever there was sufficient beach width to allow an ORV corridor of at least 30 meters (90 feet) above the mean high tide line. This ORV-free zone would protect some turtle nesting habitat from ORV use; however, the area is fairly narrow, and it is unknown if the areas to be protected are more suitable for turtle nesting than the unprotected areas, or what percentage of historic nests are located within the protected area as compared to unprotected area. Because of the relative narrow portion of habitat protected, the impacts would be long-term, minor, and beneficial.

While additional restrictions and regulations would help lessen some of the impacts from ORVs and other recreational activities, overall, the impacts would be long-term, moderate, adverse from allowing some level of night driving after dark (seasonal restrictions do not start until 10 p.m)~~.~~, and due to increased recreational access throughout the Seashore.

Cumulative Impacts. Cumulative impacts to sea turtles under alternative E would be very similar to those described for alternative A. Although alternative E would provide additional protection that would be beneficial to the regional sea turtle population, the adverse effects on sea turtles from other actions occurring in the region would still exist. Therefore, the overall cumulative impact of these past, current, and futures actions—added to the effects of actions under alternative E—would result in long-term, moderate, adverse cumulative impacts ~~that may affect/are likely to adversely affect sea turtles within the Seashore~~.

Conclusion. Through the protection of adult and hatchling sea turtles, ~~surveying~~ daily surveys and management activities, limiting ORVs to designated use areas and restricting night driving therein during the sea turtle ~~breeding~~ nesting season, alternative E would provide long-term, moderate to major, beneficial impacts. Because ORVs would be restricted between the hours of 10 p.m. and 6 a.m. during the sea turtle ~~breeding~~ nesting season, the chances are reduced that 1) adult turtles may be killed or caused to abort nesting attempts,2) nests may be run over or disturbed, and 3) hatchlings may be killed or disoriented by light pollution from vehicles and associated recreational activities, but would be greater than under alternatives C or D, ORV use and other recreational activities occurring under alternative E would have long-term, 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~~ surveys and management activities, ORV use, and other recreational activities expected under this alternative—would continue to result in long-term, moderate, adverse impacts.

Impairment of sea turtles would not occur under alternative E because implementing the protective measures under this alternative would afford a reasonable opportunity for successful nesting of sea turtles to occur annually, and would not jeopardize the continued existence of the species within the Seashore.

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Determination of Effect. Under alternative E, resource management activities would result in long-term moderate to major benefits due to the protection provided to sea turtles from daily surveying for nests during the sea turtle nesting season (May 1 – September 15) and ~~erecting buffers~~installing closures around each nest found, expanding the ~~buffers~~ closuures and installing light filter fencing around the nests during the hatching window, relocating nests from areas prone to erosion or frequent flooding, installing turtle friendly lighting o~~i~~n the Seashore and working with the USFWS, NCWRC and Dare County to encourage the development of a turtle friendly lighting educational program or a turtle friendly lighting ordinance. The benefits of establishing SMAs for birds and seabeach amaranth closures and SMAs under ML2 procedures at Bodie Island spit, Cape Point, and South Point~~-~~, combined with other areas that would be closed to ORV use such as the village beaches, ~~Ocracoke~~ would close approximately ~~40.6~~34.7 miles of Seashore beach to ORV use during the majority of the sea turtle nesting season. These closures would minimize potential impacts ~~to nesting and hatching sea~~ turtles, turtle nests, and turtle hatchlings in these areas; however, the benefits would be tempered somewhat by the fact that the SMAs would only be closed to ORV use from March 15 through August 31 which does not encompass the entire turtle nesting season and ORV pass-through corridors would be provided for the SMAs operating under ML2 procedures.

ORV and other recreational use would have long-term moderate adverse impacts from allowing some level of nighttime driving and due to increased recreational access throughout the Seashore. ORVs and other recreation use would have adverse 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. While there would still be some impacts caused by night driving, these impacts would be lessened by prohibiting night driving between the hours of 10 p.m. and 6 a.m. from May 1 to November 15. Opening 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 could impact turtles in those areas. Beach fires would still be allowed, and due to night driving being allowed until 10 p.m., beach fires would likely occur in areas throughout the Seashore besides just in front of the villages and therefore could still cause adverse impacts to adult and hatchling turtles through light pollution. Under the ESA these impacts 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 and restrictions on nonessential recreational ORV nighttime driving, the actions under alternative E would also likely cause adverse effects.

Impacts of Alternative F: Management Based on Advisory Committee Input

Species Management Activities. Surveying activities for sea turtles under alternative F would be the same as under alternatives C, D, and E, resulting in long-term, minor to moderate, beneficial impacts that may affect/are not likely to adversely affect all species of sea turtles.

Management activities for sea turtles under alternative F would be the same as under alternatives C, D, and E, with the exception that SMA ~~areas~~ would be closed to ORV use generally for only 4.5 months from March 15 through July 31 or the end of fledging, and the areas managed under ML2 procedures during the breeding season at Cape Point and South Point ~~Ocracoke~~ would have ORV pass-through corridors, subject to resource closures, while Bodie Island Spit (also managed under ML2 procedures) would have a pedestrian corridor. Some SMAs would be closed year–round to ORVs (~~-~~and managed under ML1 procedures during the breeding season), including Hatteras Inlet Spit and North Ocracoke Spit ~~Inlet~~. While not all closed areas are necessarily historically popular nesting sites, the SMAs, combined with other areas that are closed to ORV use such as the village beaches, would protect approximately ~~41.8~~39 miles of the Seashore ~~would be protected~~ during a portion of the sea turtle nesting season. However, some of these areas c~~w~~ould be re-opened to ORV use and their impacts after about July 31 when sea turtle nesting is still ongoing, reducing the overall beneficial impacts that establishing SMAs provide to turtles to long-term, minor to moderate, and beneficial. The extent of the impacts would depend on the location and size of the closures, which would be reevaluated and re-designated every 5 years, or after major hurricanes. During the closures, the beneficial impacts in the Cape Point and South Point ~~areas~~ areas~~Ocracoke~~, under ML2 management~~.~~ would also be tempered slightly because pass-through corridors would be subject to potential deterioration of nesting habitat due to the compaction of sand and contributing factors to erosion that result from ORV use.

Management activities would provide long-term, moderate to major, beneficial impacts to sea turtles~~, and the risk of incidental take would be minimal.~~

Comment [mbm 10]: See previous comment about "incidental take" in D. Be consistent in mentioning it across all alternatives (or not)! MBM

ORV and Other Recreational Use. The majority of impacts under alternative F would be the same as under alternative E, except that there would be no impacts from "park-and-stay" vehicles under alternative F since this activity would be prohibited. In addition, greater beneficial impacts would be realized under alternative F due to increased hours of nighttime driving restrictions.

Under alternative F, designated ORV routes in potential sea turtle nesting habitat (ocean intertidal zone, ocean backshore, and dunes) would be closed to nonessential ORV use from one hour after sunset until turtle patrols have surveyed the beaches in the morning, which would be approximately one-half hour after sunrise. Similar to alternative E, select ORV routes with no or a low density of turtle nests remaining would reopen for night driving between September 16 and November 15, subject to terms and conditions of an ORV permit. Turtle nesting and hatching occurs mostly during nighttime hours. Only on rare occasions do these events take place during daylight hours (NPS 2005c). Prohibiting nonessential recreational ORV nighttime driving would virtually eliminate all potential impacts to nesting turtles and hatchlings throughout the Seashore, creating long-term, moderate to major beneficial impacts. In addition, by not opening beaches to ORV use in the morning until the Seashore staff have surveyed a beach, the possibility that crawls would be obscured by ORV tracks—causing nests to be missed and therefore not protected as has occurred in the past—would be eliminated. However, some risk of long-term, minor to moderate, adverse impacts would still exist from using essential vehicles at night and allowing possible

night driving in areas outside of existing resource closures by commercial fisherman, who are actively engaged in authorized commercial fishing activities.

Similar to alternative E, those areas reopened to ORV use at night after September 15 would subject hatchlings to nighttime impacts from ORVs, although the potential for adverse impacts would be reduced by limiting it to areas where there are no nests or a very low density of nests. Therefore, while restricting night driving would result in significant beneficial impacts, because some adverse impacts could occur after September 15, night driving impacts under alternative F would be long-term, minor to moderate, ~~and~~ adverse. These impacts would be significantly less than alternatives A, B, and E, but only slightly more than alternatives C and D.

Comment [l11]: EDITOR: Commenter asked that we be consistent if we use "and" here or not

Beach fires would not be prohibited under alternative F, but they would be restricted to the areas in front of Coquina Beach, Rodanthe, Waves, Salvo, Avon, Buxton, Frisco, Hatteras Village, and the Ocracoke Day-Use Area during the sea turtle nesting season. Even though the ability to have beach fires would require a non-fee educational permit, allowing these beach fires would cause impacts (misorientation, disorientation, injury, and death) to nesting turtles and hatchlings, resulting in long-term, minor to moderate, adverse impacts; however, these impacts would not potentially be S~~s~~eashore wide and would be restricted to the few areas where they would be allowed.

Similar to alternative E, under alternative F, a 10-meter (30-foot) wide ORV-free zone would be designated in the ocean backshore wherever there was sufficient beach width to allow an ORV corridor of at least 30 meters (90 feet) above the mean high tide line. However, unlike alternative E, this ORV-free zone would be a year-round closure under alternative F. This ORV-free corridor would protect some turtle nesting habitat from ORV use; however, the area is fairly narrow and it is unknown if the areas to be protected are more suitable for turtle nesting than the unprotected areas, or what percentage of historical nests are located within the protected area as compared to unprotected areas. Because of the relative narrow portion of habitat protected, the impacts would be long-term, minor, and beneficial.

While additional restrictions and regulations would help lessen some of the impacts from ORVs and other recreational activities, overall, the impacts would be long-term, minor to moderate, adverse as, when compared to the other action alternatives, recreational use would be allowed in more areas throughout the Seashore, resulting in a greater potential for impacts to sea turtles.

Cumulative Impacts. Cumulative impacts to sea turtles under alternative F would be very similar to those described for alternative A. Although alternative F would provide additional protection that would be beneficial to the regional sea turtle population, the adverse effects on sea turtles from other actions occurring in the region would still exist. Therefore, the overall cumulative impact of these past, current, and future actions—added to the effects of actions under alternative F—would result in long-term, minor to moderate, adverse cumulative impacts.

Conclusion. Through the protection of adult and hatchling sea turtles, ~~surveying~~ surveys and management activities, limiting ORVs to designated use areas and restricting night driving therein during the sea turtle ~~breeding~~ nesting season, alternative F would provide long-term, moderate to major, beneficial impacts. Because ORVs would be restricted between the hours of 1 hour after sunset until turtle patrol has checked the beach in the morning (approximately ½ hour after sunrise), the chances are greatly reduced that adult 1) turtles may be killed or caused to abort nesting attempts, 2) nests may be run over or disturbed, and 3) hatchlings may be killed or disoriented by light pollution from vehicles and associated recreational activities, ORV use and other recreational activities occurring under alternative E 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 impacts.

Impairment of sea turtles would not occur under alternative F because implementing the protective measures under this alternative would afford a reasonable opportunity for successful nesting of sea turtles to occur annually, and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative F, resource management activities would result in long-term moderate to major benefits due to the protection provided to sea turtles from daily ~~surveying~~ surveys for nests during the sea turtle nesting season (May 1 – September 15) and ~~erecting buffers~~installation of closures around each nest found, expanding the ~~buffers~~ closures and installing light filter fencing around the nests during the hatch~~hing~~ window, relocating nests from areas prone to erosion or frequent flooding, installing turtle friendly lighting ~~i~~on the Seashore and working with the USFWS, NCWRC and Dare County to encourage the development of a turtle friendly lighting educational program or a turtle friendly lighting ordinance. The benefits of establishing SMAs for birds and seabeach amaranth closures and SMAs under either ML1 or ML2 procedures, combined with other areas that are closed to ORVs use such as the village beaches, would close approximately ~~41.8~~39 miles of Seashore beach to ORV use during the breeding season. These closures would minimize potential impacts to nesting ~~and hatching sea~~ turtles, turtle nests and turtle hatchlings in these areas; however, the benefits would be tempered somewhat by the fact that the SMAs would only be closed to ORV use from March 15 through July 31 which does not encompass the entire turtle nesting season and ORV pass-through corridors would be provided for the SMAs operating under ML2 procedures at Cape Point and South Point ~~Ocracoke~~.

ORV and other recreation use would have long-term minor to moderate adverse impacts by allowing recreational use in more areas throughout the Seashore. ORV and other recreation 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. Prohibiting nonessential recreational ORV use from one hour after sunset until turtle patrols have surveyed the beaches in the morning, which would be approximately one-half hour after sunrise, would virtually eliminate potential impacts to adult and hatchling turtles caused by night driving. Opening 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, however, could impact turtles in those select ORV route areas. Beach fires would still be allowed, but would be 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 would be required to have a beach fire, allowing beach fires would still cause adverse impacts to adult and hatchling turtles through light pollution. Under the ESA these impacts would result in a finding of may affect/are likely to adversely affect ~~to~~ 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 and restrictions on nonessential recreational ORV nighttime driving, the actions under alternative F would also likely cause adverse effects.

TABLE 46. SUMMARY OF IMPACTS TO SEA TURTLES UNDER THE ALTERNATIVES

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Resource Management Activities					
Overall, resource management activities under alternative A would have long-term, moderate benefits due to the protection provided to the sea turtles.	Overall, management activities under alternative B would have long-term, moderate benefits due to the protection provided the sea turtle.	Overall, resource management activities under alternative C would have long-term, moderate to major, beneficial impacts due to the added protection provided to sea turtles with adverse impacts. ~~The potential for incidental take would be minimized by the staff used and precautions taken.~~	Overall, similar to alternative C, management activities under alternative D would result in long-term, moderate to major, beneficial impacts and the potential for incidental take would be minimized by the staff used and precautions taken.	Management activities would provide long-term, moderate to major, beneficial impacts to sea turtles and the risk of incidental take would be minimal.	Management activities would provide long-term, moderate to major, beneficial impacts to sea turtles, and the risk of incidental take would be minimal.
ORV And Other Recreational Use					
Overall, ORV and other recreational use would have long-term, major, adverse impacts due to the amount of Seashore available for ORV use and by allowing night driving on the beach and the potential impacts from these activities.	Although additional restrictions and regulations would help lessen some of the impacts from ORV use and other recreation activities, overall, the impacts would be long-term, moderate, adverse.	Restrictions placed on nonessential, recreational ORV use under alternative C would provide substantial long-term benefits to sea turtles, including seasonal night driving restrictions that close the beach before dark (7:00 pm), some adverse impacts ~~and incidental takes~~ would still occur in areas where their use is allowed. Therefore, overall, ORV and other recreational use would have long-term, minor adverse impacts.	While restrictions placed on ORV use under alternative D would provide long-term, moderate to major, beneficial impacts, similar to alternative C, there would still be some level of incidental take in areas where ORV use and beach fires are allowed; therefore, the overall impacts for recreation and other activities would be long-term, minor adverse.	While additional restrictions and regulations would help lessen some of the impacts from ORVs and other recreational activities, overall, the impacts would be long-term, moderate, adverse from allowing some level of night driving after dark (seasonal restrictions do not start until 10 p.m)., and due to increased recreational access throughout the Seashore.	While additional restrictions and regulations would help lessen some of the impacts from ORVs and other recreational activities, overall, the impacts would be long-term, minor to moderate, adverse as, when compared to ~~the other~~ action alternatives C and D, as recreational use would be allowed in more areas of ~~throughout~~ the Seashore, resulting in a greater potential for impacts to sea turtles.

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Comment [mbm 13]: Need to decide whether or not to mention incidental take, then be consistent about mentioning it or not across all alternatives. If you do mention it, then be consistent in the wording in C-D. Question: Isn't incidental take more likely to occur from the ORV management aspects of the plan, so why (if it needs to be mentioned at all) isn't it mentioned there? My suggestion is to eliminate mentioning it anywhere, since it is NOT described in detail in any of the analysis for sea turtles and NOT mentioned at all for piping plover? MBM

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Comment [MSOffice12]: Since "incidental take" is mentioned for the other action alternatives, it should be mentioned for C too.

Comment [mbm 15]: F has less access and more restrictive hours of night driving than E. MBM

Comment [mbm 14]: Same comment as above about "incidental take." Be consistent in mentioning it (or not)! In the case of C, I could not find mention of it in the text sections, so why is it mentioned here? MBM

SEABEACH AMARANTH

Species-Specific Methodology and Assumptions

Potential impacts on seabeach amaranth populations and habitat at the Seashore were evaluated based on the species life history, its past and present occurrence at the Seashore, as well as known effects on the species from activities relating to humans, pets, predators, and ORVs. Information about habitat and other existing data were acquired from ~~park~~ staff at Cape Hatteras National Seashore, the USFWS, and available literature.

The analysis focuses on impacts to seabeach amaranth from a variety of human recreational and other activities, as well as impacts incurred as a result of surveying and management activities. Seabeach amaranth often grows in habitat areas used by other protected species within the Seashore such as plovers,

oystercatchers, colonial waterbirds, and sea turtles. Therefore any ORV-related closures established to protect the habitat or nests of these species would also benefit seabeach amaranth, although the extent of the benefit would depend upon the actual location, size, and duration of the closures. It is also assumed that increases in natural resource and law enforcement staffing at the Seashore would increase public compliance with closures and other park regulations (e.g., leash laws) from that which currently exists.

Primary steps in assessing impacts to seabeach amaranth at the Seashore were to determine (1) occurrence and location of seabeach amaranth in areas likely to be affected by management actions described in the alternatives; (2) current and future use and distribution of ORV by alternative; (3) habitat impact or alteration caused by the alternatives; and (4) disturbance potential of the actions and the potential to directly or indirectly affect seabeach amaranth as a result of ORV use. The information contained in this analysis was obtained through best professional judgment of ~~Seashore~~ staff and experts in the field, and by reviewing applicable scientific literature.

Seabeach amaranth is a fugitive annual, or a species adapted to inhabit newly disturbed habitats yearly, whose seeds are viable for long periods of time and can be dispersed long distances by wind and water, allowing it to occupy newly created habitat. Seeds may also just accumulate around the base of a plant when it dies, allowing it to continue to occupy currently available habitat.

At the Seashore, seabeach amaranth populations have fluctuated greatly since surveys began in 1985; however, no plants have been found since 2005 and the plant is currently thought to be extirpated from the Seashore (NPS 2009e). In 2005, two plants were found—one located on Bodie Island Spit and one on Ocracoke Island. In 2004, only one plant was found; it was located on Bodie Island Spit. The area on Bodie Island Spit where the plants were located has been continuously protected through summer and winter resource management closures. At Cape Point, a portion of the area where seabeach amaranth was historically found has also been continuously protected through summer and winter resource closures. However, no plants have been found in these protected areas. Additionally, large portions of the plant's historical range at Hatteras Inlet where plants were found from 2001 to 2003 are no longer present due to continued erosion and retreat of the shoreline (NPS 2009e). Despite the possibility that seabeach amaranth has been extirpated from the Seashore, it is necessary to protect potential habitat where plants might eventually occur, as well as unknown sites where seeds might be, in addition to protecting plants and currently occupied habitat (Jolls et al. 2004). As an example of its fugitive nature, seabeach amaranth was extirpated in New York from Long Island's barrier beaches for 35 years prior to plants being discovered in 1990, 1991 and again in 1992 (LIBS 1992).

Impact Thresholds

A summary of seabeach amaranth impacts under all alternatives is provided in table 47 at the end of this section.

The following thresholds for evaluating impacts to seabeach amaranth were defined.

Negligible: There would be no observable or measurable impacts to seabeach amaranth, its habitats, or the natural processes sustaining it. Impacts to the plant community would be well within natural fluctuations.

Minor Adverse: Impacts on seabeach amaranth would be measurable or perceptible, but would not be outside the natural range of variability and would be localized within a small area. Small changes to local population numbers, population structure, and other demographic factors might occur, but the natural function and character of the seabeach amaranth community would not be affected. Sufficient habitat in the park would remain functional to maintain a sustainable population in the Seashore.

Minor Beneficial: Impacts on seabeach amaranth, its habitats, or the natural processes sustaining it would be detectable, but would not be outside the natural range of variability. Improvements to key characteristics of habitat and/or protection to key propagation stages in the park would sustain or slightly improve existing population levels, population structure, or other factors and maintain a sustainable population in the Seashore.

Moderate Adverse: Impacts on seabeach amaranth, its habitats, or the natural processes sustaining it would be measurable or perceptible and could be outside the natural range of variability. A change would occur in the natural function and character of the seabeach amaranth community in terms of basic properties (e.g., abundance, distribution, quantity, and quality) but not to the extent that the basic properties of the community change. Sufficient population numbers and habitat in the park would remain functional to maintain a sustainable population in the Seashore.

Moderate Beneficial: Impacts on seabeach amaranth, its habitats, or the natural processes sustaining it would be detectable and could be outside the natural range of variability. Changes to key characteristics of habitat in the park and/or protection to key propagation stages would minimize or prevent injury to individual plants and improve the sustainability of the species in the Seashore.

Major Adverse: Impacts on seabeach amaranth, its habitats, or the natural processes sustaining it would be measurable or perceptible, would be expected to be outside the natural range of variability. Frequent disturbance to individual plants would be expected, with negative impacts that would result in a decrease in park 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 propagation and result in direct mortality or loss of habitat. Local population numbers, population structure, and other demographic factors might experience large declines.

Major Beneficial: Impacts on seabeach amaranth, its habitats in the park, or the natural processes sustaining it during key life history stages would be detectable, would be expected to be outside the natural range of variability. Changes to key characteristics of habitat in the park and/or protection to key propagation stages would substantially lessen mortality or loss of habitat and would result in notable increases in Seashore population levels.

Duration Short-term effects would ~~be less than~~be up to two reproductive seasons for seabeach amaranth.

Long-term effects would be anything beyond two reproductive seasons for seabeach amaranth.

Study Area

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

Impacts of Alternative A: No Action—Continuation of Management under the Interim Protected Species Management Strategy

Species Management Activities. Under alternative A, during August, when plants are large enough to be easily detected, an annual survey would ~~continue to~~ be conducted of all potential seabeach amaranth habitat to locate and document plants. Under alternative A, when a seabeach amaranth plant is found outside of an existing closure (i.e., bird or turtle closure) ~~Seashore~~ staff would ~~erect~~ install a 30 foot (9.1 meters) by 30 foot (9.1 meters) ~~buffer~~ closu~~us~~re around the plant(s) and mark it with signs to prevent trampling of the plants. The closures would not be removed until the plants have died in late autumn or early winter. Providing a ~~buffer~~ closure of this size until the plant dies would provide long-term, minor to moderate, benefits by helping to protect plants from being run over by ORVs or trampled by people and from erosion caused by multiple passes of ORVs in high use areas.

Prior to the annual August survey, seabeach amaranth would be subject only to ancillary ~~surveying~~ surveys by bird and turtle ~~observers~~ monitors while they conduct their primary duties. Seabeach amaranth seedlings are typically first visible beginning in June. With only ancillary observations being made during routine bird and turtle ~~surveying~~surveys, plants germinating outside of an established bird closure or other area where vehicles are prohibited would likely not be detected, resulting in long-term, minor to moderate, adverse impacts. Any plants that are not detected and subsequently protected may be destroyed by ORVs or other human activities, including Seashore staff using ATVs/UTVs and ORVs to conduct bird and turtle surveys. Any plants that are destroyed would not be detected and accounted for during the August survey.

Historically, most areas where seabeach amaranth has been found at the Seashore were either in established bird closures or other areas closed to vehicular traffic (NPS 2009e). The primary habitat of seabeach amaranth consists of overwash flats at accreting ends of islands and the sparsely vegetated zone between the high tide line and the toe of the primary dune. Much of this habitat corresponds with that of piping plover, American oystercatcher, and other protected bird species at the Seashore. Therefore, when pre-nesting closures are ~~erected~~ installed beginning in March and then subsequently expanded to protect nesting birds and unfledged chicks, seabeach amaranth plants and those portions of its habitat that overlap with the closures would be protected during its growing season resulting in long-term, minor to moderate, beneficial impacts. However, protection afforded to seabeach amaranth by closures for other protected species would vary annually and depend upon the location, size, and duration of the other species closures. Because seabeach amaranth must recruit annually and its seeds can be dispersed long distances via wind and water, closures for other species that overlap seabeach amaranth habitat and the 30-foot (9.1-meter) by 30-foot (9.1-meter) buffers ~~erected~~ installed around plants would not likely protect all areas in the Seashore where seeds exist and could potentially germinate ~~from~~ in areas of ORV traffic. Unprotected seedlings or plants in areas open to ORV use would likely be crushed and go completely undocumented and seeds may be pulverized or buried. Because ATVs/UTVs and/or ORVs are used ~~in conducting~~to conduct bird and turtle ~~surveying~~surveys and monitoring, there would also be a small probability of essential vehicle impacts on plants and seeds due to crushing and burial, respectively, causing long-term minor adverse impacts.

Under alternative A, bird and turtle closures would be surveyed for seabeach amaranth prior to reopening them to ORV traffic when the closures are no longer required to protect ~~the~~ nesting bird and their chicks and turtle ~~species~~nest and hatchlings. If any plants are ~~found~~detected, buffers around the plants would be

established while other areas of the closures where there are no plants would be reopened to ORV traffic. Areas identified as potential alternate/bypass ORV routes around bird and turtle closures would also be surveyed for seabeach amaranth, and buffers around plants would be established prior to using the routes. These actions would protect any plants and/or seeds that exist within these areas and result in long-term, minor to moderate, beneficial impacts.

Under alternative A, the Seashore would continue to place interpretive signs at all ORV entry points and at park kiosks describing the effects and susceptibility of seabeach amaranth to pedestrian and ORV use. The Seashore would also continue to notify the public of all resource closures and openings. These actions would be beneficial for helping to protect seabeach amaranth. Therefore, outreach measures would have long-term, minor, beneficial impacts.

Overall, because of the protection of seabeach amaranth habitat and plants under alternative A, surveys conducted for amaranth plants and protection measures taken when plants are detected would have long-term, minor to moderate, beneficial impacts, to amaranth habitat and plants when they occur.

~~Overall, because of the protection of seabeach amaranth habitat and plants under alternative A, surveying and management actions would have long-term, minor to moderate, beneficial impacts, if plants are found.~~

ORV and Other Recreational Use. Under alternative A, ORV use would be restricted to a corridor 100 feet wide above the mean high tide line in breeding areas of protected bird species from April 1 to August 31. While this corridor would protect a small strip of potential seabeach amaranth habitat near the toe of the dunes, much of the corridor, especially located near and on the spits and Cape Point, would lie within primary seabeach amaranth habitat and would expose any seeds or germinating plants to direct and indirect impacts from ORVs. Stems of the plant are easily broken or crushed by foot traffic and tires; thus, even limited traffic can be detrimental during the growing season (USFWS 1993). Besides damaging plants, ORVs can also pulverize seeds and bury them to depths beyond which they can germinate. In areas of the Seashore where beach widths are greatly reduced the 100-foot-wide corridor could encroach on the toe of the dunes, increasing the likelihood for impacting seeds and/or seedlings resulting in long-term, minor to moderate, adverse impacts.

During the seabeach amaranth's dormant season (December to April), there are fewer closures for protected birds. Only those suitable interior habitats at the spits and at Cape Point used by non-breeding and wintering ~~over~~ piping plovers are closed year-round to ORV and pedestrian traffic. Therefore, more seabeach amaranth habitat would be open to impacts from ORV use. Although there are no plants that can be damaged by ORVs during the plant's dormant period, ORV traffic can still have an adverse impact on seabeach amaranth by either pulverizing or burying the plant's seeds when driving over them (USFWS 1996b), resulting in long-term, moderate, adverse impacts.

While off-season ORV traffic can adversely affect seabeach amaranth through its impacts on seeds, it may also provide some benefits to the plant through the disturbance of perennial grasses and shrubs (USFWS 1996b). Seabeach amaranth is intolerant of competition from other plants. If left undisturbed, many areas within the Seashore would naturally progress through successional stages whereby perennial grasses and shrubs would become established, thus rendering the habitat unsuitable for seabeach amaranth. By using areas in late fall and winter that were previously closed to ORV traffic, ORV use helps prevent the establishment of perennial grasses and shrubs. Where this disturbance overlaps with potential seabeach amaranth habitat, it helps to maintain that habitat as potentially suitable for seabeach amaranth, resulting in long-term, minor, beneficial impacts.

Pedestrians would continue to be prohibited from seabeach amaranth closures under alternative A. Pedestrian use of beaches typically does not overlap heavily with the habitat of seabeach amaranth because joggers prefer wet sand and beach bathers prefer to be closer to the water. Pedestrian traffic during the plants dormant season is much less than during its growing season and would not likely have any impacts on the species. Even during the growing season, pedestrian traffic would generally have little effect on seabeach amaranth populations because many beaches with daily use by thousands of sunbathers, joggers, and other recreation enthusiasts have substantial and apparently healthy populations of seabeach amaranth (USFWS 1996b). However, some undetected seedlings/plants could still be trampled by pedestrians and/or their pets resulting in long-term, minor to moderate, adverse impacts.

Comment [I16]: Sandy, your message said that this said "beach bathers"? Looks like it say sunbathers, is that ok?

Overall, ORV and other recreational use under alternative A would have long-term, moderate, adverse impacts as plants may go undetected, and ~~therefore~~ would therefore be unprotected from this use.

Cumulative Impacts. Other past, present, and future planned actions within and around the Seashore have the potential to impact seabeach amaranth. Hurricanes and other weather events can have both long-term, moderate to major, adverse and beneficial impacts on seabeach amaranth within the Seashore and throughout the plant's range. Seabeach amaranth is extremely susceptible to overwash and strong storms can cause overwash in areas even at the toe of the dunes. If a storm occurs early enough in the growing season, it can destroy plants before they set seed. Storms can also bury seeds so deep that they cannot germinate. However, storms can also uncover previously buried seed banks, bringing them back to a depth where they can then germinate. Storms also play a major role in dispersing seeds through both wind and water, and can reestablish populations in areas that had become devoid of plants. Storms can destroy habitat through erosion or create new habitat by creating overwash areas. Hurricanes can also indirectly affect seabeach amaranth because of their impact on staff resources. Hurricane recovery efforts that pull staff from resource management (and presumably surveying) activities would have long-term, minor to moderate, adverse impacts by causing plants to be missed and therefore go unprotected.

The dredging of the federally authorized navigation channel at Oregon Inlet has occurred in the past and major dredging events would continue to occur about every four years. The actual dredging does not directly impact seabeach amaranth; however, heavy construction equipment use at the deposition site, usually Pea Island (USACE 2002), could result in long-term, minor adverse impacts by pulverizing or burying seeds or running over undetected seedlings or plants. Dredging of channels in and around barrier islands occurs throughout the seabeach amaranth's habitat in North Carolina and would have the same impact, depending upon the level of protection afforded the plant.

Several of the local and NPS past, current, and future planning efforts can also affect the seabeach amaranth. For example, new development might result from the County Land Use Development Plan for Dare and Hyde Counties. Though the details are lacking, if additional development results from implementing the land use plan, the amount of recreation on the area beaches would also likely increase, resulting in potential long-term, minor to moderate, adverse impacts. Other potential impacts from development are indeterminate at this time. The education aspect of the Seashore's Long-Range Interpretive Plan would provide long-term, minor benefits to seabeach amaranth because it would help to educate visitors about the plant and the protection measures that are put in place at the Seashore to help protect it. Under the Predator Management Plan, there is a slight chance that trappers hunting fox and other mammalian predators would trample seabeach amaranth plants during their trapping efforts, resulting in long-term, minor to moderate, adverse impacts. ~~Special use permits provide long-term, minor beneficial impacts by helping to pay for park staff~~Seashore staff ~~that can monitor activities and ensure that protected resources are not impacted during the special events. Concession permits also provide a measure of protection for seabeach amaranth by providing a mechanism for which to hold concessionaires accountable for their actions and any impacts to protected resources.~~

Comment [I17]: Sandy – to address your phone comment, I deleted these sentences as per earlier discussion, these were not to be include d in cumulative impacts.

The outcome of the current action to develop a Cape Lookout National Seashore ORV management plan/EIS could have long-term, minor to moderate, beneficial impacts on seabeach amaranth populations within Cape Hatteras National Seashore and throughout the rest of the plant's habitat in North Carolina. Populations of seabeach amaranth in the south are probably sources of long distance seed dispersal due to the fact that storms move northward along the U.S. Atlantic seacoast, thus Cape Lookout National Seashore could be a potential seed source for suitable habitat in Cape Hatteras National Seashore and northward. However, whether the impacts of the long-term ORV plan would be beneficial or adverse depends upon the policies developed with regard to where within the Seashore ORVs would be allowed to go and during what time of year.

The replacement of the Herbert C. Bonner Bridge would result in both long-term, minor to moderate, adverse and beneficial impacts, with the EIS for this project noting that seabeach amaranth has not been found since 2004, and if suitable habitat were found, a survey for this species would be conducted. The area near the bridge is suitable habitat for seabeach amaranth as evidence by the presence of the only plant located within the Seashore in 2004. While construction activities could impact seabeach amaranth through direct disturbance of plants or the burying of seeds, surveying for plants prior to construction activities would help minimize this impact. However, the replacement of the bridge would allow the formation of ephemeral habitats to occur more naturally, including overwash fans, increasing the amount of habitat suitable for colonization by seabeach amaranth.

The overall cumulative impacts of these past, current and future actions, in combination with the effects of alternative A, would result in long-term, moderate, adverse cumulative impacts to seabeach amaranth within the Cape Hatteras National Seashore and throughout the plant's habitat range in North Carolina.

Conclusion. ~~Although surveying and management activities would include risk that plants~~Although surveys conducted for seabeach amaranth plants and protection measures implemented~~taken~~ when plants are detected would include risk that plants would be disturbed, use of experienced staff taking precautions in areas of known occurrence or habitat ~~would be disturbed, use of experienced staff taking precautions in areas of known occurrence or habitat~~ would minimize this risk. Overall, species management activities would reduce potential impacts from ORV and other recreational use and e~~. O and other activities involving human disturbance, such as (i.e., pedestrian use and pets,)~~ would have minor to moderate beneficial impacts. Because ORV use and other~~associated~~ recreational activities could result in plants being run over/trampled and seeds being pulverized or buried to a depth where they cannot germinate, alternative A would have long-term, moderate, adverse impacts.

Comment [mbm 18]: This is very confusing. Needs to be simplified. MBM

Past, present, and future activities both inside the Seashore and within the plant's historic range in North Carolina, when combined with the impacts of ORVs, ~~,~~other recreational use~~,~~ and~~as well as~~ resources management activities for this species~~surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected w~~, would result ~~in North Carolina, when combined with the impacts of ORV use, surveying and management of the species expected under this alternative would continue to result~~ in ~~impacts that would have~~ long-term, moderate, adverse cumulative impacts.

There would be no impairment of seabeach amaranth under alternative A because implementing the protection measures under this alternative would likely afford a reasonable opportunity for at least a minimal amount of successful germination to occur at the Seashore and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative A, resource management activities would result in long-term negligible to minor benefits to seabeach amaranth if ~~plants are found~~plants are detected in the Seashore.

Benefits would be due to the protection provided by ~~erecting~~ installing ~~buffers~~ closures around plants that are ~~found~~detected, surveying for plants in August when they are visible, ~~erecting~~ installing pre-nesting and other closures for nesting bird species that overlap~~s~~ seabeach amaranth habitat, and surveying bird and turtle closures for plants prior to reopening these closures to ORV and other recreation use.

ORV and other recreational use would have long-term moderate adverse impacts on seabeach amaranth as plants may go undetected and therefore unprotected from recreation use of the Seashore. While ORV use would be restricted to a corridor 100 feet wide above the mean high tide line in breeding areas of protected bird species from April 1 to August 31, much of the corridor, especially located near and on the spits and Cape Point would lie within primary seabeach amaranth habitat and would expose any seeds or germinating plants to impacts from ORVs and other recreation use. During seabeach amaranth's dormant season more areas of the Seashore are open to ORV use, and while there would be no plants to be impacted, seeds of the plant could be either pulverized or buried by ORVs driving over them. Under the ESA these impacts would result in a finding of may affect/are likely to adversely affect seabeach amaranth 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: No Action—Continuation of Management under Terms of the Consent Decree

Species Management Activities. ~~Surveying activities for~~Surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected under alternative B ~~and the impacts of these activities~~ would be the same as under alternative A, resulting in long-term, minor to moderate, beneficial impacts to seabeach amaranth.

Management activities under alternative B would be the same as under alternative A except for the following management changes for bird species habitat that would also benefit seabeach amaranth. Under the consent decree issued in 2008, the Seashore would establish pre-nesting areas on Bodie Island Spit, Cape Point, South Beach, Hatteras Inlet Spit, North Ocracoke Spit, and ~~Ocracoke~~ South Point, and these areas would not be reduced to accommodate an ORV corridor. The pre-nesting areas would remain in place until the later of July 15 or 2 weeks after the last tern, black skimmer, American oystercatcher, piping plover, or Wilson's plover chick within the area has fledged. In subsequent years, the Seashore would establish pre-nesting closures that incorporate to the maximum extent possible the areas delineated in 2008. Because these areas overlap seabeach amaranth habitat, they would protect potential habitat for seabeach amaranth where it could possibly re-establish itself in the Seashore, and if it does, to potentially continue to survive at in the Seashore. The total amount of potential habitat protected each year would be dependent on the dynamic nature of the Seashore and the amount of breeding habitat used by during the previous 3 years since that is what the pre-nesting closures are based on. These pre-nesting closures would provide long-term, moderate, beneficial impacts to seabeach amaranth and would be the same ~~after~~ as before the June 2009 amendment to the consent decree.

Additional closures for unfledged chicks would not provide that great of a benefit to seabeach amaranth, for the additional areas to be closed would have already been open to ORV and pedestrian use and their impacts, and they are readily adjusted to accommodate the movement of the chicks. Therefore, they would not provide a sufficient amount of time for seabeach amaranth seeds to germinate and exist without potential impacts from ORVs and/or pedestrians. However, because these areas would still be surveyed prior to reopening them, they would provide long-term, minor, beneficial impacts to seabeach amaranth.

Overall, ~~, because of the protection of seabeach amaranth habitat and plants under alternative B,~~ surveys conducted for seabeach amaranth plants and the protection measures implemented when plants are

detected would result in long-term ~~surveying and management actions would have long-term,~~ minor to moderate beneficial impacts. Although ~~as~~ plants are scarce and would be difficult to detect, ~~under this management, but~~ they would be provided protection once ~~found~~detected.

ORV and Other Recreational Use. Under alternative B, the impacts from ORV use and other activities would be the same as under alternative A, except with an additional measure that would reduce adverse impacts slightly. Under alternative B, in all locations open to ORV use that are not in front of villages, a 32.8-foot (10-meter) wide ORV-free zone would be created in the ocean backshore wherever there is sufficient beach width to allow an ORV corridor of at least 65.6 feet (20 meters) above the mean high tide line. This ORV-free corridor would protect some of the beach from ORV use and reduce impacts on seabeach amaranth plants and habitat. However, the area would be fairly narrow, and it is unknown if the areas to be protected are more suitable for seabeach amaranth than the unprotected areas. Because of the relatively narrow section of beach being protected from ORV use impacts, the impacts would be long-term, minor, and beneficial. Overall, ORV use and other recreational activities would result in long-term, ~~minor to~~ moderate, adverse impacts, ~~as~~ but slightly more protection would be provided for the species when compared to alternative A.

Cumulative Impacts. Impacts to seabeach amaranth under alternative B would be the same as those described under alternative A. Although alternative B would provide some additional benefits to the plant, the adverse effects on seabeach amaranth from other actions occurring in North Carolina would still exist and would not be ~~significantly~~ greatly offset by the additional protection afforded under alternative B. Therefore, the effects of these other actions, added to the effects of actions under alternative B would result in long-term, ~~minor to~~ moderate, adverse impacts to seabeach amaranth in the Seashore and throughout the plant's habitat range in North Carolina.

Conclusion. Overall surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected ~~surveying and management activities~~ would reduce potential impacts from ORV and other recreational use, ~~and other activities (i.e., pedestrian use and pets)~~ resulting in long-term, minor to moderate, beneficial impacts. Because ORV use and other ~~, associated r~~recreational activities ~~, and commercial fishing access~~ could result in plants being run over/trampled and seeds being pulverized or buried to a depth where they cannot germinate, alternative B would have long-term, ~~minor to~~ moderate, adverse impacts.

Past, present, and future activities both inside the Seashore and within the plant's historical range in North Carolina, when combined with the impacts of ORVs, other recreational use and resources management activities for this species, ~~as well as surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected~~ would result ~~in North Carolina, when combined with the impacts of ORV use, surveying and management of the species expected under this alternative would continue to result~~ in ~~impacts that would have~~ long-term, ~~minor to~~ moderate, adverse cumulative impacts.

There would be no impairment of seabeach amaranth under alternative B because implementing the protection measures under this alternative would likely afford a reasonable opportunity for at least a minimal amount of successful germination to occur at the Seashore and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative B, resource management activities would result in long-term negligible to minor benefits to seabeach amaranth if ~~plants are found~~plants are detected ~~in~~ on the Seashore. Benefits would be due to the protection provided by ~~erecting~~ installing ~~buffers~~ closures around plants that are ~~found~~detected, surveying for plants in August when they are visible, ~~erecting~~ installing pre-nesting and other closures for nesting bird species that overlap~~s~~ seabeach amaranth habitat, and surveying bird and turtle closures for plants prior to reopening these closures to ORV and other recreation use.

Comment [MSOffice19]: "Minor to moderate" would be the same level of impacts as alternative C, even though C has the SMAs that would proactively reduce the ambient level of recreational use during much of the breeding season. Doesn't make sense that it is the same. I would argue that impacts to SBA under B would more likely be similar to A, since essentially the same measures are in effect.

Comment [I20]: Search rest of text for significantly

Comment [MSOffice21]: See comment above.

Comment [MSOffice22]: See comment above.

Comment [MSOffice23]: See comment above.

ORV and other recreational use would have long-term ~~minor to~~ moderate adverse impacts on seabeach amaranth as plants may go undetected and therefore would be unprotected from recreation use of the Seashore. While ORV use would be restricted to a corridor 100 feet wide above the mean high tide line in breeding areas of protected bird species from April 1 to August 31, much of the corridor, especially located near and on the spits and Cape Point would lie within primary seabeach amaranth habitat and would expose any seeds or germinating plants. Some additional seabeach amaranth habitat would be protected, for in all areas open to ORV use that are not in front of villages, a 32.8-foot-wide (10-meter-wide) ORV-free zone would be created in the ocean backshore wherever there is sufficient beach width to allow an ORV corridor of at least 65.6 feet (20 meters) above the mean high tide line. During seabeach amaranth's dormant season more areas of the Seashore are open to ORV use, and while there would be no plants to be impacted, seeds of the plant could be either pulverized or buried by ORVs driving over them. Under the ESA these impacts would result in a finding of may affect/are likely to adversely affect seabeach amaranth 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 B would also likely cause adverse effects.

Comment [MSOffice24]: See comment above.

Impacts of Alternative C: Seasonal Management

Species Management Activities. Surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected ~~Surveying activities for seabeach amaranth~~ under alternative C ~~and the impacts of these activities~~ would be the same as under alternatives A and B, resulting in long-term, minor to moderate, beneficial impacts ~~that may affect/are not likely to adversely affect seabeach amaranth~~.

Management activities under alternative C would be the same as under alternative B, except for the following management changes that would provide additional protection of seabeach amaranth habitat.

Under alternative C, the NPS would identify suitable seabeach amaranth habitat at the spits and ~~points~~ Cape Point where plants have been observed in more than one (i.e., two or more) of the past five years prior to June 1 and would delineate these areas with symbolic fencing by June 1 if such areas are not already protected within existing shorebird resource closure(s). The SMAs for protected species would be re-evaluated and re-designated every five years, or after major hurricanes. Though no areas would currently be protected because there have not been plants observed in two or more of the past five-years, the establishment of these SMAs would protect any plants that do become established in the future and would provide long-term, moderate, beneficial impacts. These SMAs however, would not be year-round closures and would be reopened to ORV and pedestrian use (as long as there are no overlapping bird or turtle resource closures) by September 1 if no plants are present or if plants are present the ~~buffers~~ closures would remain until the plant dies.

Additionally, SMAs for shorebirds would be established and closed from March 15 to October 14. While there would currently be no seabeach amaranth SMAs established under alternative C, for reasons stated above, through the establishment of the shorebird SMAs and other year-round ORV closures, approximately 40.6 miles of beach would be closed seasonally to ORV. Closing this amount of beach to ORV use would minimize potential impacts to seabeach amaranth and its habitat and would result in long-term, moderate beneficial impacts. Bodie Island Spit, Cape Point, and ~~Ocracoke~~ South Point would be managed under ML2 procedures and have pedestrian access corridors, unless closed by shorebird breeding behavior buffers, which would result in some adverse impacts to seabeach amaranth as described in alternative A, reducing the overall benefits in these areas slightly. Overall, the extent of the benefits from SMAs would depend on the location and size of the closures, which would be re-evaluated and re-designed every five years or after major hurricanes, but would be more than alternatives A and B.

In addition to the public education about the plant as described under alternative A, additional information about the plant and the Seashores rules and regulations would be provided via the ORV permit that users would need to obtain. With the threat of permit revocation if a user violates the Seashore's regulations or terms of the permit, it is assumed that greater compliance with closures would occur, resulting in additional long-term, minor to moderate, beneficial impacts, with the extent of the impacts based on the ability to enforce the regulations and apprehend violators.

Overall, surveys conducted for seabeach amaranth plants and the protection measures implemented when plants are detected, as well as the establishment of SMAs, would result in long-term moderate beneficial impacts to seabeach amarnth.

~~Overall, because of the protection of seabeach amaranth habitat and plants under alternative C, surveying and management actions would have long-term, moderate beneficial impacts to seabeach amaranth as the establishment of SMAs and increased protection for the species would occur compared to alternatives A and B.~~

Recreation and Other Activities. Under alternative C, the impacts from ORV use and other activities would be less than under alternative B due to the seasonal restrictions on ORV use at most locations where seabeach amaranth has historically been found. In addition, six new beach access ramps would be constructed. This would eliminate some potential seabeach amaranth habitat; however, the amount of habitat impacted is small when compared to the overall available habitat in the Seashore. Therefore, the new ramps would have long-term, negligible to minor, adverse impacts, and overall, ORV use and recreational activities would result in long-term, minor to moderate, adverse impacts. Because of the establishment of SMAs and protection of approximately 40.6 miles of beach from March 15 to October 14, the adverse impacts under alternative C would likely be less than those under alternative B, but exactly how much less would be dependent on the size, location, and duration of the SMA closures.

Cumulative Impacts. Impacts to seabeach amaranth under alternative C would be the same as those described under alternative A. Although alternative C would provide some additional benefits to the plant, the adverse effects on seabeach amaranth from other actions occurring in North Carolina would still exist and would not be ~~significantly~~ greatly offset by the additional protection afforded under alternative C. Therefore, the effects of these other actions, added to the effects of actions under alternative C would result in long-term, minor to moderate, adverse impacts.

Conclusion. Overall surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected ~~surveying and management activities~~ would reduce potential impacts from ORV use and other activities (i.e., pedestrian use and pets) resulting in long-term, moderate, beneficial impacts. Because the amount of beach habitat seasonally protected from ORV ~~use~~ and other~~associated~~ recreational use~~activities~~ under alternative C, the chance of plants being run over/trampled and seeds being pulverized or buried to a depth where they cannot germinate would be reduced. Alternative C would have long-term, minor to moderate adverse impacts.

Past, present, and future activities both inside the Seashore and within the plant's historical range in North Carolina, when combined with the impacts of ORVs, other recreational -use and resources management activities for this species, ~~as well as surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected~~ would result ~~in North Carolina, when combined with the impacts of ORV use, surveying and management of the species expected under this alternative would continue to result~~ in ~~impacts that would have~~ long-term, minor to moderate, ~~adverse~~ adverse cumulative impacts.

There would be no impairment of seabeach amaranth under alternative C because implementing the protection measures under this alternative would likely afford a reasonable opportunity for at least a minimal amount of successful germination to occur at the Seashore and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative C, resource management activities would result in long-term moderate benefits to seabeach amaranth if ~~plants are found~~plants are detected ~~in~~ on the Seashore. Benefits would be due to the protection provided by ~~erecting~~ installing ~~buffers~~ closures around plants that are ~~found~~detected, surveying for plants in August when they are visible, ~~erecting~~ installing pre-nesting and other closures for nesting bird species that overlap~~s~~ seabeach amaranth habitat, and surveying bird and turtle closures for plants prior to reopening these closures to ORVs and other recreational uses. Additional protection would be provided by identifying suitable seabeach amaranth habitat at the spits and points where plants have been observed in more than one of the past five years prior to June 1 and protecting these areas (i.e. establish a seabeach amaranth SMA). The establishment of shorebird SMAs and other year-round ORV closures would close approximately 40.6 miles of Seashore beach to ORV use from March 15 to October 14 minimizing potential impacts to seabeach amaranth and its habitat in these areas.

ORVs and other recreational uses would have long-term minor to moderate adverse impacts on seabeach amaranth as plants may go undetected and therefore unprotected from recreational use of the Seashore. Seasonal restrictions on ORV use at most locations where seabeach amaranth has historically been found, due to seabeach amaranth and shorebird SMAs, would help protect the species from impacts in those areas during the plant's growing season. Constructing six new beach access ramps would eliminate some potential habitat for the species. During seabeach amaranth's dormant season more areas of the Seashore are open to ORV use, and while there would be no plants to be impacted, seeds of the plant could be either pulverized or buried by ORVs driving over them. Under the ESA these impacts would result in a finding of may affect/are likely to adversely affect seabeach amaranth 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 C would also likely cause adverse effects.

Impacts of Alternative D: Increased Predictability and Simplified Management

Species Management Activities. Surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected ~~Surveying activities for seabeach amaranth~~ under alternative D ~~and the impacts of these activities~~ would be the ~~same~~ similar to ~~as under~~ alternative A, B and C, but establishment of year-round SMAs would provide additional benefits as more areas would be closed to ORVs year-round and the chance of finding plants would be greater. These additional protections would result in~~resulting in~~ long-term, moderate to major, beneficial impacts.

Management activities under alternative D would be the same as under alternative C, except for the following management changes that would provide additional protection of seabeach amaranth habitat.

Under alternative D approximately 40.8 miles of beach would be protected by SMAs or other ORV closures, and these closures would be year-round closures. Therefore, this habitat would be protected from potential adverse ORV impacts. Although some habitat may eventually move through some succession stages making it unsuitable for seabeach amaranth, given the dynamic nature of the seashore those areas would likely be small in area compared to the overall habitat being protected. Therefore, these year-round closures would result in long-term, moderate to major, beneficial impacts, with the extent of the benefits dependent on the location and size of the closures.

Overall, because of the increased level of protection of seabeach amaranth habitat and plants under alternative D, when compared to other alternatives, species management actions would have long-term, moderate to major beneficial impacts.

ORV and Other Recreational Use. Under alternative D, the impacts from ORV use and other activities would be less than under alternative C since ORV use would be prohibited year-round in most areas where seabeach amaranth has historically been found. In addition, four new beach access ramps would be constructed and would eliminate some potential seabeach amaranth habitat; however, the amount of habitat impacted is small when compared to the overall available habitat in the Seashore. Therefore, the new ramps would have long-term, negligible to minor adverse impacts and overall ORV use and recreation would result in long-term, minor, adverse impacts. Because the establishment of year-round SMAs would protect approximately 40.8 miles of beach, the adverse impacts under alternative D would be greatly reduced compared to the other alternatives and would be long-term, minor~~———~~, and adverse.~~-~~

Comment [MSOffice25]: There should be a statement about the level of impacts based in the threshold definitions.

Cumulative Impacts. Impacts to seabeach amaranth under alternative D would be the same as those described under alternative A. Although alternative D provides significant protection of seabeach amaranth plants and habitat, the adverse effects on seabeach amaranth from other actions occurring in North Carolina would still exist. While they would be offset somewhat by the protection afforded the plant and its habitat under alternative D, the effects, when added to those under alternative D, would result in long-term, minor, adverse impacts.

Conclusion. Overall surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected ~~surveying and management activities~~ would reduce potential impacts from ORV and other recreational use, ~~and other activities (i.e., pedestrian use and pets)~~ resulting in long-term, moderate to major beneficial impacts. Because of the amount of beach habitat protected from ORVs year-round under alternative D, the chances are greatly reduced that ORV and other recreational activities could result in plants being run over/trampled and seeds being pulverized or buried to a depth where they cannot germinate. Alternative D would have long-term, minor, adverse impacts.

Past, present, and future activities both inside the Seashore and within the plant's historical range in North Carolina, when combined with the impacts of ORVs, other recreational use and resources management activities for this species, ~~use, as well as surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected would result in North Carolina, when combined with the impacts of ORV use, surveying and management of the species expected under this alternative~~ would ~~continue to~~ result in ~~impacts that would have~~ long-term, minor, adverse cumulative impacts.

There would be no impairment of seabeach amaranth under alternative D because implementing the protection measures under this alternative would likely afford a reasonable opportunity for at least a minimal amount of successful germination to occur at the Seashore and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative D, resource management activities would result in long-term moderate benefits to seabeach amaranth if ~~plants are found~~plants are detected in the Seashore. Benefits would be due to the protection provided by ~~erecting~~ installing closures~~buffers~~ around plants that are ~~found~~detected, surveying for plants in August when they are visible, ~~erecting~~ installing pre-nesting and other closures for nesting bird species that overlap~~s~~ seabeach amaranth habitat, and surveying bird and turtle closures for plants prior to reopening these closures to ORV and other recreational use. Additional protection would be provided by identifying suitable seabeach amaranth habitat at the spits and ~~points~~ Cape Point where plants have been observed in more than one of the past five years prior to June 1 and protecting these areas (i.e. establish a seabeach amaranth SMA). SMAs, both seabeach amaranth and shorebird, would be year-round closures. Combined with other year-round ORV closures, these areas

would protect approximately 40.8 miles of Seashore beach virtually eliminating potential impacts to seabeach amaranth and its habitat in these areas.

ORVs and other recreational use would have long-term minor adverse impacts on seabeach amaranth due to reduced recreational access throughout the Seashore. Year-round restrictions on ORV use at most locations where seabeach amaranth has historically been found, due to seabeach amaranth and shorebird SMAs, would help protect the species from impacts in those areas. Constructing four new beach access ramps would eliminate some potential habitat for the species. During seabeach amaranth's dormant season some areas of the Seashore remain open to ORV use, and while there would be no plants to be impacted, seeds of the plant could be either pulverized or buried by ORVs driving over them. Under the ESA these impacts would result in a finding of may affect/are likely to adversely affect seabeach amaranth 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 D would also likely cause adverse effects.

Impacts of Alternative E: Variable Access and Maximum Management

Species Management Activities. Surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected under alternative E would be the same as under alternative A, B, C, and D, resulting in long-term, minor to moderate, beneficial impacts.

Management activities under alternative E would be the same as under alternative C, except for the following management changes that would reduce the overall beneficial impacts slightly.

Under alternative E approximately 34.7 miles of beach would be protected by SMAs or other ORV closures during the breeding season. These areas would generally be closed to ORVs from March 15 to August 31, except Bodie Island Spit, Cape Point, and South Point, which would be managed under ML2 procedures and open year-round but limited to an access corridor with a pass-through zone March 15 to August 31. The access corridor may be closed depending on breeding shorebird buffers. These areas would reopen to ORV use only after the area had been thoroughly surveyed for seabeach amaranth plants in August, so any plants would not be impacted; however, suitable habitat that is reopened would be subject to impacts from ORVs and pedestrians as described under alternative A. The ORV pass-through access corridors would potentially allow some additional habitat to be impacted year-round, depending on shorebird breeding closures, but overall closures would provide long-term, moderate, beneficial impacts as a result of SMA closures to ORV use from March 15 to August 31.

Overall, because of the protection provided to seabeach amaranth habitat and individual plants, under alternative E, would have long-term, minor to moderate, beneficial impacts, although more areas would be managed under ML2 procedures and more recreational access would be allowed during the breeding season than under actions alternatives C and D.

ORV and Other Recreational Use. Under alternative E, the impacts from ORV use and other activities would be the similar to those under alternative C with the following exceptions. Under alternative E, in all locations open to ORV use that are not in front of villages, a 32.8-foot (10-meter) wide ORV-free zone would be created in the ocean backshore wherever there is sufficient beach width to allow an ORV corridor of at least 98.4 feet (30 meters) above the mean high tide line. This ORV-free corridor would protect some of the beach from ORV use and reduce impacts on seabeach amaranth plants and habitat. However, the area would be fairly narrow and it is unknown if the areas to be protected are more suitable for seabeach amaranth than the unprotected areas. Therefore, the impacts would be long-term, minor to

moderate, and beneficial. The ORV pass-through access corridors in areas under ML2 management would allow some ORV impacts to seabeach amaranth habitat in those areas, depending on shorebird breeding closures, and would have long term, minor to moderate, adverse impacts. In addition, seven new beach access ramps would be constructed throughout the Seashore. This would eliminate some potential seabeach amaranth habitat; however, the amount of habitat impacted is small when compared to the overall available habitat ~~in~~ on the Seashore. Therefore, the new ramps would have long-term, negligible to minor, adverse impacts and overall, ORV use and recreation activities would have long-term, minor to moderate, adverse impacts to seabeach amaranth due to the increased level of recreational access allowed when compared to the other action alternatives.

Cumulative Impacts. Impacts to seabeach amaranth under alternative E would be the same as those described under alternative A. Although alternative E would provide some additional benefits to the plant, the adverse effects on seabeach amaranth from other actions occurring in North Carolina would still exist and would not be ~~significantly~~ greatly offset by the additional protection afforded under alternative E. Therefore, the effects of these other actions, added to the effects of actions under alternative E would result in long-term, minor to moderate, adverse impacts that may affect/are likely to adversely affect seabeach amaranth in the Seashore and throughout the plant's habitat range in North Carolina.

Conclusion. Overall surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected~~surveying and management activities~~ would reduce potential impacts from ORV use and other activities (i.e., pedestrian use and pets) resulting in long-term, minor to moderate, beneficial impacts. Because ORV use and other recreational activities would be restricted in areas of known seabeach amaranth habitat, the chances would be reduced that plants could be run over/trampled and seeds being pulverized or buried to a depth where they cannot germinate. Alternative E would have long-term, minor to moderate adverse impacts.

Past, present, and future activities both ~~inside~~ on the Seashore and within the plant's historical range in North Carolina, when combined with the impacts of ORVs, other recreational use and resources management activities for this species, ~~use, as well as surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected~~ would result in~~North Carolina, when combined with the impacts of ORV use, surveying and management of the species expected under this alternative would continue to result in impacts that would have~~ long-term, minor to moderate, cumulative adverse impacts.

There would be no impairment of seabeach amaranth under alternative E because implementing the protection measures under this alternative would likely afford a reasonable opportunity for at least a minimal amount of successful germination to occur at the Seashore and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative E, resource management activities would result in long-term minor to moderate benefits to seabeach amaranth if plants are ~~found in~~detected on the Seashore. Benefits would be due to the protection provided by ~~erecting buffers~~installing closures around plants that are ~~found~~detected, surveying for plants in August when they are visible, ~~erecting~~ installing pre-nesting and other closures for nesting bird species that overlap~~s~~ seabeach amaranth habitat, and surveying bird and turtle closures for plants prior to reopening these closures to ORV and other recreational use. Approximately 34.7~~40.6~~ miles of beach would be protected by SMAs or other ORV closures from March 15 to August 31. Bodie Island Spit, Cape Point, and ~~Ocracoke~~ South Point would be under ML2 procedures and potentially ~~and~~ open year-round but limited to a corridor with a pass-through zone March 15 to August 31. These closures would protect seabeach amaranth and its habitat during these timeframes, but would allow ORV impacts to occur during the dormant season when these areas are reopened.

ORV and other recreational use would have long-term minor to moderate adverse impacts on seabeach amaranth as plants may go undetected and therefore unprotected from recreation use of the Seashore. Seasonal restrictions on ORV use at most locations where seabeach amaranth has historically been found, due to seabeach amaranth and shorebird SMAs, would help protect the species from impacts in those areas. Some additional seabeach amaranth habitat would be protected, for in all areas open to ORV use that are not in front of villages, a 32.8-foot-wide (10-meter-wide) ORV-free zone would be created in the ocean backshore wherever there is sufficient beach width to allow an ORV corridor of at least 98.4 feet (30 meters) above the mean high tide line. Constructing ~~eight~~ seven new beach access ramps c~~w~~ould eliminate some potential habitat for the species. During seabeach amaranth's dormant season more areas of the Seashore are open to ORV use, and while there would be no plants to be impacted, seeds of the plant could be either pulverized or buried by ORVs driving over them. Under the ESA these impacts would result in a finding of may affect/are likely to adversely affect seabeach amaranth 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 E would also likely cause adverse effects.

Comment [mbm 26]: The parking lots generally would not be in primary SBA habitat. MBM

Impacts of Alternative F: Management Based on Advisory Committee Input

Species Management Activities. Surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected ~~Surveying activities for seabeach amaranth~~ under alternative F ~~and the impacts of these activities~~ would be the same as under alternative A, B, C, D, and E, resulting in long-term, minor-to moderate, beneficial impacts.

~~Management activities~~Protection measures under alternative F would be the same as under alternative E, except for the following management changes.

Under alternative ~~E~~ F approximately ~~41.83~~94.7 miles of beach would be protected by SMAs or other ORV closures. In general, these areas would be closed from March 15 to July 31 or ~~when fledging ends~~later if chicks still have not fledged. Bodie Island ~~s~~Sp~~P~~it ~~and Ocracoke South Point~~ would be managed under ML2 procedures and have a pedestrian access corridor while Cape Point and South Point ~~Ocracoke~~, also managed under ML2 procedures, would have an ORV access corridor that may be closed depending on breeding shorebird buffers. Though these SMAs ~~would~~ could potentially reopen to ORV use prior to the annual August survey for seabeach amaranth, they would be surveyed for seabeach amaranth prior to reopening them and any plants found would be protected with 30-foot (9.1-meter) by 30-foot (9.1-meter) ~~buffers~~closures, so any plants would not be impacted. Also, at the spits and Cape Point the interior habitat would revert to a wintering closure for piping plovers and would provide protection to any plants that may occur away from the immediate ocean shoreline and closer to the dunes or interior habitat. However, habitat in other areas that is reopened and suitable for seabeach amaranth would be subject to impacts from ORVs and pedestrians as described under alternative A. The pedestrian corridors and the ORV pass-through corridor would also potentially allow some additional habitat to be impacted year-round, depending on shorebird breeding closures. Therefore, these closures would provide long-term, moderate beneficial impacts.

Overall, because of the protection ~~of~~ provided to seabeach amaranth habitat and individual plants, alternative F ~~under alternative F, surveying and management actions~~ would have long-term, minor to moderate, beneficial impacts.

ORV and Other Recreational Use. Under alternative F, the impacts from ORV use and other activities would be the similar to those under alternative E. In addition, eight new beach access ramps would be constructed. This would eliminate some potential seabeach amaranth habitat; however, the amount of habitat impacted is small when compared to the overall available habitat o~~i~~n the Seashore. Therefore, the

new ramps would have long-term, negligible to minor, adverse impacts and overall, ORV use and recreation activities would have long-term, minor to moderate, adverse impacts.

Cumulative Impacts. Impacts to seabeach amaranth under alternative F would be the same as those described under alternative A. Although alternative F would provide some additional benefits to the plant, the adverse effects on seabeach amaranth from other actions occurring in North Carolina would still exist and would not be ~~significantly~~ greatly offset by the additional protection afforded under alternative F. Therefore, the effects of these other actions, added to the effects of actions under alternative F would result in long-term, minor to moderate, adverse cumulative impacts ~~that may affect/are likely to adversely affect seabeach amaranth in the Seashore and throughout the plant's habitat range in North Carolina~~.

Conclusion. Overall, surveying and management activities would reduce potential impacts from ORV ~~use~~ and other recreational use~~activities (i.e., pedestrian use and pets),~~ resulting in long-term, minor to moderate, beneficial impacts. Because ORV use and other recreation activities could result in plants being run over/trampled and seeds being pulverized or buried to a depth where they cannot germinate, alternative F would have long-term, minor to moderate adverse impacts.

Past, present, and future activities both ~~inside~~ on the Seashore and within the plant's historical range in North Carolina, when combined with the impacts of ORVs, other recreational use and resources management activities for this species, ~~use, as well as s, surveys conducted for seabeach amaranth plants and protection measures implemented when plants are detected urveying and management of the species expected under this alternative~~ would ~~continue to~~ result in ~~impacts that would have~~ long-term, minor to moderate, adverse cumulative impacts.

There would be no impairment of seabeach amaranth under alternative F because implementing the protection measures under this alternative would likely afford a reasonable opportunity for at least a minimal amount of successful germination to occur at the Seashore and would not jeopardize the continued existence of the species within the Seashore.

Determination of Effect. Under alternative F, resource management activities would result in long-term minor to moderate benefits to seabeach amaranth if ~~plants are found~~plants are detected in the Seashore. Benefits would be due to the protection provided by ~~erecting~~ installing ~~buffers~~ closures around plants that are ~~found~~detected, surveying for plants in August when they are visible, ~~erecting~~ installing pre-nesting and other closures for nesting bird species that overlap~~s~~ seabeach amaranth habitat, and surveying bird and turtle closures for plants prior to reopening these closures to ORV and other recreation use. Approximately ~~41.8~~39 miles of beach would be protected by SMAs or other ORV closures from March 15 to July 31. Bodie Island Spit and ~~Ocracoke~~ South Point would be managed under ML2 procedures and would have an ORV pass-through corridor that may be closed depending on breeding shorebird buffers. These closures would protect seabeach amaranth and its habitat during these timeframes, but would allow ORV impacts to occur during the seasons when these areas are reopened.

ORV~~s~~ and other ~~recreation~~ recreational use would have long-term minor to moderate adverse impacts on seabeach amaranth as plants may go undetected and would therefore be unprotected from recreation use of the Seashore. Seasonal restrictions on ORV use at ~~most locations where seabeach amaranth has historically been found, due to~~ seabeach amaranth and shorebird SMAs~~,~~ would help protect the species from impacts in those areas. Some additional seabeach amaranth habitat would be protected, for in all areas open to ORV use that are not in front of villages, a 32.8-foot-wide (10-meter-wide) ORV-free zone would be created in the ocean backshore wherever there is sufficient beach width to allow an ORV corridor of at least 98.4 feet (30 meters) above the mean high tide line. Constructing eight new beach access ramps would eliminate some potential habitat for the species. During seabeach amaranth's dormant season more areas of the Seashore are open to ORV use, and while there would be no plants to

be impacted, seeds of the plant could be either pulverized or buried by ORVs driving over them. Under the ESA these impacts would result in a finding of may affect/~~are~~ likely to adversely affect for seabeach amaranth 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 ~~E~~ F would also likely cause adverse effects.

TABLE 47. SUMMARY OF IMPACTS TO SEABEACH AMARANTH UNDER THE ALTERNATIVES

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Species Management Activities					
Overall, because of the protection of seabeach amaranth habitat and plants under alternative A, surveying and management actions would have long-term, minor to moderate, beneficial impacts, if plants are ~~found~~detected.	Overall, because of the protection of seabeach amaranth habitat and plants under alternative B, surveying and management actions would have long-term, minor to moderate, beneficial impacts, if plants are detected. ~~Overall, because of the protection of seabeach amaranth habitat and plants under alternative B, surveying and management actions would have long-term, minor to moderate beneficial impacts as plants would be difficult to detect under this management, but would be provided protection once found~~detected~~.~~	Overall, because of the protection of seabeach amaranth habitat and plants under alternative C, surveying and management actions would have long-term, moderate beneficial impacts to seabeach amaranth as the establishment of SMAs and increased protection for the species would occur compared to alternatives A and B.	Overall, because of the increased level of protection of seabeach amaranth habitat and plants under alternative D, when compared to other alternatives, species management actions would have long-term, moderate to major beneficial impacts.	Overall, because of the protection of seabeach amaranth habitat and plants under alternative E, surveying and management actions would have long-term, minor to moderate, beneficial impacts as ORV access to more areas would be allowed during the germination period, than under action alternatives C and D. ~~more areas would be under ML2 procedures and more access allowed.~~	Overall, because of the protection of seabeach amaranth habitat and plants under alternative F, surveying and management actions would have long-term, minor to moderate, beneficial impacts as ORV access to more areas would be allowed during the germination period, than under action alternatives C and D. ~~Overall, because of the protection of seabeach amaranth habitat and plants under alternative F, surveying and management actions would have long-term, minor to moderate, beneficial impacts.~~
ORV And Other Recreational Use					
Overall, ORV and other recreation use under alternative A would have long-term, moderate, adverse impacts as plants may go undetected, and therefore unprotected from this use.	Overall, ORV use and other recreation activities would result in long-term, ~~minor to~~ moderate, adverse impacts, ~~though~~has slightly more protection would be provided for the species when compared to alternative A.	Overall, ORV use and recreation activities would result in long-term, minor to moderate, adverse impacts. Because of the establishment of SMAs and protection of approximately 40.6 miles of beach, the adverse impacts under alternative C would likely be long-term, minor to moderate adverse.	Overall ORV use and recreation would result in long-term, minor, adverse impacts. Because the establishment of ~~year-round~~ SMAs closed to ORVs year-round would protect approximately 40.8 miles of beach, the adverse impacts under alternative D would be greatly reduced compared to the other alternatives and result in long-term, minor——, adverse impacts.	Overall, ORV use and recreation activities would have long-term, minor to moderate, adverse impacts to seabeach amaranth due to the increased level of recreational access allowed when compared to the other action alternatives.	Overall, ORV use and recreation activities would be similar to those under alternative E and have long-term, minor to moderate, adverse impacts.

WILDLIFE AND WILDLIFE HABITAT

(This section deleted in "Part II2 Revised" document to avoid confusion, since my comments on this section were already included in the "Part I1" document. mbm)

~~GUIDING REGULATIONS AND POLICIES~~

~~The Seashore's Resource Management Plan (NPS 1997a) identifies the following natural resource-related goals to provide direction for future management of the Seashore.~~

- ~~identify visitor uses and impacts to establish appropriate management policies that would meet management policies that would meet the needs of the park visitor while providing for the while providing for the preservation and protection of the resources unimpaired for future resources unimpaired for future generations;~~

- ~~continue to provide rigorous enforcement, research, environmental surveying, and applied resource management in accordance with available funding and direction; and~~

- ~~continue to closely monitor and regulate recreational use in accordance with environmental, ecological, and preservation considerations.~~

~~Service-wide NPS regulations and policies, including the NPS Organic Act of 1916, NPS *Management Polices 2006* (NPS 2006c), and the NPS Natural Resource Management Reference Manual #77, also direct national parks to provide for the protection of park resources. The Organic Act directs national parks to conserve wildlife unimpaired for future generations and is interpreted to mean that native animal life is to be protected and perpetuated as part of a park unit's natural ecosystem. Parks rely on natural processes to control populations of native species to the greatest extent possible; otherwise, they are protected from harvest, harassment, or harm by human activities.~~

~~The NPS *Management Policies 2006* state that the NPS "will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems. The term "plants and animals" refers to all five of the commonly recognized kingdoms of living things and includes such groups as flowering plants, ferns, mosses, lichens, algae, fungi, bacteria, mammals, birds, reptiles, amphibians, fishes, insects, worms, crustaceans, and microscopic plants or animals." The NPS will achieve this by:~~

- ~~"preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the and animal populations and the communities and ecosystems in which they occur;~~

  ~~which they occur;~~
- ~~restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions; and~~

- ~~minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them" (NPS 2006c).~~

~~Section 4.1 of NPS *Management Policies 2006* states that "natural resources will be managed to preserve fundamental physical and biological processes, as well as individual species, features, and plant and~~

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animal communities. The Service will not attempt to solely preserve individual species (except threatened or endangered species) or individual natural processes; rather, it will try to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems" (NPS 2006c). According to Section 8.2.2.1 of the NPS *Management Policies 2006*, "Superintendents will develop and implement visitor use management plans and take action, as appropriate, to ensure that recreational uses and activities in the park are consistent with its authorizing legislation or proclamation and do not cause unacceptable impacts on park resources or values" (NPS 2006c).

Seashore wildlife have evolved in a barrier island ecosystem, which is dependent on the continuation of natural shoreline processes. Barrier islands are highly dynamic with changes in sea level, wave and wind action, and ocean currents continuously creating and altering habitat for wildlife through the processes of erosion and accretion of shorelines and sand dunes; overwash across the islands; and the formation, migration, and closure of inlets. To protect coastal barrier processes, the NPS *Management Policies 2006* direct that natural shoreline processes such as erosion, deposition, dune formation, overwash, inlet formation, and shoreline migration will be allowed to continue without interference (NPS 2006c, sec. 4.8.1.1). The policies further state, "[w]here human activities or structures have altered the nature or rate of natural shoreline processes, the Service will, in consultation with appropriate state and federal agencies, investigate alternatives for mitigating the effects of such activities or structures and for restoring natural conditions."

ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS

The following describes the methodology used to evaluate the impacts of the proposed alternatives on general wildlife at the Seashore. This discussion focuses on those species that may potentially be impacted by the actions described in the proposed alternatives and is, therefore, directed toward specific wildlife, including invertebrates and "other" bird species (those not state or federally protected or species of special concern). The analysis is organized according to those two wildlife types. Although a number of studies have investigated ORV impacts on invertebrates found on sandy beaches, the studies have focused on a relatively small number of species, and only a few of the studies have occurred on southeastern U.S. beaches that would have similar species to the beaches of Cape Hatteras National Seashore. There have also not been any comprehensive studies within the Seashore to determine the species composition and abundance of invertebrates within the bird foraging habitat. As a result, sufficient information is not available to provide a site-specific assessment of impacts of ORVs on all of the invertebrate species inhabiting the wrack, intertidal sand flats, island spits, and the high energy intertidal zone at the Seashore. Therefore, impacts to invertebrates are discussed in general terms, based on existing studies and, where possible, impacts on species specific to the Seashore are discussed.

Potential impacts on other bird species and their associated habitat focused on shorebirds that would likely be using the same habitats as the protected species addressed in this plan/EIS. Information about habitat and other existing data were acquired from staff at the Seashore, the USFWS, and available literature (see appendix B, Literature Review). A comprehensive list of other bird species can be found in "Chapter 3: Affected Environment."

For each alternative, potential impacts on wildlife and wildlife habitat were evaluated based on the pattern of proposed ORV use at the Seashore, resulting from what areas are open ORV and other recreational uses and for what duration, the nature of habitats and species present, and the nature of coastal barrier processes that create and alter habitat. Primary steps in assessing impacts on wildlife and wildlife habitat were to determine (1) the potential for species to occur in habitats likely to be affected by management actions described in the alternatives; (2) current and future use and distribution of ORVs by alternative; (3) habitat impact or alteration caused by the alternatives; and (4) disturbance potential of the action and

the potential to directly or indirectly affect wildlife or wildlife habitat as a result of ORV activities. The information contained in this analysis was obtained through best professional judgment of the Seashore staff and experts in the field, and by reviewing applicable scientific literature.

A summary of impacts to wildlife and wildlife habitat under all alternatives is provided in table 49 at the end of this section. The following thresholds for evaluating impacts to wildlife and wildlife habitat were defined.

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

Minor Adverse: Impacts on native 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 protected species, but would not result in injury or mortality. Sufficient habitat in the park would remain functional to maintain a sustainable population in the Seashore.

Moderate Adverse: Impacts on native 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 park and result in harassment, injury, or mortality to one or more individuals. However, sufficient population numbers and habitat in the park would remain functional to maintain a sustainable population in the Seashore.

Major Adverse: Impacts on native 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 park 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 park 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 bird species and one to two years for all other native species.

Long-term would be anything beyond two breeding seasons for bird species or two years for all other native species.

Study Area

The study area for assessment of the various alternatives is the Seashore boundary. The study area for the cumulative impacts analysis is the Seashore plus the adjacent lands outside of the Seashore boundaries on Bodie, Hatteras, and Ocracoke islands.

Impacts Common to All Alternatives

Impacts to Invertebrates – Resource Management Activities. Under all alternatives, species surveying and management would occur for piping plover, sea turtles, and seabeach amaranth. These surveying activities may vary in duration between alternatives, but the use of ATVs/UTVs and, in some cases, ORVs to conduct certain surveying and management activities is a constant among alternatives.

Management activities that would have the greatest potential to impact invertebrates include the use of vehicles for surveying and management because of the potential for mortality of individual invertebrates caused by compaction under vehicle tires. Seashore staff would continue to use ATVs/UTVs and occasionally ORVs to conduct bird and turtle surveys and also to establish resource closures as required based on species behavior under all alternatives. Staff would avoid driving across the wrack line, an area known to contain high number of invertebrates, and would only drive during nighttime hours when patrolling for law enforcement reasons, which would limit impacts to invertebrates in this area. Driving in the wrack line would be limited because studies have shown that areas closed to ORV use have higher densities of invertebrates in these areas (Landry 2004; Kluft and Ginsberg 2009; Moss and McPhee 2006). Due to the limited amount of vehicle use by staff and the fact that such use would occur predominantly during the day, impacts to beach invertebrates from resource management activities would be long-term, negligible, and adverse across all alternatives.

Impacts to Other Bird Species – Resource Management Activities. Under all alternatives Seashore staff would perform surveys of recent breeding areas for protected species and would also continue to monitor breeding, nesting, and fledging activities throughout the breeding season. Although the time and duration of these surveys may vary between alternatives, common to all alternatives is that surveying and monitoring activities would bring staff and/or vehicles into contact with other bird species, increasing the potential for disturbance. However, the majority of these other bird species are not at the Seashore during their breeding cycle, which would reduce the impacts of disturbance from resources management staff under all alternatives. Because resource protection staff would also take proper measures to minimize any disturbance to these species, surveying activities associated with all alternatives would only result in negligible adverse effects on other bird species.

Also common to all alternatives is the provision of pre-nesting habitat closures for protected species, species closures for breeding activities, and closure of non-breeding wintering habitat. All alternatives include the establishment of pre-nesting closures for recent piping plover breeding areas, and nesting buffers and closures around established territories and nests of colonial waterbirds and American oystercatchers. The symbolic fencing would deter the entry of people, pets, and ORVs into these habitats. Although the size and location of these closures vary between the alternatives, these closures would be implemented under each alternative and would benefit birds other than the piping plover, American oystercatcher, and other protected species. Species that are not listed as state or federally protected or are not species of special concern would also benefit from the management measures for protected species under all of the alternatives. To the extent that these pre-nesting closures would be available for use by other bird species, they would provide a long-term beneficial impact to other bird species under all alternatives.

Further, the availability of wintering habitat can be an important determinant of individual performance of migratory birds under all alternatives. Restricted access to food-rich winter habitats may limit survival of females and immature males, an outcome that could be an important driver of population structure and dynamics (Studds and Marra 2005). All alternatives provide for non-breeding closures to all recreational uses, such as the interior habitats at spits and at Cape Point to provide for resting and foraging for all species. Such suitable habitats include ephemeral ponds and moist flats at Cape Point, Hatteras Inlet Spit, North and South Ocracoke, and Bodie Island Spit. These areas provide protection to other wintering/migrating species during the winter months and would have long-term beneficial impacts on non-breeding birds under all alternatives.

In summary, impacts from surveying and management activities under all alternatives would result in long-term beneficial impacts to other bird species due to the protection offered by the closures established for special status species.

Predation. An indirect impact from ORV and recreational use is the attraction of mammalian and bird predators to the waste stream associated with recreational use (USFWS 1996a). Although the Seashore would enforce proper trash disposal and anti-wildlife feeding regulations, recreational use would continue to have indirect impacts on other bird species through the attraction of predators. These predators are a well known factor in nest failure for piping plover and all ground nesting birds within the Seashore. However, because the majority of these other bird species do not breed at the Seashore, they are not subject to predation pressures during this life-cycle stage. However, under all alternatives, some adult migratory bird species could still be taken by predators, resulting in long-term, negligible to minor adverse impacts to other bird species at the Seashore.

Impacts of Alternative A: No Action – Continuation of Management under the Interim Protected Species Management Strategy

Under alternative A, there would be no construction activities implemented and therefore no construction related impacts would occur to wildlife or wildlife habitat. Activities that could potentially impact wildlife and wildlife habitat under alternative A would be associated with species surveying and management, the continued recreational use of ORVs, and pedestrian activity.

Impacts to Other Bird Species

ORV and Other Recreational Use. Alternative A would permit ORV access to all areas of the Seashore, 24 hours a day, except those areas that are closed for resource protection during breeding season, or those areas closed for administrative or safety purposes. An ORV corridor would be established as the area approximately 150 feet landward from the average, normal high tide line, or if less than 150 feet of space is available, at the vegetation or the toe of the remnant dune line. The ORV corridor would be no more than 100 feet wide in recent breeding areas, during the pre-nesting closure dates established for each protected species. Because this alternative would allow an unlimited number of vehicles and pedestrians to access most areas of the Seashore 24 hours a day, there is the potential for frequent disturbance to other bird species. Even though buffers would be established for protected species (which could be used by other bird species), it is likely that some birds could be disturbed by recreational or commercial fishing activities as vehicles disturbance can effect non-breeding birds (Tarr 2008). However, because the majority of other bird species have relatively stable population numbers and do not rely on the Seashore for breeding, impacts from recreational use and commercial vehicles would be long-term, minor, and adverse because impacts would be noticeable, but they would not be expected to be outside the range of natural variability.

In summary, impacts from ORV and other recreational use under alternative A would result in long term, negligible to minor, adverse impacts to other bird species due to disturbance from recreational use and the attraction of predators from human activities.

Impacts to Invertebrates

ORV and Other Recreational Use. Under alternative A, ORV routes would include the entire ocean beach and would include the wrack line, intertidal zone, or sand flats that would be open to ORV use unless closed by protected species closures. While the typical ORV use pattern within the Seashore is to drive on the upper beach, above the high tide line (Hardgrove 2005), when recreational vehicles reach their destination they may drive into the intertidal zone and park. Access to commercial fishing grounds also involves operating vehicles in the intertidal zone to reach desired fishing destinations. Driving on the sands of the intertidal zone would likely have adverse impacts on invertebrates due to mortality of individual species caused by compaction under vehicle tires. Access to the intertidal zone often requires vehicles to cross over the wrack line, which is normally deposited within the ORV corridor and is usually an area of high concentrations of invertebrates. Driving over the wrack line would cause damage and dispersal to an important source of food and habitat for many beach invertebrates (Kluft and Ginsberg 2009; Stephenson 1999).

Impacts of night driving on ghost crab populations at the Seashore are also a concern under alternative A. Though the extent of the ghost crab populations within the Seashore has not been documented, Wolcott and Wolcott (1984) concluded that even 20–50 vehicles driving at night could impact ghost crab populations, as demonstrated in their study at Cape Lookout National Seashore. As unlimited night driving would be allowed under alternative A, it can be expected that this level of traffic would have long-term minor to moderate adverse impacts on the ghost crab population.

In summary, the implementation of alternative A would result in long-term, minor to moderate, adverse impacts to invertebrate species primarily due to mortality arising from unlimited night driving in the intertidal and wrack areas.

Cumulative Impacts. Other past, present, and future planned actions within and the Seashore have the potential to impact invertebrates and other bird species. The dredging of the federally authorized navigation channel at Oregon Inlet has occurred in the past and would continue to occur on an annual basis in the future. While the actual dredging would impact benthic invertebrates within the channel, it would not directly impact invertebrates within the sandy beach habitat of the Seashore. However, during the dredging operations some heavy construction equipment may be used at the deposition site, which is typically Pea Island (Corps 2003; NPS 2007e, 2003e). Depending on the size and weight of the equipment and the timing and duration of the operations, there could be a short-term, moderate, adverse impact on some of the invertebrate species on Pea Island beaches due to crushing and compaction of the sand. However, given the total available spit habitat within the Seashore, the overall impact to the Seashore would be short term, minor to moderate, and adverse. The type and placement location of the dredged material, as well as the timing and frequency of placement, may also have adverse impacts on invertebrates in the study area. Deposition of dredged material has direct impacts to invertebrates in the area where the material is deposited, due to crushing under the weight of the material, changes in the sediment characteristics of the beach, and increases in turbidity. While populations of most beach invertebrates can recover fairly quickly from a single beach disposal event, annual sand placements could keep beach fauna in a long-term state of disturbance at reduced levels. Because the Pea Island population of ghost crabs is particularly sensitive to deposition of sand/dredge material, they would be adversely impacted within the beach disposal area (USFWS 2001). The effects of deposition of dredged materials would result in long term, moderate, adverse impacts on invertebrates. Dredging and deposition of material should not result in any measurable impacts to other bird species because there would be

sufficient area outside the area of deposition for other bird species to use for resting and foraging. The replacement of the Herbert C. Bonner Bridge is likely to adversely affect invertebrates due to bridge piling placement, dredging, and deposition of dredged materials, which would result in similar impacts as the annual Oregon Inlet dredging, although bridge construction would be a one-time event with only short-term effects on invertebrates. The new bridge could disturb or displace some other bird species, but could also provide some benefits by allowing barrier island processes to occur more naturally than the existing bridge and provide for new habitat opportunities. To the extent that the new bridge would allow the natural formation of new habitats, such as overwash fans, new inlets, and low sloping beaches, it might provide additional suitable habitat for other bird species. In addition, the Final EIS for the project lays out a plan for avoidance, minimization, and compensatory mitigation to ensure impacts to wildlife and wildlife habitats, including invertebrate and other bird species habitats, are minimized (FHWA 2007). The final bridge alignment could result in the closure of ramp 4 and the construction of a new ramp 3 and associated parking north of Oregon Inlet Campground. The new ramp and parking area would be constructed in proximity to NC 12, but could result in the displacement of some bird species due to loss of habitat in the area of disturbance. However, due to the relatively small size of the construction area, sufficient habitat would remain to maintain a sustainable population in the Seashore and impacts to birds due to direct habitat loss would be long-term, negligible to minor, and adverse. Impacts to beach invertebrates would be long-term, negligible, and adverse due to the relatively small construction area, the mobility of invertebrates, and the distance of the facilities from the high energy shoreline where concentrations of invertebrates are higher.

Commercial fishing has been allowed within the Seashore in the past and would continue to be allowed under alternative A. Commercial fish harvests, if they continue at their current level, would have a long-term, negligible, adverse impact on other bird species because there would continue to be a sufficient supply of aquatic resources for the other bird species to prey upon. Potential impacts to invertebrates would be direct from vehicles driving on the wrack line, and are discussed above.

The implementation of the land use plans and zoning ordinances for Dare and Hyde counties that address how development can occur in the counties could result in additional residential development and an increase in the local population. This could result in adverse impacts on invertebrates and other bird species by increasing the amount of ORV traffic on the beaches, as well as decreasing the amount of habitat available to these species due to increased development pressures in the counties. However, that lack of detail on expected local development patterns makes is extremely difficult to estimate impacts on invertebrates and other bird species under alternative A.

The overall cumulative impact of these past, current, and future actions on invertebrates, would be long-term, negligible to moderate to , and adverse; and when combined with the long-term, minor to moderate, adverse impacts in alternative A, would be long-term, minor to moderate and adverse depending upon the individual species of invertebrate. The overall cumulative impact of these past, current, and future actions on other bird species would be long-term, negligible to to minor , and adverse, and , when combined with the long-term, minor, adverse impacts under alternative A, would result in long-term, minor, adverse impacts to other bird species in the area of analysis.

Conclusion. Under alternative A, ORV use would have negligible to moderate, adverse impacts on invertebrate and bird species within the Seashore due to habitat disturbance or direct mortality from vehicles either during species surveying and management, or from recreational use, and alternative A has no areas closed to ORV use except for resource-related closures. The establishment of pre-nesting closures, resource closures, and buffers would result in long-term, negligible, adverse impacts on invertebrates due to vehicle use by resources management staff, as well as impacts to bird species from disturbance during monitoring activities. These management activities would also have beneficial impacts through the protection they afford the other bird species that take advantage of the closures.

Cumulative impacts to invertebrates would be long-term, minor to moderate, and adverse, depending on the species of invertebrate and level of disturbance. Cumulative impacts to other bird species would be long term, minor, and adverse under alternative A.

Impairment to invertebrates and other bird species would not occur because populations of these wildlife communities would continue to exist at the Seashore.

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Impacts of Alternative B: No Action – Continuation of Management under Terms of the Consent Decree

Impacts to Other Bird Species

ORV and Other Recreational Use. Recreational use and other activities under alternative B would be similar to alternative A, except for restrictions on night driving and increased resource protection buffer distances. Alternative B would also involve the designation of an "ORV-free zone" in the ocean backshore (except in front of villages) when there is sufficient beach width to permit a 65.6-foot (20-meter) wide ORV corridor along the shoreline. Due to increased buffer distances and night driving restrictions required by the consent decree, adverse impacts to other bird species from recreational use would expected to be less than those under alternative A. As previously mentioned, the majority of other bird species have relatively stable population numbers and do not rely on the Seashore for breeding. Therefore, impacts to other bird species from ORV and other recreational use would be long-term, negligible to minor, adverse because any changes to these populations would likely be in the range of natural variability.

Impacts to Invertebrates

ORV and Other Recreational Use. Recreational use and other activities under alternative B would be similar to alternative A, except for restrictions on night driving and increased resource protection buffer distances. Alternative B would also involve the designation of an "ORV-free zone" in the ocean backshore (except in front of villages) when there is sufficient beach width to permit a 65.6-foot (20-meter) wide ORV corridor along the shoreline. Under alternative B, visitors would be allowed to operate ORVs in all areas of the Seashore, but driving between the hours of 10:00 p.m. and 6:00 a.m. would be prohibited from May 1 through September 15, and would require a permit from September 15 through November 15. However, commercial fishermen would be able to access the shoreline at 5:00 a.m. instead of 6:00 a.m., subject to certain restrictions per the June 2008 modification to the consent decree. As under alternative A, ORV use would be subject to temporary resource closures, seasonal ORV closures in front of the villages, and temporary ORV safety closures. Recreational ORV use would be expected to continue at levels similar to alternative A, but there would be substantially less night driving on an annual basis due to the restrictions. Because night driving would be limited, and night is the time when ghost crab are most active, alternative B would likely have long-term, minor, adverse impacts on the ghost crab population because the amount of time that ORVs spend in ghost crab habitat would be limited. However, in those areas that require ORVs to frequently drive through the wrack due to insufficient beach width and/or protected species closures, both during day and nighttime, impacts to invertebrates within or near the wrack would be long-term, minor and adverse due to direct impacts from invertebrates being crushed by vehicles. Due to the amount of areas that would be closed for protected species under alternative B, impacts to all invertebrate species would be lower under alternative B when compared to alternative A.

In summary, the implementation of alternative B would result in long-term, minor adverse impacts to invertebrate species resulting from the continued use of ORVs in invertebrate habitat.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative B would be identical to those under alternative A. These actions would have long-term negligible to moderate adverse impacts for invertebrate species. These impacts, as described under alternative A, when combined with the long-term, minor adverse impacts to invertebrates in alternative B, would be long-term, minor to moderate, adverse depending upon the individual species of invertebrate. The overall cumulative impact of these past, current and future actions on other bird species would be long-term negligible to minor. These impacts, when combined with the long-term, negligible to minor, adverse impacts under alternative B, would result in long-term, minor, adverse impacts to other bird species.

Conclusion. ORV use would have minor adverse impacts on invertebrate and bird species within the Seashore under alternative B due to habitat disturbance or direct mortality from vehicles, but would also have beneficial impacts from night driving restrictions. The establishment of pre-nesting closures, larger resource protection closures, and buffers provides a beneficial impact to invertebrates and other bird species but would result in negligible adverse impacts on invertebrates due to vehicle use by resources management staff.

Cumulative impacts to invertebrates would be long-term, minor to moderate, and adverse, depending on the species of invertebrate. Cumulative impacts to other bird species would be long-term, minor, and adverse under alternative B.

Impairment to invertebrates and other bird species would not occur because populations of these wildlife communities would continue to exist at the Seashore.

Impacts of Alternative C: Seasonal Management

Impacts to Other Bird Species

ORV and Other Recreational Use. Alternative C would involve closing the spits, points, and other SMAs to vehicular access for seven months out of the year, although pedestrian access to the most popular recreation areas would still be possible via an access corridor. Species buffers under this alternative would be similar to those under alternative B, although they would be larger in areas where ML1 measures would apply. Under alternative C, other bird species would benefit from the lack of vehicles and reduced pedestrian presence at the SMAs between March 14 and October 15. Because this alternative would require some level of resource education in order to receive an ORV permit, all species at the Seashore, including other bird species, would benefit from the increased level of resource stewardship that is associated with public awareness. Some additional recreational access would result from the establishment of the interdunal road between ramp 45 and ramp 49, but the roads would be closed during the pre-nesting period and provide additional habitat for non-listed species during that time. The interdunal road would provide access around Cape Point to new ramps 47 and 48, around sites typically used by other bird species at the Seashore. Use of the road should not result in measurable impacts to other bird species because they would either remain on the beach or within the forested wetlands in the interior of the island. An indirect impact from recreational use would be the attraction of mammalian and avian predators, as described under alternative A.

Closing approximately 29 miles of village beaches and SMAsbeach to ORV use for seven months out of the year would result in fewer disturbances to other bird species that use the SMAs for foraging and would also reduce the waste stream and the local abundance of predators. There would continue to be disturbance to other bird species from vehicles and pedestrians, but it would be less than under the no-action alternatives due to the increased buffer distances and seasonal closures of the SMAs under

alternative C. Therefore, impacts to other bird species from recreational activities under alternative C would be long-term, negligible, and adverse.

Construction Activities. Implementation of alternative C would involve the installation or replacement of six new ORV access ramps, construction of eight new or expanded parking lots, and the development of one new interdunal road from ramp 45 to ramp 49. Construction activities would result in the temporary displacement of some other bird species localized in the areas of proposed disturbance and would involve a loss of some marginal habitat near the parking areas. Impacts to other bird species would be short term, negligible to minor, and adverse because these short-term disturbance impacts and changes to these marginal areas of habitat would not be expected to be a factor in the continued existence of these species at the Seashore.

Impacts to Invertebrates

ORV and Other Recreational Use. Alternative C would involve the designation of some year-round ORV routes, as well as some routes and areas that would be open to ORV use from October 15 to March 14, primarily for resource protection reasons. Although the spits, points, and other SMAs would be closed to vehicular access for seven months out of the year, pedestrian access to the most popular recreation areas would still be possible via a pedestrian access corridor. ORV and pedestrian access would continue be subject to temporary resource closures and non-breeding habitat restrictions. Species buffers under this alternative would be similar to those under alternative B, although they would be larger in areas designated for ML1 measures. Alternative C would prohibit ORVs on the beaches between 7:00 p.m. to 7:00 a.m. from May 1 through November 15. This alternative would involve a permit system with an educational requirement and the possibility of revocation in the event of a violation.

Closing approximately 29 miles of beach to ORV use for seven months out of the year would result in fewer disturbances to beach invertebrates that inhabit the SMAs. Limiting vehicles to daytime use for 6.5 months of the year would reduce the potential for impacts to nocturnal invertebrates, such as the ghost crab, throughout the Seashore. However, vehicle use would still result in the loss of individual invertebrates, but would not be measurable and would be well within natural fluctuations as the area where driving would be permitted would be limited. Therefore, impacts to invertebrates from ORV and other recreational use under alternative C would be long-term, negligible to minor, and adverse.

Construction Activities. Implementation of alternative C would involve the construction (or replacement) of six ORV access ramps, nine new or expanded parking lots, and one new interdunal road which would extend from ramp 45 to ramp 49. Because the majority of invertebrate species identified inhabit the area between the dunes and the ocean, away from where construction would take place, proposed construction activities under this alternative would result in short-term, negligible adverse impacts to invertebrates due to temporary displacement during construction activities.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative C would be identical to those under alternative A. These cumulative actions would have long-term negligible to moderate adverse impacts to invertebrates. These impactsAlternative C would contribute short and long-term, negligible to minor, adverse impacts to invertebrate species and short- and long-term, negligible to minor, adverse impacts to other bird species. Species management measures would provide benefits to both invertebrates and other bird species as the implementation of these management measures would result in increased protection and decreased pedestrian and ORV impacts.

, wWhen combined with the long-term, negligible to minor, adverse impacts to invertebrates in alternative C, overall cumulative impacts would bewould have long-term, minor and adverse. The overall cumulative

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impact of these past, current, and future actions on other bird species would be long-term negligible to minor and, when combined with the short and long-term, negligible to minor, adverse impacts under alternative C, would result in long-term, negligible to minor, adverse impacts to other bird species in the area of analysis.

Conclusion. The implementation of alternative C would involve the establishment of "ORV-free" zones in SMAs from March through October. This, coupled with the prohibition of night driving for 6.5 months of the year, would provide wildlife with times and areas where pedestrian and ORV disturbance would be greatly reduced or eliminated. Unlike the no-action alternatives, alternative C would involve some construction activities in order to provide additional recreational access, while avoiding sensitive species areas. Impacts to invertebrates from species management and recreational activities under alternative C would be long-term, negligible to minor and adverse as there would still be recreational use in the wrack line area, but these species would benefit from nighttime and other closures. Proposed construction activities under this alternative would result in short-term, negligible, adverse impacts to invertebrates from disturbance during construction activities. Impacts to other bird species from recreational activities under alternative C would be long-term, negligible, and adverse as all recreational use at the Seashore would still provide some level of bird disturbance. Impacts from species surveying and management would be long-term and beneficial. Construction impacts to other bird species would be short- and long-term, negligible to minor, and adverse under alternative C.

Overall cumulative impacts to invertebrate species would be long-term, minor and adverse. Overall cumulative impacts to other bird species would be long-term, negligible to minor, adverse in the area of analysis.

Impairment to invertebrates and other bird species would not occur because populations of these wildlife communities would continue to exist at the Seashore, with long-term impacts being less than major.

Impacts of Alternative D: Increased Predictability and Simplified Management

Impacts to Other Bird Species

ORV and Other Recreational Use. Under alternative D, all areas that have historically supported sensitive species would be closed to ORV use year-round. Approximately 40 of the 68 miles of Seashore beaches would not be accessible for vehicular use. All ten11 of the SMAs would be managed using ML1 measures, which would involve larger, longer lasting species buffers with no pedestrian or ORV access corridors provided. ORV and pedestrian access would continue be subject to temporary resource closures in the 28 miles of beach outside of the SMAs, in addition restrictions in non-breeding habitat areas. Alternative D would prohibit ORVs on the beaches between 7:00 p.m. and 7:00 a.m. from May 1 through November 15. An indirect impact from recreational use would be the attraction of mammalian and avian predators, as described under alternative A.

Closing approximately 40 miles of beach to ORV use year roundfor seven months out of the year would result in fewer disturbances to other bird species that use the SMAs for foraging and a reduction in the waste stream and the local abundance of predators. There would continue to be disturbance to other bird species from vehicles and pedestrians, but there would be the lowest potential for disturbance under alternative D due to the increased buffer distances, limitation on the amount of beach available to ORVs and pedestrians, and provision of large, disturbance-free areas. Therefore, impacts to other bird species under alternative D should not be detectable and would therefore be long-term negligible and adverse.

Construction Activities. Alternative D would require the least amount of construction of the action alternatives. This alternative would involve the construction (or replacement) of four ORV access ramps

and one expanded parking lot. Construction activities would result in the temporary displacement of some other bird species localized in the areas of proposed disturbance and would involve a loss of a small amount of marginal habitat near the expanded parking lot at the Ocracoke Day Use Area. Construction impacts to other bird species would be short-term, negligible, and adverse because these changes would not results in impacts to other bird species populations.

Impacts to Invertebrates

ORV and Other Recreational Use. Under alternative D, all areas that have historically supported sensitive species would be closed to ORV use year-round. Approximately 40 of the 68 miles of Seashore beaches would not be accessible for vehicular use. All 1ten1 of the SMAs would be managed using ML1 measures during the breeding season, which would involve larger, longer lasting species buffers with no pedestrian or ORV access corridors provided. ORV and pedestrian access would continue be subject to temporary resource closures in the 28 miles of beach outside of the SMAs, in addition restrictions in non-breeding habitat areas. Alternative D would prohibit ORVs on the beaches between 7:00 p.m. and 7:00 a.m. from May 1 through November 15.

Closing approximately 40 miles of beach to ORV use year-round would result in fewer disturbances to beach invertebrates that inhabit those beaches. Limiting vehicles to daytime use for 6.5 months of the year in the areas where ORV use is permitted would reduce the potential for impacts to nocturnal invertebrates throughout the Seashore. Under alternative D, the potential for impacts to invertebrates would be the lowest among all the alternatives. However, ORV use would still result in the loss of individual invertebrates, but would not be measurable and would be well within natural fluctuations. Therefore, impacts to invertebrates from ORV and other recreational use under alternative D would be long-term, negligible, and adverse.

Construction Activities. As with alternative C, all construction under alternative D would occur outside areas of invertebrate habitat, and therefore this alternative would result in short term, negligible, adverse impacts to invertebrates due to temporary displacement during construction activities, but no long-term loss of invertebrate habitat would occur.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative D would be identical to those under alternative A. Alternative D would contribute short- and long-term, negligible, adverse impacts to invertebrate species and short-term, negligible, adverse impacts to other bird species. However, species management measures would provide benefits to both invertebrates and other bird species because the implementation of these management measures would result in increased protection and decreased pedestrian and ORV impacts.These actions would have long-term negligible to moderate adverse impacts on invertebrates which, when

When combined with the impacts of alternative D, overall cumulative impacts would be have long-term, negligible to minor, adverse cumulative impacts depending upon the individual species of invertebrates. Cumulative actions would have long-term negligible to minor adverse impacts on bird species, which, When when combined with the overall long-term negligible impacts of implementing alternative D, the overall cumulative impact on other bird species would bewould have long-term, negligible, and adverse cumulative impacts.

Conclusion. The implementation of alternative D would involve the prohibition of ORVs on 40 of the approximately 68 miles of Seashore beaches, in addition to seasonal restrictions on night driving, and establishment of large protected species buffers. These measures would provide wildlife with times and areas where pedestrian and ORV disturbance would be greatly reduced or completely eliminated. Although alternative D would involve some construction activities, these activities would be limited to

the expansion of one parking area and the establishment of four new ramps all in areas that are not known to be important bird habitat. Impacts to invertebrates from species management and recreational activities under alternative D would be long-term, negligible, and adverse. Proposed construction activities under this alternative would result in short-term, negligible, adverse impacts to invertebrates.

Construction impacts to other bird species would be short-term, negligible, and adverse under alternative D. Impacts to other bird species from limitations on recreational activities under alternative D would be long-term and beneficial. Impacts to other bird species from species surveying and management would be long-term and beneficial.

Overall cumulative impacts to invertebrate species would be long-term, negligible to minor, adverse depending upon the individual species of invertebrate. Overall cumulative impacts to other bird species would be long-term, negligible, and adverse in the area of analysis.

Comment [MSOffice28]: Why is this "minor" if the component impacts are "negligible"?

Because the basis has a range to moderate. Changed to neg to minor

Impairment to invertebrates and other bird species would not occur because populations of these wildlife communities would continue to exist at the Seashore, with long-term impacts being less than major.

Impacts of Alternative E: Variable Access and Maximum Management

Impacts to Other Bird Species

ORV and Other Recreational Use. Alternative E provides an increased level of beach access for recreational purposes through strategies such as improving the interdunal road system, providing ORV access corridors to selected points and spits, allowing a "park and stay" option for ORVs at points and spits, and establishing a pedestrian trail near Oregon Inlet. Because this alternative would require some level of resource education in order to receive an ORV permit, all species at the Seashore, including other bird species, should benefit from the increased level of resource stewardship that is associated with public awareness. Some additional recreational access would result from the establishment of the interdunal road between ramp 45 and ramp 49, but portions of the beach would be closed during the pre-nesting period. The interdunal road would provide access around Cape Point to new ramps 47 and 48. Use of the road should not result in measurable impacts to other bird species because they would either remain on the beach or within the forested wetlands in the interior of the island. An indirect impact from recreational use would be the attraction of mammalian and avian predators, as described under alternative A. Increased levels of pedestrian an ORV access would still result in the generation of waste, which would increase the potential for predation when compared to alternatives C and D.

Closing approximately 26 34 miles of beach to ORV use for almost six months a year would reduce the potential for disturbances to other bird species that use these seasonally closed areas. However, this alternative would still allow access to some of these areas through an ORV access corridor or pedestrian trail. The relative large protected species buffers would provide some mitigation from recreational impacts, when compared to alternative A. There would continue to be disturbance to other bird species from vehicles and pedestrians under alternatives E and impacts would be long-term, negligible to minor, and adverse as impacts from disturbance may be noticeable to these populations, but would be expected to be in the natural range of variability.

Construction Activities. Implementation of alternative E would involve the construction (or replacement) of 7 new ORV access ramps, 14 new or expanded parking lots, 1 new interdunal road, and a pedestrian trail near Oregon Inlet. Construction activities would result in the temporary displacement of some other bird species localized in the areas of proposed disturbance and would involve a loss of some marginal habitat near the parking areas. Construction impacts to other bird species would be short-term,

minor, and adverse because they may be displaced during construction, but would not lose prime habitat over the long term.

Impacts to Invertebrates

ORV and Other Recreational Use. Alternative E would provide increased flexibility in the areas of beach accessible for recreational purposes through strategies such as improving the interdunal road system, allowing a "park and stay" option for ORVs at points and spits, and providing ORV access corridors to selected points and spits. Alternative E also contains a seasonal aspect which would result in certain routes and areas being open to ORV use from September 1 through March 14 and some ORV access would be provided via a corridor, subject to resource closures, to Bodie Island Spit, Cape Point, and South Point Ocracoke from March 15 through August 31. Protected species buffers would follow the ML1 measures at most areas of the Seashore, with the exception of Bodie Island Spit, Cape Point, and South Point, where ML2 buffers would apply. From May 1 through September 15, the ocean intertidal zone, ocean backshore, and dunes would be closed to ORV use from 10:00 p.m. to 6:00 a.m. ORV and pedestrian access would continue be subject to temporary resource closures and non-breeding habitat restrictions. This alternative would involve a permit system with an educational requirement.

Closing approximately 26 miles of beach to ORV use for almost six months a year would reduce the potential for disturbances to beach invertebrates that inhabit these seasonally closed areas. However, this alternative would still allow access to some of these areas through an ORV access corridor. Limiting vehicles to daytime use for 6.5 months of the year would reduce the potential for impacts to nocturnal invertebrates throughout the Seashore, although vehicles would still be allowed on beaches until 10 p.m. under this alternative, and some limited overnight use would be allowed with the "park and stay" option. Vehicle use would result in the loss of individual invertebrates, but would be well within natural fluctuations. Therefore, impacts to invertebrates from ORV and other recreational use under alternative E would be long-term, minor, and adverse.

Construction Activities. As with alternative C, all construction under alternative E would occur outside areas of invertebrate habitat, and therefore this alternative would result in short term, negligible, adverse impacts to invertebrates due to temporary displacement during construction activities, but no long-term loss of invertebrate habitat would occur.

Cumulative Impacts. The same past, present, and future impacts from cumulative actions described for alternative A would also occur under alternative E. Alternative E would contribute short- and long-term, negligible to minor, adverse impacts to invertebrates and other bird speciesCumulative actions under alternative E would have long-term negligible to moderate impacts to invertebrate species. These impacts, wWhen combined with the long-term negligible to adverse impacts of alternative E, overall cumulative impacts to invertebrates would bewould have long-term, minor, and adverse cumulative impacts to invertebrate species. Cumulative actions under alternative E would have long-term negligible to minor adverse impacts to bird species. These impacts, when combined with the long-term negligible to minor adverse impact to bird species would have The overall cumulative impact on other bird species would be long-term, negligible to minor, and adverse cumulative impacts to bird species.

Conclusion. The implementation of alternative E would involve increased levels of public recreational access coupled with seasonal and nighttime driving limits. Like the other action alternatives, alternative E would involve construction activities in order to provide additional ORV and pedestrian access, although this alternative would provide almost 15 miles of "ORV-free" areas. Impacts to invertebrates from species management activities would be long-term, negligible, and adverse. Impacts to invertebrates from recreational activities under alternative E would be long-term, minor, and adverse. Construction activities under this alternative would result in short-term, negligible, adverse impacts to invertebrates. Impacts to

other bird species from surveying and management would be long-term and beneficial. Impacts to other bird species from recreational activities would be long-term, negligible to minor, and adverse. Construction impacts to other bird species would be short-term, minor, and adverse.

Overall cumulative impacts to invertebrates would be long-term, minor, and adverse. Cumulative impacts on other bird species would be long-term, negligible to minor, and adverse.

Impairment to invertebrates and other bird species would not occur because populations of these wildlife communities would continue to exist at the Seashore.

Impacts of Alternative F: Management Based on Advisory Committee Input

Impacts to Other Bird Species

ORV and Other Recreational Use. Alternative F provides a level of recreational beach access similar to that under alternative E but would also include the development of three new interdunal roads, two of which would provide additional vehicular access on Hatteras Inlet Spit and North Ocracoke Spit. ORV and pedestrian access would continue be subject to temporary resource closures and non-breeding habitat restrictions. Because this alternative would require some level of resource education in order to receive an ORV permit, all species at the Seashore, including other bird species, should benefit from the increased level of resource stewardship that is associated with public awareness. Some additional recreational access (and associated impacts to other bird species) would result from the establishment of three new interdunal roads. Recreational trash and waste would lead to a greater number of predators in the area, as described under alternative A. Increased levels of pedestrian and ORV access would still result in the generation of waste, which would increase the potential for predation when compared to alternatives C and D.

Alternative F would involve closing the northern village beaches to ORVs for three months, southern village beaches for nine months, and closing some SMAs for approximately 4.5 months out of the year. Closing these areas seasonally to ORV use would reduce the potential for disturbances other bird species that use these seasonally closed areas. However, this alternative would still allow access to some of these areas through a pedestrian corridor and trail or an ORV access corridor, subject to resource closures, along the shoreline to Cape Point. The relatively large protected species buffers would provide some mitigation from recreational impacts, when compared to alternative A. However, there would continue to be disturbance to other bird species from vehicles and pedestrians under alternatives F and impacts would be long-term, negligible to minor, and adverse.

Construction Activities. Implementation of alternative F would include the construction (or replacement) of 9 ORV access ramps, 11 new or expanded parking lots, 3 new interdunal roads, and a pedestrian trail near Oregon Inlet. Construction activities would result in the temporary displacement of some other bird species localized in the areas of proposed disturbance and would involve a loss of some marginal habitat near the parking areas. Construction impacts to other bird species would be short-term, minor, and adverse as areas of important habitat would not be lost and there would not be noticeable impacts to populations.

Impacts to Invertebrates

ORV and Other Recreational Use. Alternative F provides a level of recreational beach access similar to that under alternative E, although there would be no "park and stay" option. Alternative F would also include the development of three new interdunal roads, two of which would provide additional vehicular access on Hatteras Inlet Spit and North Ocracoke Spit. Night driving would be similarly restricted from

May 1 through November 15, but vehicles would be removed from the beaches starting one hour after sunset until approximately ½ hour after sunrise, which further limits the hours that vehicles are allowed on beaches in the evening hours. ORV and pedestrian access would continue be subject to temporary resource closures and non-breeding habitat restrictions. This alternative would involve a permit system with an educational requirement.

Alternative F would involve closing the northern village beaches to ORVs for three months, southern village beaches for nine months, and closing some SMAs for approximately 4.5 months out of the year. Closing these areas seasonally to ORV use would reduce the potential for disturbances to beach invertebrates that inhabit these areas. Limiting vehicles to daytime use for 6.5 months of the year would reduce the potential for impacts to nocturnal invertebrates throughout the Seashore. Vehicle use would result in the loss of individual invertebrates, but would not be measurable and would be well within natural fluctuations. Therefore, impacts to invertebrates from ORV and other recreational use under alternative F would be long-term, minor, and adverse.

Construction Activities. As with alternative C, all construction under alternative F would occur outside areas of invertebrate habitat; therefore, this alternative would result in short-term, negligible, adverse impacts to invertebrates due to temporary displacement during construction activities, but no long-term loss of invertebrate habitat would occur.

Cumulative Impacts. The same past, present, and future impacts from cumulative actions described for alternative A would also occur under alternative F. Cumulative actions under alternative F would have long-term negligible to moderate adverse impacts to invertebrate species. These impacts, when combined with the Alternative F would contribute short- and long-term, negligible to minor, adverse impacts to invertebrates and other bird speciesunder alternative F would have long-term minor adverse cumulative impacts to invertebrates. Cumulative actions under alternative F would have long-term negligible to minor adverse impacts to bird species. These impacts, wWhen combined with the impacts of alternative Flong-term negligible to minor adverse impacts to bird under alternative F would have , overall cumulative impacts to invertebrates would be long-term, minor, and adverse. The overall cumulative impact on other bird species would be long-term, negligible to minor, and adverse cumulative impacts to other bird species.

Conclusion. The implementation of alternative F would involve increased levels of public recreational access coupled with seasonal and nighttime driving limits. Like the other action alternatives, alternative F would involve construction activities in order to provide additional ORV and pedestrian access, although this alternative would provide approximately 16 miles of "ORV-free" areas. Impacts to invertebrates from species management activities would be long-term, negligible, and adverse. Impacts to invertebrates from recreational activities under alternative F would be long-term, minor, and adverse. Construction activities under this alternative would result in short-term, negligible, adverse impacts to invertebrates. Impacts to other bird species from surveying and management would be long-term and beneficial. Impacts to other bird species from recreational activities would be long-term, negligible to minor, and adverse. Construction impacts to other bird species would be short-term, minor, and adverse.

Overall cumulative impacts to invertebrates would be long-term, minor, and adverse. Cumulative impacts on other bird species under alternative F would be long-term, negligible to minor, and adverse. Impairment to invertebrates and other bird species would not occur because populations of these wildlife communities would continue to exist at the Seashore, with long-term impacts being less than major.

1 **TABLE 49. SUMMARY OF IMPACTS TO WILDLIFE AND WILDLIFE HABITAT UNDER THE ALTERNATIVES**

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Other Bird Species					
Resource management activities would result in long-term beneficial impacts to other bird species due to the protection offered by the closures established for special status species. ORV and other recreational use under alternative A would result in long term, negligible to minor, adverse impacts to other bird species due to disturbance from recreational use and the attraction of predators from human activities. There would be no construction impacts to other bird species as no construction activities would occur under this alternative.	Resource management activities would result in long-term beneficial impacts to other bird species due to the protection offered by the closures established for special status species. ORV and other recreational use would result in long term, negligible to minor, adverse impacts to other bird species due to disturbance from recreational use and the attraction of predators from human activities. There would be no construction impacts to other bird species as no construction activities would occur under this alternative.	Resource management activities would result in long-term beneficial impacts to other bird species due to the protection offered by the closures established for special status species. ORV and other recreational use would result in long term, negligible and adverse impacts to other bird species due to disturbance from recreational use and the attraction of predators from human activities. Impacts to other bird species from construction activities would be short- term, negligible to minor, and adverse due to temporary displacement during construction activities. Some loss of marginal habitat could occur, but would not result in impacts to other bird species as prime habitat areas would remain.	Resource management activities would result in long-term beneficial impacts to other bird species due to the protection offered by the closures established for special status species. ORV and other recreational use would result in long term, negligible and adverse impacts to other bird species due to disturbance from recreational use and the attraction of predators from human activities. Impacts would be reduced under this alternative due to the amount of beach closed to recreational use. Impacts to other bird species from construction activities would be short- term, negligible to minor, and adverse due to temporary displacement during construction activities. Some loss of marginal habitat could occur, but would not result in impacts to other bird species as prime habitat areas would remain.	Resource management activities would result in long-term beneficial impacts to other bird species due to the protection offered by the closures established for special status species. ORV and other recreational use would result in long term, negligible to minor and adverse impacts to other bird species due to disturbance from recreational use and the attraction of predators from human activities. Impacts to other bird species from construction activities would be short- term, minor, and adverse due to temporary displacement during construction activities. Some loss of marginal habitat could occur, but would not result in impacts to other bird species as prime habitat areas would remain.	Resource management activities would result in long-term beneficial impacts to other bird species due to the protection offered by the closures established for special status species. ORV and other recreational use would result in long term, negligible to minor and adverse impacts to other bird species due to disturbance from recreational use and the attraction of predators from human activities. Impacts to other bird species from construction activities would be short- term, minor, and adverse due to temporary displacement during construction activities. Some loss of marginal habitat could occur, but would not result in impacts to other bird species as prime habitat areas would remain.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Invertebrates					
The use of vehicles to conduct resource management activities would result in long-term, negligible adverse impacts to invertebrates due to the potential for mortality of individual invertebrate species. ORV use would result in long-term, minor to moderate, adverse impacts to invertebrate species primarily due to mortality arising from unlimited night driving in the intertidal and wrack areas.	The use of vehicles to conduct resource management activities would result in long-term, negligible adverse impacts to invertebrates due to the potential for mortality of individual invertebrate species. ORV use would result in long-term, minor adverse impacts to invertebrate species resulting from the continued use of ORVs in invertebrate habitat. Impacts would be reduced when compared to alternative A due to limitations on ORV use at night and within the larger resource management closures under alternative B.	The use of vehicles to conduct resource management activities would result in long-term, negligible adverse impacts to invertebrates due to the potential for mortality of individual invertebrate species. ORV use would result in long-term, negligible to minor adverse impacts to invertebrate species resulting from the continued use of ORVs in invertebrate habitat. Impacts would be reduced due to longer seasonal restrictions on vehicle use under alternative C. Short term, negligible, adverse impacts to invertebrates would occur due to temporary displacement during construction activities	The use of vehicles to conduct resource management activities would result in long-term, negligible adverse impacts to invertebrates due to the potential for mortality of individual invertebrate species. ORV use would result in long-term, negligible and adverse impacts to invertebrate species resulting from the continued use of ORVs in invertebrate habitat. Impacts to invertebrates would be reduced under this alternative due to the amount of beach closed to recreational use. Short term, negligible, adverse impacts to invertebrates would occur due to temporary displacement during construction activities	The use of vehicles to conduct resource management activities would result in long-term, negligible adverse impacts to invertebrates due to the potential for mortality of individual invertebrate species. ORV use would result in long-term, minor adverse impacts to invertebrate species resulting from the continued use of ORVs in invertebrate habitat. Short term, negligible, adverse impacts to invertebrates would occur due to temporary displacement during construction activities	The use of vehicles to conduct resource management activities would result in long-term, negligible adverse impacts to invertebrates due to the potential for mortality of individual invertebrate species. ORV use would result in long-term, minor adverse impacts to invertebrate species resulting from the continued use of ORVs in invertebrate habitat. Short term, negligible, adverse impacts to invertebrates would occur due to temporary displacement during construction activities

SOUNDSCAPES

GUIDING REGULATIONS AND POLICIES

The NPS Organic Act (16 USC 1) establishes and authorizes the NPS "to conserve the scenery and the natural and historic objects and wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (NPS Organic Act (16 USC 1)). An important aspect of natural communities that the NPS wishes to preserve within our national parks is the natural soundscape, which protects visitor experience as well as wildlife.

Regarding general park soundscape management, NPS *Management Policies 2006*, Section 4.9 Soundscape Management, requires that the NPS "preserve, to the greatest extent possible, the natural soundscapes of parks." Additionally, the NPS "will restore to the natural condition wherever possible those park soundscapes that have become degraded by the unnatural sounds (noise), and will protect natural soundscapes from unacceptable impacts" (NPS *Management Policies 2006* (NPS 2006c, sec 4.9)). Additionally, Director's Order #47: Soundscape Preservation and Management, was developed to emphasize NPS policies "that will require, to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive

noise sources." This Director's Order also directs park managers to measure acoustic conditions, differentiate existing or proposed human-made sounds that are consistent with park purposes, set acoustic goals based on the sounds deemed consistent with the park purpose, and determine which noise sources are impacting the parks (NPS 2000a).

As discussed in Chapter 1: Purpose and Need for Action, ORV use within national parks is governed by Executive Order 11644, Use of Off-road Vehicles on Public Lands, as amended by Executive Order 11989. In accordance with this executive order and as discussed in NPS *Management Policies 2006*, Section 8.2.3.1 Motorized Off-road Vehicle Use, ORVs are allowed in locations where no adverse impacts to the natural, cultural, scenic and esthetic values would occur (NPS *Management Policies 2006* (NPS 2006c, sec 8.2.3.1)). Additionally, NPS *Management Policies 2006*, Section 8.2.3 Use of Motorized Equipment, acknowledges that motorized equipment operating in national parks could adversely impact the park's natural soundscape. To preserve the natural soundscape, park superintendent~~'~~s will manage when and where motorized equipment is used, evaluating effects on the natural soundscape against the natural ambient sound level (that which exists in the absence of human-induced sounds) (NPS *Management Policies 2006* (NPS 2006c, sec 8.2.3)).

Additionally, 36 CFR 2.12 Audio Disturbance prohibits the operation of motorized vehicles within national parks in excess of 60 dBA at a distance of 50 feet from the source, or if below that noise level, noise which is unreasonable. Reasonableness is dependent upon several factors including the nature and purpose of the actor's conduct, location and time of occurrence, the park's purpose and the impact the noise has on park users (36 CFR 2.12).

METHODOLOGY, ASSUMPTIONS, AND IMPACT THRESHOLDS

The methodology used to assess impacts to the natural soundscape from the management of ORV use at the Seashore is consistent with *NPS Management Polices 2006* and *Director's Order # 47: Soundscape Preservation and Noise Management*.

As ORV driving is more prominent on the beaches, versus along the sound where visitors typically drive in to recreational areas and park their vehicles, impacts to the natural soundscape, visitor experience and wildlife would be negligible on the sound. Therefore, the impacts analysis for all alternatives focuses on the beach areas, where most routes are established for ORV driving.

Impacts to the natural soundscape of the Seashore from ORV use were assessed using published information from the Federal Highway Administration (FHWA) regarding automobile noise emission levels for travel speeds of 15 and 25 mph, measured at reference distances of approximately 15 meters (49 feet). These travel speeds are consistent with current and future proposed action speed limits for ORVs in the Seashore. Using these known vehicle noise emission levels, which vary by frequency, for the aforementioned travel speeds, the NPS Natural Sounds Program extrapolated vehicle noise levels at several distances from an ORV track. The extrapolation accounts for the effects of atmospheric absorption of sound waves with frequency, which is dependent upon the atmospheric conditions of the park. Specifically, factors including temperature and humidity affect sound absorption depending on the frequency spectrum of the sound wave (Caltrans 1998). Sound waves may be further attenuated by ground surfaces such that soft surfaces, which include soft dirt, grass, or scattered bushes and trees, tend to absorb some of the sound energy as it passes over the soft surface from source to receiver. Conversely, hard surfaces like parking lots and smooth bodies of water tend to reflect sound waves, thereby providing no additional attenuation of sound energy (Caltrans 1998). The extrapolated vehicular sound levels conservatively assume no significant ground absorption in order to provide a general sense of vehicle noise drop-off rates with distance from a given ORV track. Thus, depending upon the ground surface between the source and receiver, noise levels in the park may be further attenuated.

As noise from the surf is a predominant natural sound source at the Seashore, the Natural Sounds Program also calculated estimates of surf noise levels at several distances from an ORV track.[1] These calculations assume a surf noise level estimate of 55 dBA as measured 15 meters (49 feet) from the surf line, which is representative of the maximum value of surf noise in a range (20–55 dBA) identified in *Disposition of Offshore Cooling Water Conduits SONGS Unit 1 EIR*, as discussed in Chapter 3: Affected Environment. This surf noise level is also consistent with estimates of ambient levels at the surf line based on calculations using the measurement data collected on Bodie Island and at Cape Point (refer to "Chapter 3: Affected Environment"). A median distance from the surf line to an ORV track of 21 meters (69 feet) was used as part of the calculation based on information from the NPS, which indicates typical distances between the surf line and ORV tracks ranging between 18 and 24 meters (59 and 79 feet) (F. Turina, NPS, pers. comm. 2009xx).

Impacts to the natural soundscape were assessed according to distances at which vehicle noise dominates the sound energy, as compared to the predominant natural sound of the surf, both landward and seaward from a given ORV track. Thus, vehicular and surf noise level estimations were predicted for both landward and seaward directions from a given ORV track. No additional sources of noise, including from visitor presence throughout the Seashore, were considered as part of the impacts analysis. As vehicle counts on ORV tracks are not available, vehicle noise level predictions are representative of the intensity of the vehicle noise during a single pass-by event and do not reflect the frequency of occurrence. The landward and seaward vehicle and surf noise level predictions are provided in table 50 and table 51, respectively. The distances shown in both tables represent distances from a given ORV track in meters and feet. Since table 50 depicts vehicle and surf noise levels at distances landward from a given ORV track, the distance from the surf is determined by adding the median distance between the surf line and ORV track (21 meters (69 feet)) to the particular distance from the ORV track. For example, at a distance of 15 meters (49 feet) landward from the ORV track, a given receiver is located approximately 36 meters (118 feet) from the surf line. Conversely, since table 51 depicts vehicle and surf noise levels at distances (in meters and in feet) in a seaward direction from an ORV track, the distance from the surf line is given by subtracting the distance from the ORV track from the 21 meter (69 foot) distance between a typical ORV track and the surf line. For example, at a distance of 15 meters (49 feet) from an ORV track, a receiver is located approximately 6 meters (20 feet) from the surf line. Beyond 21 meters (69 feet) from an ORV track, a receiver is located in the ocean. Therefore, surf noise levels beyond 21 meters (69 feet) are listed as "N/A" (i.e., "not applicable").

1 NPS protocols for acoustic monitoring at national parks (NPS 2006) were followed in collection of acoustic data at Cape Hatteras National Seashore to determine ambient conditions. The protocols attempt to capture spatial and temporal variability within the park. Therefore, monitors are typically not placed near sound sources that would dominate and mask other acoustic resources (i.e. birds, insects). Acoustic conditions at the surf were extrapolated using the collected data. The results of the extrapolation were verified and corroborated by published sources (*Disposition of Offshore Cooling Water Conduits SONGS Unit 1 EIR*) and the experiences of park managers.

TABLE 50. VEHICLE AND SURF NOISE LEVELS AT DISTANCES FROM AN ORV TRACK

			Other Distances from an ORV Track in meters (feet)								
Sound Source	Noise Level at Reference Distance (dBA)	Reference Distance of Measured Noise Level (meters)	4 (13)	10 (33)	15 (49)	20 (66)	30 (98)	50 (164)	150 (492)	200 (656)	250 (820)
Auto at 15 mph (FHWA)	52	15.24	64.0	56.0	52.5	49.9	46.3	41.7	31.5	28.7	26.4
Ocean surf ambient	55	15	52.8	51.8	51.2	50.6	49.7	48.2	44.4	43.3	42.4
Auto at 25 mph (FHWA)	59	15.24	71.0	63.0	59.4	56.9	53.3	48.7	38.5	35.7	33.4

Source: NPS Natural Sounds Program, September 17, 2009.

Notes: 1. Distances are in meters and feet from a given ORV track. Assumed distance between ORV track and surf is 21 meters (69 feet).
2. Distance from surf may be calculated by adding the distance from the ORV track to 21 meters (69 feet).
3. Reference distances of sound sources represent locations where values are known based on measured, published data. Other distances from an ORV track are predicted sound levels based on the known, measured levels at the specified reference distances (R. Stanley, NPS Soundscapes Program, pers. comm. October 28, 2009)

TABLE 51. SEAWARD VEHICLE AND SURF NOISE LEVELS AT DISTANCES FROM AN ORV TRACK

			Other Distances from an ORV Track in meters (feet)						
Sound Source	Noise Level at Reference Distance (dBA)	Reference Distance of Measured Noise Level (meters)	4 (13)	10 (33)	15 (49)	20 (66)	50 (164)	150 (492)	250 (820)
Auto at 15 mph (FHWA)	52	15.24	64.0	56.0	52.5	49.9	41.7	31.5	26.4
Ocean surf ambient	55	15	54.5	56.3	59.0	66.8	N/A	N/A	N/A
Auto at 25 mph (FHWA)	59	15.24	71.0	63.0	59.4	56.9	48.7	38.5	35.7

Source: NPS Natural Sounds Program, September 17, 2009.

Notes: 1. Distances are in meters and feet from a given ORV track. Assumed distance between ORV track and surf is 21 meters (69 feet).
2. Distance to surf may be calculated by subtracting the distance from the ORV track from 21 meters (69 feet).
3. "N/A" ("not applicable") indicates the receiver is located in the ocean, and surf noise levels are not calculated.
4. Reference distances of sound sources represent locations where values are known based on measured, published data. Other distances from an ORV track are predicted sound levels based on the known, measured levels at the specified reference distances (R. Stanley, NPS Soundscapes Program, pers. comm. October 28, 2009).

In addition to determining the impacts to the natural soundscape of the Seashore, considerations were given to visitor use as well as impacts to wildlife from ORV use. Impacts to visitors were evaluated based their ability to experience natural sounds of the Seashore and the effects on their awareness of vehicles.

Consideration of the effects of ORV noise on wildlife included the potential for changes in communication by shifting call frequencies away from those typically associated with transportation noise (100Hz to 1 kHz). Species at greatest risk include the piping plover, black skimmer, Wilson's plover, least tern, common tern and gull-billed tern. For example, the piping plover's call is between 1 and 3 kHz, with most energy centered around 2kHz while the fundamental frequency of the black skimmer's call is at or below 2 kHz. Similarly, most acoustic energy in the call of the Wilson's plover occurs below 3 kHz. Therefore, since the acoustic energy of the calls of these bird species may fall within the frequency range associated with transportation noise, studies show that communication may be compromised for these bird species (Slabbekoorn and Boer-Visser 2006). Such an effect on wildlife communication would occur regardless of vehicle speed and the particular alternative implemented.

[Preparer's note: NPS sounds program to provide additional text on known effects of birds exposed to noise in frequencies close to those of transportation (e.g., birds will call during different times when less noisy).]

An additional consideration for wildlife impacts included the potential for reductions in listening area for predators seeking prey and reductions in alerting distance for prey listening for predators. More specifically, a 3 dBA increase in ambient sound levels by ORV noise would reduce a predator's listening area by half, while the same decibel increase would reduce the alerting distance of prey by 30 percent. Similarly, a 3 dBA increase in ambient sound levels would also reduce, by 50 percent, the area in which humans may listen for birds. For example, under conditions where natural sounds prevail and ORV use is not present as an intrusion, prey listening for a predator may be able to hear a predator as far as 90 feet from said predator. However, if the introduction of ORV noise increases the ambient sound level by a factor of 3 dBA, the distance at which prey can hear the approaching predator reduces to 60 feet. These reduction factors are based on geometric spreading of sound energy in space and are larger for greater increases in the ambient environment.

A summary of soundscapes impacts under all alternatives is provided in table 52 at the end of this section. Thresholds for identifying natural soundscapes impacts are defined as follows:

Negligible: Natural sounds would prevail; the area would be closed to vehicles or noise generated by the use of ORVs and construction would be infrequent or absent, and mostly not measurable or detectable.

Minor: Vehicle noise dominates sound energy to a distance of 30 meters inland from the vehicle and to a distance of 10 meters toward the surf; OR, sound energy from vehicle noise exceeds sound energy from the surf by 3 dBA to a distance of 10 meters from the vehicle in either direction. Noise from construction activities would be short-term, lasting only a few days to a week, and localized and would not occur in ecologically sensitive areas.

Moderate: Vehicle noise dominates sound energy to a distance of 60 meters inland from the vehicle, and vehicle noise dominates sound energy to the surf line; OR sound energy from vehicle noise exceeds sound energy from the surf by 3 dBA to a distance of 50 meters inland from the vehicle and 15 meters towards the surf. Noise from construction activities would be short-term, lasting only a few days to a week, but would be more widespread and may occur in ecologically sensitive areas.

Major: Vehicle noise dominates sound energy at distances greater than 60 meters inland from the vehicle and sound energy from vehicle noise exceeds sound energy from the surf by 3 dBA beyond 50 meters inland from the vehicle; OR, vehicle noise levels at the surf line exceed sound energy from the surf by 3 dBA. Noise from construction activities would occur for over a period of several months in highly ecologically sensitive areas.

Duration: Short-term impacts would result from actions occurring over a period of less than one year.

Long-term impacts would result from actions occurring over a period of longer than one year and would occur intermittently over the life of the management plans.

Thresholds were developed based on several factors. Specifically, the distance at which vehicle noise begins to dominate the natural ambient (the surf) is important because, at this point, vehicle noise is more likely to be audible to visitors and wildlife, and a situation is created in which natural sounds no longer predominate. Such distances are based on best available judgment, and in part on the area of affect around the vehicle in which the vehicle noise adds at least 3 dBA to the natural ambient environment.

Study Area

The study area for which soundscape impacts were assessed includes the entire area within the Seashore Boundary.

Impacts of Alternative A: No Action—Continuation of Management under the Interim Protected Species Management Strategy

Analysis. Under alternative A, all areas of the Seashore would continue to be open to ORV use, unless closures were established for resource protection, administrative, or safety reasons. ORV use would also be temporarily prohibited during seasonal closures in front of villages from September 16 to May 14. The speed limit would be 25 mph (unless otherwise posted) on park beaches for public and private vehicles, although the speed limit in front of villages (from September 16 to May 14) would be 10 mph.

According to table 50, a vehicle traveling at 25 mph would dominate the sound energy as far as 50 meters landward from an ORV track, producing a noise level of 48.7 dBA versus 48.2 dBA produced by the natural sound of the surf. Since vehicle noise dominates beyond 30 meters inland from the vehicle, landward impacts from ORV use on the beaches would be moderate and adverse. Additionally, as depicted in table 51, a vehicle traveling at 25 mph would dominate the sound energy to a distance of 10 meters from an ORV track towards the surf. At 15 meters seaward, vehicle noise and surf sounds are nearly equivalent, with a vehicle contribution of 59.4 dBA and a contribution from the surf of 59.0 dBA. Since vehicle noise is still prevalent beyond 10 meters seaward from the ORV track, moderate adverse impacts to the natural soundscape would occur along the beaches between an ORV track and the surf.

In front of village beaches, during seasonal closures between September 16 and May 14, and in areas where an ORV corridor is less than 100 feet wide, when the speed limit is lowered from 25 mph to 10 mph, vehicle noise would be noticeably less and would not dominate the sound energy as far from the ORV track as a vehicle traveling at 25 mph. Comparing vehicle noise levels at 25 mph with those produced at 15 mph (15 mph may be used as a close approximation of noise levels produced by a vehicle traveling 10 mph), noise levels for the lower speed are approximately 7 dBA less for all distances inland and seaward from an ORV track. Additionally, noise emissions from vehicles traveling at 15 mph would dominate the sound energy to a distance of 15 meters inland from an ORV track, at which point vehicle

noise levels would be 52.5 dBA while surf sounds would be 51.2 dBA. Thus, moderate adverse impacts occurring at 25 mph speeds would become minor adverse impacts inland from an ORV track when vehicle speeds are limited to 10 mph. Similarly, vehicle noise would dominate the sound energy to a distance of 4 meters from an ORV track towards the surf and become nearly equivalent at 10 meters from the ORV track. Therefore, minor adverse impacts to the natural soundscape would result from ORV use in front of village beaches during seasonal closures and in areas with ORV corridors less than 100 feet wide when speeds are lowered to 10 mph.

As noise from ORV use would add at least 3 dBA to the natural ambient sound levels within the Seashore, wildlife would also experience adverse impacts. Specifically, wildlife may experience impacts to their abilities to detect predators and hunt for prey, such that a predator's listening area and a prey's alerting distance may be reduced. At vehicle speeds of 25 mph, sound energy from the vehicle noise would exceed the sound energy from the surf by at least 3 dBA to a distance of approximately 30 meters inland from an ORV track (see table 50). Similarly, ambient levels would be increased by at least 3 dBA to a distance beyond 10 meters seaward from an ORV track, but not as far as the surf line (see table 51). Therefore, when vehicles are traveling at 25mph, wildlife on the beaches would experience moderate adverse impacts. When speeds are reduced to 10 mph, increases of at least 3 dBA above the natural ambient would occur closer to ORV tracks, thereby creating minor adverse impacts to wildlife.

The presence of vehicles on the beaches at the Seashore would also adversely impact visitor use such that a visitor's ability to experience and enjoy the natural soundscape and their awareness of vehicles around them may be affected. Similar to wildlife, adding 3 dBA or more to the natural ambient environment results in a reduction of a visitor's listening area over which they can hear birds and insects and enjoy the sounds of the surf. Further, between ORV tracks and the surf, at distances where the sound of the surf dominates the sound energy, a potential reduction in vehicle awareness by visitors may result. The distance at which surf sounds dominate is further from an ORV track for higher speeds and closer for slower speeds. Therefore, the potential for reductions in visitor awareness actually increase for slower speeds. In relation to visitor enjoyment, a slower travel speed would reduce the potential for reductions in visitor listening areas since the area over which 3 dBA is added to the natural ambient environment would be smaller.

The majority of ORV routes along the beaches are for year round use, except during times of temporary resource, safety, or administrative closures. Due to the potential for year-round ORV use along most beach routes, impacts to the natural soundscape, wildlife and visitor use would generally be regarded as long-term, minor to moderate and adverse but have the potential to become short-term impacts depending on the length of closure periods. In front of village beaches, where ORV routes are specifically designated as being seasonally closed to ORVs from ~~from~~May 15 through September 15~~6 to May 14~~, impacts to the natural soundscape, wildlife and visitor use would be short-term, minor to moderate and adverse. During this four~~eight~~-month seasonal closure period, or during any closure period which limits ORV activity to less than one year, areas undergoing such closures would also experience short-term benefits due to the temporary lack of ORV noise. However, during closures, ORVs may potentially be diverted to other routes that remain open. Vehicle diversions would potentially increase the number of ORVs along these open routes and the frequency of occurrence of single ORV pass-by events. Impacts would remain minor to moderate and adverse, depending on vehicle speed, but vehicle noise may dominate the sound energy more frequently. Further, as identified in "Table 3, Off-Road Vehicle Routes and Areas," in chapter 2, some seasonal as well as year-round ORV routes have been designated as longstanding safety closures. In such areas, impacts would be negligible such that natural sounds would prevail due to the absence of ORVs. In the event that longstanding safety closures would be lifted, thus re-opening ORV routes in areas with such closures, impacts would be minor to moderate and adverse, depending on vehicle travel speeds. The duration of these impacts would be short-term and adverse in areas with seasonal ORV routes and long-term and adverse in areas with year-round ORV routes. In general, all ORV use as well as closure

periods would occur intermittently over the length of the management plan, thereby creating long-term minor to moderate adverse impacts as well as long-term benefits (during closure periods) to the natural soundscape along the beaches of the Seashore.

Under alternative A, there would be no planned construction of new ORV access ramps or reconfigurations of existing ramps. Thus, there would be no construction noise-related impacts under this alternative.

Cumulative Impacts. Other past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore, which in turn may affect wildlife and visitor use. In recent years, hurricanes, storms, and other events have resulted in roads being over washed with sand and water, including ramps to beaches and ORV corridors. Depending on the degree of damage following a storm, certain areas of the Seashore and some ORV routes may be closed off to visitors. ~~Additionally, dredging of the Oregon Inlet causes temporary shoreline closures along Bodie Island.~~ Weather-related closures as well as those associated with dredging would reduce human-induced noise in closed areas. However, such closures would also potentially result in increased concentrations of ORVs and visitors in other areas of the Seashore that would remain open. Weather-related ~~and dredging~~ closures would result in minor to moderate adverse impacts regarded as short-term in duration depending on the length of the closure periods. Impacts would also be regarded as long-term as weather events and dredging may recur.

Additional adverse impacts may also result from current increases in vehicle traffic and village events bringing additional visitors to the Seashore. The Corridor Management Plan for the Outer Banks Scenic Byway would also potentially attract additional visitors to the Seashore, thereby adding more vehicle traffic and visitor presence. Increased vehicle traffic and visitor presence would potentially increase the ambient sound environment. Adverse impacts would be long-term and minor to moderate, depending upon vehicle speed limits. Further, the potential for aircraft overflights associated with military training operations would add an additional source of noise to the ambient environment of the park. Adverse impacts would be short-term minor and adverse, only lasting the duration of the overflight operation.

The Bonner Bridge Replacement may create construction-related noise, however as construction activities would be localized, adverse impacts would be long-term and minor. Additional construction-related noise is associated with the berm construction under the Civilian Conservation Corps (CCC), however such activities have occurred in the past. Continued maintenance of berms would potentially create localized, negligible adverse impacts.

The potential long-term minor to moderate adverse impacts from actions described above coupled with the minor to moderate adverse impacts associated with the implementation of alternative A, would result in long-term, minor to moderate adverse cumulative impacts on the natural soundscape within the Seashore.

Conclusion. Based on predicted vehicle noise levels at distances both landward and seaward from an ORV track for a posted speed limit of 25 mph, vehicle noise would dominate the sound energy to distances between 30 and 60 meters inland from an ORV track and beyond 10 meters from an ORV track towards the surf line. Vehicle noise would also add 3 dBA or more to the natural ambient environment within 50 meters inland and 15 meters seaward of a vehicle traveling at 25 mph. Conversely, for a posted speed of 10 mph, vehicle noise would dominate the sound energy between the ORV track and a distance of 30 meters inland from the track and would dominate within 10 meters seaward of the vehicle track. Further, for a 10 mph speed limit, both inland and seaward of a vehicle, vehicle noise would add 3 dBA or more to the natural ambient within 10 meters of the vehicle. As ORV driving is more prominent on the beaches, versus along the sound where visitors typically drive in to recreational areas and park their

vehicles, impacts to the natural soundscape, visitor use and wildlife would be negligible on the sound. Therefore, long-term minor to moderate impacts, depending upon vehicle speed would occur along the beaches where most routes are established for ORV driving. While impacts over the majority of the Seashore beaches would be long-term and adverse due to greater numbers of designated year-round ORV routes, impacts would be short-term and adverse in the areas in front of village beaches, which are only opened seasonally to ORV use. Short-term adverse impacts would also result during other closure periods along any ORV route for resource protection, safety or administrative purposes. During closures, the potential for increased vehicle concentrations along remaining open ORV routes would increase the frequency of occurrence of single ORV pass-by events. Impacts would remain minor to moderate and adverse, depending on vehicle speed, but vehicle noise may dominate the natural soundscape more frequently. In general, as ORV use would continue intermittently over the life of the management plan, vehicle noise would be a recurring, long-term minor to moderate adverse impact in all areas of the Seashore beaches open to ORV driving. Additionally, as closure periods, which have the potential to provide short-term benefits, would be implemented throughout the life of the management plan, long-term benefits would arise.

~~C~~Cumulative impacts to the natural soundscape would be long-term, minor to moderate and adverse.

There would be no impairment to soundscapes because…

Impacts of Alternative B: No Action—Continuation of Management under Terms of the Consent Decree

Analysis. Under alternative B, areas accessible to ORVs would be similar to alternative A, except that the area from ramp 43 to 0.4 miles north would be open to ORVs year-round instead of just seasonally and large pre-nesting closures would be established. Basically, all areas of the Seashore would continue to be open to ORV use, unless closures are established for resource protection, administrative, or safety reasons or routes are designated for seasonal use. Further, vehicle speed limits for ORVs would be similar to those under alternative A, except that under alternative A, speeds would be limited to 25 mph with a reduction to 10 mph in front of villages during the off season (September 16 – May 14). Under alternative B, in general, a reduced speed limit (15 mph) would be imposed from May 15 through September 15 while the speed limit would increase to 25 mph from September 15 through May 14.

As ORV access areas and speed limits are similar to alternative A, during the time period when speed limits are 15 mph, impacts to the natural soundscape and wildlife would be minor and adverse and would become moderate and adverse during times when the speed limit is increased to 25 mph. Larger resource protection buffers identified under this alternative would also further decrease the potential for vehicle noise impacts to ground-nesting birds as vehicle noise does not add 3 dBA or more to the ambient environment further than 30 meters inland of a vehicle, even for higher speeds. Impacts to visitors would also be similar to those described under alternative A, although slower speeds imposed during the peak season when most visitors are on the beaches would potentially result in greater reductions in visitor awareness as surf sounds would dominate closer to vehicles. The duration of impacts would be long-term and adverse along routes open year-round, including along the additional year-round route from ramp 43 to 0.4 miles north established under alternative B. As all ORV routes, including those open year-round, are subject to closures, long-term impacts would potentially become short-term and adverse, depending on the length of the specific closure. Short-term benefits would also arise during closure periods which limit ORV activity to less than one year due to the lack of vehicle noise during these periods. Some additional short-term benefits would arise under alternative B due to regulations eliminating night driving over a period of approximately four months. However, similar to alternative A, closure periods present the potential for increased numbers of vehicles in areas where routes remain open, thereby more frequently dominating the sound energy in such areas. In general, all ORV use as well as closure periods

would occur intermittently over the length of the management plan, thereby creating long-term minor to moderate adverse impacts as well as long-term benefits (during closure periods) to the natural soundscape along the beaches of the Seashore.

Under alternative B, there would be no planned construction of new ORV access ramps or reconfigurations of existing ramps. Thus, there would be no construction noise-related impacts under this alternative.

Cumulative Impacts. Under alternative B, the same past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore, which in turn may affect wildlife and visitor use, as under alternative A. These long-term minor to moderate adverse impacts, combined with the long-term minor to moderate adverse impacts of alternative B would result in long-term minor to moderate cumulative impacts. However, the potential for such cumulative impacts would be somewhat reduced due to the seasonal elimination of night driving

Conclusion. As described under alternative A, impacts to the natural soundscape and wildlife within the Seashore would be minor to moderate, depending upon vehicle speed. Due to the slower speed limits proposed during the peak season when more visitors would be using beach areas, the potential for a greater reduction in visitor awareness would occur under this alternative as compared to alternative A. On beaches where ORV routes are open year-round, including the additional year-round route established under alternative B, impacts would be long-term and adverse, but would potentially become short-term and adverse during closure periods. In locations where ORV routes are specifically designated as "seasonal," impacts would be short-term and adverse. As with alternative A, closures of any kind present the potential for increased concentrations of vehicles in areas where ORV routes remain open. In such areas, the potential for vehicle noise to more frequently dominate the sound energy would arise. Aside from the short-term benefits that would occur in areas undergoing closure periods of any kind, additional short-term benefits may occur under alternative B as a result of regulations imposed to seasonally eliminate night driving. In general, all ORV use as well as closure periods would occur intermittently over the length of the management plan, thereby creating long-term minor to moderate adverse impacts as well as long-term benefits (during closure periods) to the natural soundscape along the beaches of the Seashore.

Cumulative impacts to the natural soundscape would be long-term, minor to moderate and adverse.

There would be no impairment to soundscapes because…

Impacts of Alternative C: Seasonal Management

Analysis. Under alternative C, ORV access would be prohibited in all areas of the Seashore except where an ORV route is specifically designated. Areas of high resource sensitivity and high visitor use could be designated as seasonal ORV routes, with restrictions based on seasonal resource and visitor use, or as year-round non-ORV areas. Generally, most areas where there is a seasonally designated ~~seasonal~~ ORV route would be open to ORVs from October 15 to March 14. Areas of historically lower visitor use and resource sensitivity would be designated as year-round ORV routes, subject to temporary resource closures. Additionally, ORV speeds would be limited to 15 mph (unless otherwise posted), with no proposed increases during the off season.

Similar to impacts described under alternatives A and B for a 15 mph speed limit, impacts both inland and seaward along the Seashore beaches would be long-term minor and adverse in areas designated for year-

round ORV use with the potential to become short-term in duration during temporary resource closures. Further, impacts to the natural soundscape in areas specifically designated for seasonal ORV use would be short-term, minor and adverse as seasonal closures would generally limit ORV activity in such areas to five months (i.e., ORV routes would generally be open from March 15 to Oct 14). Compared to alternatives A and B, seasonal closures under alternative C would last approximately three months longer, thus providing longer periods for natural sounds to prevail in seasonally closed areas. Unlike alternatives A and B, which allow for ORV access throughout the entire Seashore, the establishment of vehicle-free areas year-round under alternative C would result in areas of long-term negligible adverse impacts such that ORV noise is absent, and natural sounds would prevail. The establishment of non-ORV areas and additional seasonally designated ORV areas with longer closure periods under alternative C would create fewer areas open to ORV use as compared to alternatives A and B. Therefore, the spatial extent of short-term benefits would be greater than under alternatives A and B. Conversely, the potential would also exist for increased concentrations of ORVs in areas that would remain open to ORV use. As described under alternatives A and B, diversion of ORVs to open areas would potentially result in vehicle noise more frequently dominating the sound energy in such areas. Given the potential for fewer open ORV areas, vehicle concentrations in open areas under alternative C may be potentially greater than under alternatives A and B, thereby potentially increasing the frequency of vehicle noise in such areas. In general, all ORV use as well as closure periods would occur intermittently over the length of the management plan, thereby creating long-term minor adverse impacts as well as long-term benefits (during closure periods) to the natural soundscape along the beaches of the Seashore where ORV use is allowed.

Similar to impacts described under alternatives A and B for a 15 mph speed limit, impacts to wildlife would be minor and adverse. However, under alternative C, additional resource protection closures outside of the breeding season as well as designated vehicle-free areas would be established based on an annual nonbreeding habitat assessment conducted after the breeding season. Such closures and designated vehicle free areas would provide areas of nonbreeding shorebird habitat with reduced human disturbance and additional short-term and long-term benefits. Non-ORV areas would also result in negligible wildlife impacts, with potentials for ORV pass-by events only for administrative purposes. Additional larger resource protection buffers, as compared to alternatives A and B, would also reduce the potential for impacts to ground-nesting birds as they may be located further from vehicles.

Impacts to visitor use would also be similar to alternatives A and B. However, under this alternative, seasonal restrictions on ORV use as well as designated non-ORV route areas based on locations of high visitor use would potentially reduce the impacts to visitor awareness of vehicles on the beaches as well as visitors' ability to experience natural sounds.

As part of this alternative, existing ramps would be improved, reconfigured and/or supplemented by new ramps, including the construction of a new ramp 47. As noise from construction activities would generally last for only a few days to a week and would be localized, construction and reconfiguration of ramps would create short-term minor adverse impacts.

Cumulative Impacts. Under alternative C, the same past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore, which in turn may affect wildlife and visitor use, as under the no action alternatives. These long-term minor to moderate adverse impacts, combined with the long-term minor adverse impacts of alternative C would result in long-term minor ~~to moderate~~adverse cumulative impacts, which would potentially be reduced due to seasonal restrictions on ORV use and designated non-ORV areas under this alternative.

Conclusion. As described under alternative A, impacts to the natural soundscape, and in turn, wildlife, resulting from a 15 mph speed limit would be minor and adverse. However, the potential for wildlife and visitor use impacts as well as the extent of such impacts may be reduced due to seasonal restrictions and

designated non-ORV areas. Like under alternatives A and B, impacts would be long-term and adverse for year-round ORV areas, potentially becoming short-term subject to temporary resource closures. As seasonal closures would limit ORV activity to less than a year, short-term adverse impacts would result. Closures of any kind, depending on the closure length, would also provide short-term benefits by providing noise-free periods. Under alternative C there would be areas of negligible impacts due to designated non-ORV areas and greater opportunities for natural sounds to prevail due to longer seasonal closure periods as compared to alternatives A and B. Conversely, fewer open ORV areas and longer seasonal closure periods also present the potential for greater concentrations of ORVs in areas with open ORV routes, thereby increasing the frequency of vehicle noise in such areas. In general, all ORV use as well as closure periods would occur intermittently over the length of the management plan, thereby creating long-term minor adverse impacts as well as long-term benefits (during closure periods) to the natural soundscape along the beaches of the Seashore where ORV use is allowed. Construction activities associated with ramp reconfigurations and improvements, as well as the addition of a new ramp, would be localized and last only a few days to a week. Therefore, construction-related impacts would be minor and adverse.

Cumulative impacts to the natural soundscape would be long-term, minor

-and adverse.

There would be no impairment to soundscapes because…

Impacts of Alternative D: Increased Predictability and Simplified Management

Analysis. Under this alternative, ORV routes would be determined by identifying areas that historically do not support sensitive resources and areas of lower visitor use. These areas would be designated ORV routes year-round. Unlike under alternative C, areas of historically high resource sensitivity or high visitor use would not be designated as ORV routes. Year-round vehicle-free areas would include the area in front of villages and lifeguarded beaches as well as designated "Species Management Areas." Additionally, ORV speeds would be limited to 15 mph (unless otherwise posted), with no proposed increases during the off season.

Compared to the no action alternatives as well as alternative C, the designated ORV use and non-ORV use areas proposed under this alternative would decrease the area over which vehicle noise may potentially impact the natural soundscape of the Seashore. Specifically, alternative D would provide the largest area of long-term negligible impacts along the beaches since approximately 40.8 miles of beach~~25 ORV routes~~ would become non-ORV areas~~routes~~. In such areas, natural sounds would prevail, thus providing a long-term benefit to the natural soundscape, also over the largest area among all alternatives. Similar to the no action alternatives and alternative C, in areas designated as year-round ORV routes, impacts would be long-term minor and adverse due to the proposed 15 mph vehicle speed limit and potential for ORV activity occurring for more than one year. Impacts may potentially become short-term minor and adverse in year-round ORV use areas subject to temporary resource closures. During such closures, short-term benefits would occur due to the lack of ORV noise and would be long-term benefits considering that resource closures would recur throughout the life of the management plan. As with the no action alternatives and alternative C, closure periods and a reduced number of open ORV routes creates the potential for higher concentrations of vehicles in areas remaining open to ORV use. Due to the greater number of non-ORV areas under this alternative as compared to the no action alternatives and alternative C, alternative D presents the greatest potential for vehicle noise to dominate the sound energy more frequently (i.e., potential for greater vehicle pass-by events) in these areas.

Similar to wildlife impacts described under alternatives A and B for a 15 mph speed limit, impacts to wildlife under this alternative would be minor and adverse. However, like under alternative C, additional resource protection closures as well as designated vehicle-free areas in "Species Management Areas" would be established. Such closures and designated vehicle free areas would provide additional short-term and long-term benefits as compared to the no-action alternatives. Larger designated non-ORV areas would also result in additional negligible wildlife impacts as compared to alternative C. Further, larger resource protection buffers, as compared to alternatives A and B, would also reduce the potential for impacts to ground-nesting birds as they may be located further from vehicles.

The greater number of designated non-ORV areas, particularly in areas of high visitor use, proposed under this alternative provides a greater number of places for visitors to experience and enjoy the natural soundscape of the park without intermittent disturbances from vehicle pass-by events and reduces the potential for impacts to visitor awareness of vehicles. Particularly, residents and visitors staying in the villages would experience long-term negligible adverse impacts and long-term benefits while using village area beaches.

Similar to alternative C, as part of this alternative, existing ramps would be improved, reconfigured and/or supplemented by new ramps. Impacts from construction-related activities would last only a few days to a week and would be localized. Therefore, construction related noise impacts would be regarded as minor and adverse.

Cumulative Impacts. Under alternative D, the same past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore, which in turn may affect wildlife and visitor use, as under the no action alternatives. These long-term minor to moderate adverse impacts, combined with the long-term minor adverse impacts of alternative D would result in long-term minor ~~to moderate~~ cumulative impacts, which would potentially be least, compared to all alternatives, due to the largest extent of non-ORV use areas under alternative D.

Conclusion. As described under alternative A, impacts to the natural soundscape and wildlife resulting from a 15 mph speed limit would be minor and adverse. However, the potential for impacts to wildlife and visitor use from ORV noise would be the least under this alternative, as compared to the no-action and all action alternatives due to larger, year-round areas of designated non-ORV use. Adverse impacts would be long-term for all ORV routes since they are designated for year-round ORV use, but would potentially become short-term subject to temporary resource closures. During resource closures, short-term benefits would occur due to the lack of ORV noise and would also be long-term benefits since closures would recur throughout the life of the management plan. The key difference between this alternative and all other alternatives is that alternative D has the greatest extent of long-term negligible adverse impacts resulting from the number of year-round non-ORV route designations. Alternative D also has the greatest extent of long-term benefits to the natural soundscape, visitors and wildlife due to these non-ORV areas. However, this alternative would also present the greatest potential for increased ORV pass-by events that dominate the sound energy in designated ORV areas due to the fewer number of open ORV areas in which vehicles may drive. Like under alternative C, construction related noise impacts from ramp improvements and the construction of a new ramp would be minor and adverse.

Cumulative impacts to the natural soundscape would be long-term, minor and adverse.

There would be no impairment to soundscapes because…

Impacts of Alternative E: Variable Access and Maximum Management

Analysis. Management of ORV use under alternative E would be similar to management techniques proposed under alternative C with regards to the methodology for determining locations of ORV and non-ORV routes and access. Specifically, ORV access would be prohibited in all areas of the Seashore except where an ORV route is specifically designated. Areas of high resource sensitivity and high visitor use would generally be designated as seasonal ORV routes with restrictions based on seasonal resource and visitor use or as year-round non-ORV areas. Generally, most village beach areas where there is a designated seasonal ORV route would be open to ORVs from November 1 to March 31. Most areas of historically lower visitor use and resource sensitivity would be designated as year-round ORV routes, subject to temporary resource closures and limited access periods with ORV pass-through routes during shorebird breeding seasons. Additionally, ORV speeds would be limited to 15 mph (unless otherwise posted), with no proposed increases during the off season.

As alternative E would result in similar management techniques to alternative C, impacts to the natural soundscape would also be similar. Both inland and seaward along the Seashore beaches, impacts would be minor and adverse due to the proposed 15 mph speed limit. Like alternative C, in areas designated for year-round ORV use, adverse impacts would be long-term with the potential to become short-term in duration during temporary resource closures. Also similar to alternative C, adverse impacts to the natural soundscape in areas specifically designated for seasonal ORV use would be short-term, as seasonal closures would generally limit ORV activity in such areas to between five and 6.5 months depending on whether the route is within a "species management area." Short-term adverse impacts may also be regarded as long-term as vehicle use would be an intermittent recurring impact over the life of the management plan. Short-term benefits would also occur during seasonal and temporary resource closures due to the lack of ORV noise and would also be regarded as long-term benefits due to the recurrence of such closures over the life of the management plan. Compared to the no-action alternatives and similar to alternative C, this alternative would result in areas of long-term negligible impacts, which would also be regarded as long-term benefits, in beach locations where non-ORV use is specifically designated. However, the extent of such impacts and benefits would not be as large as under alternative D. As described under alternatives C and D, although seasonal and resource closures would provide benefit to areas by eliminating vehicle noise during those times, the potential would arise for increased vehicle concentrations along other routes that would remain open. The diversions to other open routes may not be as significant under this alternative as under alternative C or D given that some seasonal routes are open longer than others, ORV pass-through zones would be established in certain areas, and water taxi service to Bodie Island Spit and South Point would be available as an alternative option to driving. Although water taxi service would potentially create a temporary and occasional source of noise in the areas of the beach nearest the water taxi route, adverse impacts from the water taxis should be considered relative to the benefits associated with the potential reduction in vehicle use on the beach that the available service would provide.

Similar to alternatives C and D, impacts to wildlife under this alternative would be minor and adverse for the proposed 15 mph speed limit. Additional resource protection closures, compared to the no-action alternatives, as well as designated vehicle-free areas or seasonally closed ORV routes in "Species Management Areas" would be established. Such closures and designated vehicle free areas would provide additional short-term and long-term benefits as compared to the no-action alternatives, but not as much as under alternative D. Further, the establishment of pass-through zones during the shorebird breeding season would potentially result in additional periods of minor adverse impacts compared to alternatives C and D, although standard resource protection buffers would be applied. Designated non-ORV areas would also result in additional negligible wildlife impacts as compared to the no-action alternatives. Larger resource protection buffers, as compared to the no-action alternatives, would also reduce the potential for impacts to ground-nesting birds as they may be located further from vehicles.

Impacts to visitor use in terms of visitor awareness of vehicles and visitor ability to enjoy the natural soundscape would be as described under alternatives C and D. The establishment of year-round vehicle-free areas, under the implementation of alternative E, particularly in areas of high visitor use, would provide opportunities for non-ORV users to experience the natural quiet. Areas open to seasonal use would also provide such opportunities, similar to alternative C, however, the earlier opening of seasonally designated ORV areas in addition to the opportunity for ORV pass-through zones would potentially result in fewer "noise-free" opportunities for visitors and a greater potential for reductions in visitor awareness of vehicles.

As with the other action alternatives, existing ramp relocation would occur, however more new ramps would be constructed. Although the potential exists for additional periods of construction, activities would still be localized and limited to a few days to a week, thereby making construction-related impacts minor and adverse, similar to the other action alternatives.

Cumulative Impacts. Under alternative E, the same past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore, which in turn may affect wildlife and visitor use, as under the no action alternatives. These long-term minor to moderate adverse impacts, combined with the long-term minor adverse impacts of alternative E would result in long-term minor adverse ~~to moderate~~ cumulative impacts. However, the impact potential would be less than under the no-action alternatives, due to the implementation of seasonal ORV routes and designated non-ORV areas, but greater than under alternative D due to greater extent of ORV access and the establishment of ORV pass-through zones.

Conclusion. As described under alternative A, impacts to the natural soundscape and wildlife on the beaches resulting from a 15 mph speed limit would be minor and adverse. However, like under alternative C, the potential for wildlife and visitor use impacts as well as the extent of such impacts may be reduced due to seasonal restrictions and designated non-ORV areas. On the other hand, pass-through zones and earlier openings along seasonal routes under this alternative would potentially provide fewer "noise-free" periods for visitors and wildlife. Like under the no action alternatives and alternatives C and D, impacts would be long-term and adverse for year-round ORV areas, potentially becoming short-term subject to temporary resource closures. As seasonal closures would limit ORV activity to less than a year, short-term adverse impacts would result, which would also be regarded as long-term adverse impacts due to the fact that ORV use would recur intermittently over the life of the management plan. Closures of any kind, depending on the closure length, would also provide short-term and long-term benefits by providing temporary noise-free periods that would recur over the life of the management plan. Although areas of negligible impacts would also exist under this alternative due to designated non-ORV areas, their extent would not be as large as under alternative D. Vehicle diversions to other open routes may not be as significant under this alternative as under alternative C or D given that some seasonal routes are open longer than others, ORV pass-through zones would be established in certain areas, and water taxi service would be available as an alternative option to driving. Although under this alternative, more ramps would be constructed, as compared to alternatives C and D, construction-related impacts would remain minor and adverse due to the localized nature of the activities.

Cumulative impacts to the natural soundscape would be long-term, minor and adverse.

There would be no impairment to soundscapes because…

Impacts of Alternative F: Management Based on Advisory Committee Input

Analysis. Management of ORV use under alternative F would be similar to management techniques proposed under alternatives C and E with regards to the methodology for determining locations of ORV and non-ORV routes and access. Specifically, ORV access would be prohibited in all areas of the Seashore except where an ORV route is specifically designated. Areas of high resource sensitivity and high visitor use would generally be designated as seasonal ORV routes with restrictions based on seasonal resource and visitor use or as year-round non-ORV areas. Generally, most areas where there is a designated seasonal ORV route would be open to ORVs from either August 1 to March 14 or September 16 to May 14. Two areas on Ocracoke Island would only be open from November 1 to March 31 and November 1 to March 14. Most areas of historically lower visitor use and resource sensitivity would be designated as year-round ORV routes, subject to temporary resource closures and limited access through ORV pass-through zones during shorebird breeding season. Additionally, ORV speeds would be limited to 15 mph (unless otherwise posted), with no proposed increases during the off season.

As management techniques would be similar to those proposed under alternatives C and E, impacts to the natural soundscape would be similar. Both inland and seaward along the Seashore beaches, impacts would be minor and adverse due to the proposed 15 mph speed limit. The duration of impacts would also generally be the same, with long-term adverse impacts occurring in regions with year-round ORV routes. Such impacts would potentially become short-term and adverse subject to temporary closures. Also similar to alternative C, adverse impacts to the natural soundscape in areas specifically designated for seasonal ORV use would be short-term. However, the length of seasonal closures would be shorter than under alternatives C and E, such that ORV use would be allowed along seasonal routes for approximately 7.5 to 8 months, depending on whether or not the route is in a "Species Management Area." Therefore, the period in which natural sounds would prevail would be shorter under this alternative. Short-term adverse impacts may also be regarded as long-term as vehicle use would be an intermittent recurring impact over the life of the management plan. Short-term benefits would also occur during seasonal and temporary resource closures due to the lack of ORV noise and would also be regarded as long-term benefits due to the recurrence of such closures over the life of the management plan. Compared to the no-action alternatives and similar to alternatives C and E, this alternative would result in areas of long-term negligible impacts, which would also be regarded as long-term benefits, in beach locations where non-ORV use is specifically designated. The extent of long-term negligible impacts and long-term benefits would potentially be greater than alternatives C and E due to the greater number of designated non-ORV routes. However, the extent of such impacts and benefits would not be as large as under alternative D. As described under the other action alternatives, although seasonal and resource closures would provide benefit to areas by eliminating vehicle noise during those times, the potential would arise for increased vehicle concentrations along other routes that would remain open. The time period of potential increased vehicle concentrations may be shorter under this alternative than under the other action alternatives given that seasonal routes are open longer.

Similar to the other action alternatives, adverse impacts to wildlife would be minor due to the proposed 15 mph speed limit. Additional resource protection closures, compared to the no-action alternatives, as well as designated vehicle-free areas or seasonally closed ORV routes in "Species Management Areas" would be established. Such closures and designated vehicle free areas would provide additional short-term and long-term benefits as compared to the no-action alternatives, but not as much as under alternative D. Designated non-ORV areas would also result in additional negligible wildlife impacts and benefits as compared to the no-action alternatives. The extent of such impacts and benefits due to non-ORV areas would be greater under this alternative compared to alternatives C and E since there would be a greater cumulative length of non-ORV area~~route~~s under this alternative. Like under the other action alternatives, larger resource protection buffers, as compared to the no-action alternatives, would also reduce the potential for impacts to ground-nesting birds as they may be located further from vehicles.

Impacts to visitor use in terms of visitor awareness of vehicles and visitor ability to enjoy the natural soundscape would be as described under the other action alternatives. The establishment of year-round vehicle-free areas, under the implementation of alternative F, particularly in areas of high visitor use, would provide opportunities for non-ORV users to experience the natural quiet. Areas open to seasonal use would also provide such opportunities, similar to alternatives C and E, however, the earlier opening of seasonally designated ORV areas would potentially result in fewer "noise-free" opportunities for visitors and a greater potential for reductions in visitor awareness of vehicles.

As with alternative E, existing ramp relocation would occur, and more new ramps would be constructed compared to the other action alternatives and the no-action alternatives. Although the potential exists for additional periods of construction, activities would still be localized and limited to a few days to a week, thereby making construction-related impacts minor and adverse.

Cumulative Impacts. Under alternative F, the same past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore, which in turn may affect wildlife and visitor use, as under the no action alternatives. These long-term minor to moderate adverse impacts, combined with the long-term minor adverse impacts of alternative F would result in long-term minor ~~to moderate~~adverse cumulative impacts. Like under the other action alternatives, the impact potential would be less than under the no-action alternatives, due to the implementation of seasonal ORV routes and designated non-ORV areas, but greater than under alternative D due to the greater extent of ORV access. Cumulative impacts may also be greater under this alternative compared to alternatives C and E, as ORV routes would open earlier, thereby providing shorter "noise-free" periods.

Conclusion. As described under alternative A, impacts to the natural soundscape and wildlife on the beaches resulting from a 15 mph speed limit would be minor and adverse. Like under alternatives C and E, the potential for wildlife and visitor use impacts from ORV noise may be reduced due to seasonal closures and designated non-ORV areas. However, seasonal routes would re-open earlier than under alternatives C and E, thereby creating shorter "noise-free" periods. Like under the no action alternatives and the other action alternatives, impacts would be long-term and adverse for year-round ORV areas, potentially becoming short-term subject to temporary resource closures. As seasonal closures would limit ORV activity to less than a year, short-term adverse impacts would result, which would also be regarded as long-term adverse impacts due to the fact that ORV use would recur intermittently over the life of the management plan. Closures of any kind, depending on the closure length, would also provide short-term and long-term benefits by providing temporary noise-free periods that would recur over the life of the management plan. Larger areas of negligible impacts due to designated non-ORV areas would also exist under this alternative as compared to the no-action alternatives and alternatives C and E. Vehicle diversions to other open routes may not be as significant under this alternative as under the other action alternatives given that some seasonal routes are open longer than others. Although under this alternative, more ramps would be constructed, as compared to alternatives C and D, construction-related impacts would remain minor and adverse due to the localized nature of the activities.

Cumulative impacts to the natural soundscape would be long-term, minor and adverse.

There would be no impairment to soundscapes because…

TABLE 52. SUMMARY OF IMPACTS TO SOUNDSCAPES UNDER THE ALTERNATIVES

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Soundscapes					

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Overall, minor to moderate impacts, depending upon vehicle speed would occur along the beaches where most routes are established for ORV driving. While impacts over the majority of the Seashore beaches would be long-term and adverse due to greater numbers of designated year-round ORV routes, impacts would be short-term and adverse in the areas in front of village beaches, which are only opened seasonally to ORV use. Short-term adverse impacts would also result during other closure periods along any ORV route for resource protection, safety or administrative purposes. During closures, the potential for increased vehicle concentrations along remaining open ORV routes would increase the frequency of occurrence of single ORV pass-by events. Impacts would remain minor to moderate and adverse, depending on vehicle speed, but vehicle noise may dominate the natural soundscape more frequently. In general, as ORV use would continue intermittently over the life of the management plan, vehicle noise would be a recurring, long-term minor to moderate adverse impact in all areas of the Seashore beaches open to ORV driving. Additionally, as closure periods,	As described under alternative A, impacts to the natural soundscape and wildlife within the Seashore would be minor to moderate, depending upon vehicle speed. Due to the slower speed limits proposed during the peak season when more visitors would be using beach areas, the potential for a greater reduction in visitor awareness would occur under this alternative as compared to alternative A. On beaches where ORV routes are open year-round, including the additional year-round route established under alternative B, impacts would be long-term and adverse, but would potentially become short-term and adverse during closure periods. In locations where ORV routes are specifically designated as "seasonal," impacts would be short-term and adverse. As with alternative A, closures of any kind present the potential for increased concentrations of vehicles in areas where ORV routes remain open. In such areas, the potential for vehicle noise to more frequently dominate the sound energy would arise. Aside from the short-term benefits that would occur in areas undergoing closure periods of any kind, additional short-term benefits may occur under alternative B as a result of regulations imposed to seasonally eliminate night	As described under alternative A, impacts to the natural soundscape, and in turn, wildlife, resulting from a 15 mph speed limit would be minor and adverse. However, the potential for wildlife and visitor use impacts as well as the extent of such impacts may be reduced due to seasonal restrictions and designated non-ORV areas. Like under alternatives A and B, impacts would be long-term and adverse for year-round ORV areas, potentially becoming short-term subject to temporary resource closures. As seasonal closures would limit ORV activity to less than a year, short-term adverse impacts would result. Closures of any kind, depending on the closure length, would also provide short-term benefits by providing noise-free periods. Under alternative C there would be areas of negligible impacts due to designated non-ORV areas and greater opportunities for natural sounds to prevail due to longer seasonal closure periods as compared to alternatives A and B. Conversely, fewer open ORV areas and longer seasonal closure periods also present the potential for greater concentrations of ORVs in areas with open ORV routes, thereby increasing the frequency of vehicle noise in such areas. Construction activities would be localized and last only a few days to a week and would be	As described under alternative A, impacts to the natural soundscape and wildlife resulting from a 15 mph speed limit would be minor and adverse. However, the potential for impacts to wildlife and visitor use from ORV noise would be the least under this alternative, as compared to the no-action and all action alternatives due to larger areas of designated non-ORV use. During resource closures, short-term benefits would occur due to the lack of ORV noise and would also be long-term benefits since closures would recur throughout the life of the management plan. The key difference between this alternative and all other alternatives is that alternative D has the greatest extent of long-term negligible adverse impacts resulting from the number of year-round non-ORV route designations. Alternative D also has the greatest extent of long-term benefits to the natural soundscape, visitors and wildlife due to these non-ORV areas. However, this alternative would also present the greatest potential for increased ORV pass-by events that dominate the sound energy in designated ORV areas due to the fewer number of open ORV areas in which vehicles may drive. Like under alternative C, construction related noise impacts from ramp improvements and the construction of a new ramp would	As described under alternative A, impacts to the natural soundscape and wildlife on the beaches resulting from a 15 mph speed limit would be minor and adverse. However, like under alternative C, the potential for wildlife and visitor use impacts as well as the extent of such impacts may be reduced due to seasonal restrictions and designated non-ORV areas. On the other hand, pass-through zones and earlier openings along seasonal routes under this alternative would potentially provide fewer "noise-free" periods for visitors and wildlife. Vehicle diversions to other open routes may not be as frequent under this alternative as under alternative C or D given that some seasonal routes are open longer than others, ORV pass-through zones would be established in certain areas, and water taxi service would be available as an alternative option to driving. Although under this alternative, more ramps would be constructed, as compared to alternatives C and D, construction-related impacts would remain minor and adverse due to the localized nature of the activities. Cumulative impacts under alternative E would be long-term, minor and adverse.	As described under alternative A, impacts to the natural soundscape and wildlife on the beaches resulting from a 15 mph speed limit would be minor and adverse. Like under alternatives C and E, the potential for wildlife and visitor use impacts from ORV noise may be reduced due to seasonal closures and designated non-ORV areas. However, seasonal routes would re-open earlier than under alternatives C and E, thereby creating shorter "noise-free" periods. Vehicle diversions to other open routes may not be as frequent under this alternative as under the other action alternatives given that some seasonal routes are open longer than others. Although under this alternative, more ramps would be constructed, as compared to alternatives C and D, construction-related impacts would remain minor and adverse due to the localized nature of the activities. Cumulative impacts under alternative F would be long-term, minor and adverse.

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
which have the potential to provide short-term benefits, would be implemented throughout the life of the management plan, long-term benefits would arise. Cumulative impacts under alternative A would be long-term, minor to moderate and adverse.	driving. Cumulative impacts under alternative B would be long-term, minor to moderate and adverse.	minor and adverse. Cumulative impacts under alternative C would be long-term, minor and adverse.	be minor and adverse. Cumulative impacts under alternative D would be long-term, minor and adverse.		

VISITOR USE AND EXPERIENCE

GUIDING REGULATIONS AND POLICIES

Cape Hatteras National Seashore's authorizing legislation (the Act) states that the national seashore shall be set apart "for the benefit and enjoyment of the people." The act further states that "except for certain portions of the area, deemed to be especially adaptable for recreational uses, particularly swimming, boating, sailing, fishing, and other recreational activities of similar nature, which shall be developed for such uses as needed, the said areas shall be permanently reserved as a primitive wilderness and no development of the project or plan for the convenience of visitors shall be undertaken which would be incompatible with the preservation of the unique flora and fauna or the physiographic conditions now prevailing in this area" (NPS 1937, Section 4). Management goals related to ORV use are included in the Seashore's General Management Plan, which states, "Selected beaches will continue to be open for ORV recreational driving and in conjunction with surf fishing in accordance with the existing use restrictions" (NPS 1984). Providing for this use would occur in the context of the overall planning objective of preserving the cultural resources and the flora, fauna, and natural physiographic condition, while providing for appropriate recreational use and public access to the oceanside and soundside shores in a manner that will minimize visitor use conflict, enhance visitor safety, and preserve Seashore resources.

The 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 National Park Service 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. Appropriate visitor enjoyment is often associated with the inspirational qualities of the parks. As a general matter, preferred forms of enjoyment are those that are uniquely suited to the superlative natural and cultural resources found in the parks and that (1) foster an understanding of and appreciation for park resources and values, or (2) promote enjoyment through a direct association with, interaction with, or relation to park resources. These preferred forms of use contribute to the personal growth and well-being of visitors by taking advantage of the inherent educational value of parks. Equally important, many appropriate uses also contribute to the health and personal fitness of park visitors. These are the types of uses that the Service will actively promote, in accordance with the Organic Act.

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 (Use of Off-road Vehicles on Public Lands, as amended by Executive Order 11989). 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 off-road vehicle 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 would 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 2006c, sec. 4.4.1).

The goals of providing a variety of recreational opportunities while protecting the natural systems at Cape Hatteras National Seashore are evident in the objectives of this plan/EIS. With regard to visitor use and experience, the objectives state that this plan/EIS should:

- ensure that ORV operators are informed about the rules and regulations regarding ORV use at the Seashore;
- manage ORV use to allow for a variety of visitor use experiences;
- minimize conflicts between ORV use and other uses; and
- ensure that ORV management promotes the safety of all visitors.

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In addition, the Seashore has identified objectives for communicating with the general public and visitor population that enjoy the recreational opportunities and natural and cultural resources provided by the Seashore. Communication and information sharing is an integral component of ensuring visitor satisfaction. Thus, the proposed plan should also accomplish the following:

- establish a civic engagement component for ORV management;
- establish procedures for prompt and efficient public notification of beach access status including any temporary ORV use restrictions for such things as ramp maintenance, resource and public safety closures, storm events, etc.; and
- build stewardship through public awareness and understanding of NPS resource management and visitor use policies and responsibilities as they pertain to the Seashore and ORV management.

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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 primary sources of data used to determine current visitation were surveys conducted by the NPS (Loomis 2009axx, bxx; Mansfield 2009xx), the visitor use survey conducted by the park in 2002 (University of Idaho 2003), and NPS visitor use statistics (NPS 2008e), as described in the "Chapter 3: Affected Environment." The number of recreational visitors as reported by NPS is not a precise count, but is

estimated from a variety of sources (NPS 1993). The estimated range for ORV numbers is based on NPS aerial survey counts adjusted by rental housing data to derive a minimum and maximum conservative estimate for oceanside ORV use.

The likelihood of partial or full beach resource closures and the associated restriction of ORV or pedestrian access were also considered in determining visitor use impacts. These closures are dependent on the breeding habits of specific species, particularly the piping plover, American oystercatcher, and four species of colonial waterbirds, ~~and the sea turtles,~~ including when the bird species court, establish territory, build nests, and lay eggs, as well as when the young first leave the nest to forage for food; and three species of sea turtles, including ~~or~~ when turtles lay nests until turtle hatchlings return to the sea. Also, in evaluating visitor experience, the Seashore's enabling legislation was considered so that the analysis of visitor experience considered not only the ability of visitors to engage in a desired activity, but if that activity is compatible with the preservation of the unique flora and fauna or the physiographic conditions.

In addition to visitor activities, the analysis of visitor use also considers the viewscape (night sky) and soundscape of the Seashore and potential visitor use conflicts. Soundscapes are covered separately in this plan/EIS, but noise impacts do influence visitor experience and are therefore mentioned in this analysis where appropriate. The alternatives were qualitatively analyzed and considered if, while engaging in their desired visitor activity, visitors would see and hear the sights and sounds expected under that activity. An important component of this experience that was specifically addressed in the impact thresholds is viewing night skies. The analysis of night skies looks at zones that have been identified in the Seashore by the NPS Night Skies Team (see "Chapter 3: Affected Environment"). The zones represent the conditions that should be occurring at the Seashore in regards to permanent lighting sources, and not necessarily what is occurring currently. For example, in the NDZ and PLZ1 zones, there is no expectation of artificial lighting. These zones exclude temporary lighting installed less than 60 days for special purposes (not ongoing) and all emergency lighting.

A summary of visitor use and experience impacts under all alternatives is provided in table 53 at the end of this section. 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.

Any permanent lighting would not change the existing lighting zone designation throughout the Seashore. Visitors would not have a noticeable change in the ability to experience night skies in the NDZ and PLZ1 zones.

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.

New introduced sources of permanent light may slightly alter the desired lighting zone designation of an area. Visitors would have a noticeable, but slight, change in the ability to experience night skies in the NDZ and PLZ1 zones, but this change would not impact their overall visitor experience.

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.

New introduced sources of permanent light would create a noticeable change in the desired lighting zone designation of an area. Visitors would have a noticeable change in the ability to experience night skies in the NDZ and PLZ1 zones, and this change would impact their overall visitor experience.

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.

Visitors would not be able to experience night skies in the NDZ and PLZ1 zones, and this change would impact their overall visitor experience.

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.

Comment [mbm 29]: Is this a reasonable definition of "short-term"? (It is a much shorter time period than how the term is used under all other impact topics.) Under this definition of "short term" almost nothing will be short-term, so need to carefully review where it is used throughout this section. Only short-term impacts, under this definition, maybe the inconvenience of getting a permit and the impact of brief restrictions due to carrying capacity (and some resource closures under A). MBM

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Comment [dw30]: JH - Should this indicate consecutive or non-consecutive?

Berger: confirm change is OK, if it occurs for three times a year, just one year, could still be long-term as effects could be felt in future years (i.e. uncertainty one year could make people not want to return other 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—Continuation of Management under the Interim Protected Species Management Strategy

Under alternative A, all areas of the Seashore would continue to be open to ORV and pedestrian use, unless closures were established for resource protection, administrative, or safety reasons. Visitors could be restricted from popular areas, such as the points and spits, depending on the duration and extent of the closure, but in most cases, alternative or bypass routes would be identified and used to allow access to the maximum extent possible.

Resource Closures. Resource closures for birds would continue to be implemented annually, based on recent breeding activity on the spits, Cape Point, and South Beach and in other Seashore locations. Before implementing a closure, alternate access routes and then bypass criteria would be evaluated. An ORV and pedestrian corridor would be provided adjacent to closure areas unless species activity or safety issues required a full-beach closure. If a bypass is not available, a full-beach closure could limit ORV access through certain sections for a limited period, dependent on species behaviors and conditions.

Recent breeding activity for piping plover has been limited to Bodie Island Spit, Cape Point, ~~and~~ South Beach, Hatteras Inlet~~sland~~ Spit, and Ocracoke Island Spit. American oystercatchers nest in these areas as well, but not exclusively. Although the location of recent piping plover breeding areas could restrict large

areas of each of the point and spits beginning in April, ORV corridors to the spits and Cape Point would most likely remain open throughout the early parts of the spring and summer. However, a full-beach closure could occur to protect piping plover or American oystercatcher chicks once they vacate the nest and begin foraging. Foraging activity could occur anytime throughout the summer months, and could last from 3 to 5 weeks, until the chicks take flight. As resource closures are closed to all visitor use, ORV users and other visitors would not be able to reach the spits unless alternate access was available via an existing interdunal road or bypass. However, this type of full beach closure is less likely under alternative A than under other alternatives.

Because turtles nest anywhere in the Seashore, partial and full-beach closures could occur anywhere along Seashore beaches throughout the summer and fall months, as hatchlings emerge from the nest. These nest closures generally last from approximately the 55th day after the nest is laid until the nests hatch. Full beach closures would be unlikely, however, since using alternative routes or applying the identified bypass criteria ~~or, if absolutely necessary, relocating nests following the NCWRC handbook~~ would help ensure that ORV and pedestrian access would continue to the points and spits and other portions of the beaches.

Of particular concern for all visitors is having access to the points and spits, especially for fishing and other recreational pursuits such as walking and beachcombing. The primary access to these areas are through ramp 4 (includes Bodie Island Spit), ramps 43 to ramp 49 (includes Cape Point), ramp 55 (includes Hatteras Inlet Spit), and on Ocracoke ramp 59 (includes North Ocracoke spit) and ramps 70 and 72 (includes South Point). RTI estimates between 100,000 to 395,000 ORVs visit the Seashore annually (Loomis 2009axx), with an estimated 55%, or approximately 60,500 to 217,250 ORVs, expected to visit Seashore beaches during June through August. As indicated in the assessment of ramp usage for oceanside ramps during July 4 and Memorial Day, 2008, 75% of these ORVs use ramps for access to the points and spits, and therefore, an estimated 45,375 to 162,938 ORVs could be affected by closures. Applying a conservative high estimate of 2.7 passengers per ORV during the summer months (NPS 1993; Mansfield 2009xx), this would represent about 122,000 to 440,000 visitors in ORVs that use the access ramps. Given the approximately 2.2 million visitors each year in recent years, this would have the potential to affect about 5 to 20% of the park visitors annually. This estimate would represent the worst case scenario assuming that 75% of the ORV users are driving to the points and spits, and full beach closures at these access routes.

Therefore, under alternative A, partial-beach resource closures on the spits and points would result in restricting areas where ORV use and recreational pursuits could occur; however, pedestrians and visitors participating in activities such as swimming, sunbathing, beach walking, jogging, and shell collecting, would be able to participate in activities outside of any resource closures. Therefore, the effects of partial beach resource closures on the visitor experience would result in long-term, negligible to minor, adverse impacts. If full-beach resource closures were implemented on the spits or along spit access routes, impacts to users would likely be long-term and moderately adverse, even if the closure is temporary, since any full-beach resource closures that restrict ORV access and other visitor use would most likely occur during the summer months, when the majority of visitation occurs, and in areas where the majority of the use occurs. In the unlikely event that more than one spit or point experienced a full beach closure at the same time, impacts would be long-term, moderate to major, and adverse due to the restriction of these highly popular locations for visitor recreational use.

Resource closures for American oystercatchers, colonial waterbirds, and sea turtles may also occur in other areas throughout the Seashore. Besides the spits, American oystercatchers and colonial waterbirds are found along the shore, from Cape Point north to Pea Island and in various areas between Cape Point and Hatteras Inlet and on Ocracoke Island. This breeding habitat occurs in vicinity of ORV access ramps where ORV use is much lighter. Based on aerial surveys conducted on July 4, 2008, the daytime count

between ramps 23–38 (south of Salvo through south of Avon) is about 25% of the total oceanside ramp use, much less than the use that occurs at the more popular ramps near the spits. Generally, any ORVs and other dispersed recreation users would negotiate around these smaller closures throughout the Seashore, resulting in short-term, negligible to minor, adverse impacts because ORV and pedestrian accessibility would remain. Although a temporary full-beach resource closure could also occur in areas outside the spits, the adverse impacts would be long-term and minor because the beach would remain open on either side of resource closure and would be accessible from an ORV ramp.

Safety Closures. In addition to resource closures, alternative A cwould continue the four existing safety closures, and would continue the two administrative closures near the lighthouse and Buxton Woods. In addition, the village beaches would continue to be closed to ORV use in the busy summer months. These areas include a total of approximately 24 miles, or one-third of the total beach mileage, which would continue to be restricted to ORV users, resulting in long-term, minor, adverse impacts by limiting the ORV visitor use in these areas. Alternatively, these closures would continue to be a benefit related to protecting visitor safety and to those non-ORV users desiring a vehicle-free experience with more natural views and no vehicle-related noise in more populated areas (e.g., the village beaches, the lighthouse administrative closure area). The 2002 visitor use survey found that visiting the lighthouses was the top reason for visiting the Seashore (followed by beach combing and fishing, and visiting historic sites was the second most popular activity reported by visitors, ranked just below sunbathing/swimming). Therefore, the restriction on ORV use at these administrative areas would continue to provide a long-term benefit to the many visitors that seek the experience of historic site and lighthouse viewing without interference from vehicle traffic and noise.

Permitting and Carrying Capacity Requirements. Alternative A does not include any permitting requirements for ORV use, and has no carrying capacity restrictions or associated capacity-related management measures. This is a short-term benefit to visitor experience for most ORV users because it eliminates paperwork and effort needed to get a permit. However, without this permitting program, there is no opportunity to require a mandatory review by ORV users of rules and regulations associated with ORV use at the Seashore. This can lead to ORV users not being aware of or misunderstanding the regulations and accordingly violating the regulations, which can result in short-term negligible, minor, adverse impacts to visitor experiences at the Seashore. In addition, without the permit system, if there are violators, there would be no mechanism in place to revoke a permit and, as such, restrict access of violators to the Seashore.

The lack of any type of carrying capacity restrictions would generally be viewed as a benefit to ORV users in that there would be no restriction on the numbers of ORVs allowed on the beach in open areas, so there would be less chance of being turned away or not having the desired access during a beach vacation. However, the 2002 visitor use study (University of Idaho 2003) found that 27% of visitors felt “crowded to extremely crowded” and 43% felt “somewhat crowded,” and 49% of visitor groups reported that crowding “detracted from their park experience.” As such, under the existing conditions, almost half of the visitors indicated that crowding was adversely affecting their visitor experience, and these adverse effects would continue and potentially increase with increases in visitor use as indicated by the relatively steady long-term increase in visitation at the Seashore. Therefore, without carrying capacity limitations, a large number of vehicles could occur in a relatively small area, and short-term, minor to moderate, adverse impacts to visitor experience or satisfaction could occur if overcrowded conditions are reached, depending on the user’s tolerance for a high density of use.

Other Recreational Pursuits. Fishing tournaments, which occur during the spring and fall, would continue to use all the open Seashore beaches, except one-half mile on either side of Cape Point, one-half mile from Hatteras and Ocracoke Inlet, and one-half mile on the north side of Oregon Inlet, and all major nesting areas at the Seashore where resource closures related to bird breeding activity have occurred.

Some resource closures could occur, but as explained above, these would not be overly restrictive due to options for providing access through or around turtle nests and the provision of an ORV corridor where possible for bird closures. Therefore, alternative A would result in short-term, negligible, adverse impacts to visitors participating in fishing tournaments because historical beach access for tournament fishermen would continue.

Pedestrians and other activities, such as swimming, sunbathing, beach walking, jogging, and shell collecting, would be allowed outside of any resource closures. In many cases, the defined ORV and pedestrian corridors would overlap or be the same, raising the possibility of conflict between ORV and non-ORV users and a diminished visitor experience for visitors seeking solitude and freedom from vehicular distractions. Because the width of the ORV corridor would be approximately 150 feet, sufficient room should be available for both ORVs and pedestrians. Because pedestrians and ORVs would be present in the same areas, the noise and the sight of vehicles could decrease the visitor experience for those visitors seeking solitude and a natural setting. Results of the 2002 survey indicated that vehicles on the beach was one of the top 3 factors that received the highest proportion of "detracted from my experience" ratings; however, this was only 18% of the 249 people surveyed. In addition, 34% said vehicles on the beach had no effect on their experience, 20% said they added to their experience, and 29 % did not encounter vehicles (University of Idaho 2003). Therefore, impacts would be long~~short~~-term, ~~, minor~~moderate, and adverse to pedestrians and other non-ORV dependent visitors.

Recreational pursuits, such as kite flying, Frisbees, and ball throwing, would not be allowed within or above all bird closures. These restrictions would have long-term, negligible to minor, adverse impacts on visitor use because many other locations exist throughout the Seashore that accommodate these or similar activities. Pets would need to be confined or on a leash at all times in all areas and would be prohibited within any symbolic fencing around any bird closure area. Even on a lease~~h~~, pets are prohibited from the landward side of ORV corridors at the spits and points. These restrictions would have long-term, minor, adverse impacts on responsible pet owners because pets would be allowed in the Seashore, but would still need to be restrained following NPS regulations~~policy~~.

Night Sky. A somewhat unique aspect of visitor experience is the enjoyment of a dark night sky. Under alternative A, night driving would continue to be permitted, so there would be the possibility of disruption of night sky viewing due to vehicle lights on the beach and lighting from parked campers where people are fishing, especially in areas away from the villages, resulting in minor long~~short~~-term adverse effects.

Comment [MSOffice31]: Even seasonal impacts that re-occur year after year would be "long-term"

Overall Impact to Visitor Use. Those looking for an experience at the Seashore that includes ORV would have long-term negligible to minor adverse impacts as some areas would be closed for resource protection, but alternative A would provide the most ORV access of~~than~~ any alternative. Should there be extensive resource closures in a given year, the potential for long-term moderate impacts exists. Those looking for a non-ORV experience at the Seashore would experience long-term moderate adverse impacts as alternative A does not provide for a specific separation of uses or non-ORV areas. Since night driving would be permitted under alternative A, there would be long~~short~~-term minor adverse impacts to night skies.

Cumulative Impacts. Other past, present, and planned future activities within the Seashore have the potential to affect visitors and the recreational opportunities supported within the Seashore. In recent years, hurricanes, storms, and other events, as well as the subsequent recovery time required following these events, have adversely impacted visitors. Barrier islands are dynamic and constantly being reshaped by forces of nature, such as weather events. Following these events, roads are often overwashed with sand and water, facilities destroyed, and portions of an island may be lost or reshaped. Visitors cannot consistently depend that the recreation opportunity or visitor experience they enjoyed during a recent or past visit may be available in the future. In addition, following an event, staff and other Seashore

resources may be dedicated to recovery efforts rather than to facilitating visitor enjoyment in some areas throughout the Seashore. Depending on the degree of damage following a storm, areas of the Seashore may be closed for a substantial period of time. Thus, weather events may result in short-term and long-term, minor to major, adverse impacts, depending upon the severity of the storm.

Adverse impacts may also result from other activities within the Seashore that restrict visitor use, including the dredging of the federally authorized navigation channel at Oregon Inlet, which causes temporary shoreline closures along Bodie Island, and the implementation of the Seashore's Resource Management Plan, which, in the interest of protecting resources, may restrict some visitor opportunities.

Beneficial impacts to visitor experience have occurred, and would continue to occur into the future, from the implementation of the following Seashore plans or actions:

- *Cape Hatteras National Seashore General Management Plan* (NPS 1984), which considers visitor needs in managing Seashore resources.

- Cape Hatteras National Seashore Comprehensive Interpretive Plan, which would identify the interpretive programs and associated facilities necessary to inform and teach the public about the purpose and significance of the Seashore and the many resources and opportunities that comprise the Seashore.

- Bonner Bridge replacement ~~and the opening of the dune road around Cape Point, ~~, which would continue to ensure visitors and their vehicles access between Bodie and Hatteras Islands along NC-12 ~~and provide alternate access through the dunes at Cape Point, if and when the beach is closed~~.

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Actions, such as ongoing road maintenance and repair to NC-12 and associated bridges, would most likely provide long-term beneficial impacts to visitor use and experience because of the importance of the road in maintaining access, with short-term minor impacts during construction. The GMP and interpretive plan would most likely provide long-term beneficial impacts because these plans and activities would ensure that visitor opportunities continue within the Seashore.

The potentially adverse impacts of storm events, in combination with the generally minor impacts of alternative A, would result in long-term, moderate, adverse cumulative impacts to ORV users and other visitors dependent on ORVs for access to particular areas of the Seashore. However, the beneficial impacts of Seashore plans and ongoing road maintenance, when combined with the impacts of alternative A, would result in long-term, negligible to minor, adverse cumulative impacts for ORV users~~beneficial and long-term, moderate, adverse~~ cumulative impacts for ~~to all visitors, and particularly~~ non-ORV users~~, by ensuring continued protection of Seashore resources and access for visitors to enjoy these resources~~.

Conclusion. Resource closures on the spits would result in long-term negligible to minor adverse impacts if these closures are partial beach closures where ORVs and other visitors are able to negotiate around closure areas using ORV corridors and access areas and have continued access to favored destinations or fishing locations. Full-beach resource closures at the spits and points would generally result in long-term, moderate, adverse impacts to those visitors who regularly frequent these locations because of the inability to participate in recreational activities in these areas. In the unlikely event that more than one spit or point experienced a full beach closure at the same time, impacts would be short-term, moderate to major, and adverse.

In areas outside the spits, partial-beach resource closures would result in long-term, negligible to minor, adverse impacts because ORVs and visitors would negotiate around these smaller closures. Full-beach

resource closures in these areas would only be long-term, minor, and adverse because the beach would remain open on either side of a resource closure and would be accessible from an ORV ramp. Because pedestrian uses and most other recreational opportunities could occur outside resource closure areas, shortshort-term, minor, adverse impacts would occur to these users. The lack of permits or a defined carrying capacity would be viewed as a benefit in that there would be no restriction on numbers of ORVs allowed on the beach in open areas and no additional effort to complete the necessary activities for a permit, but could lead to short-term, minor to moderate, adverse impacts to visitor experience or satisfaction if overcrowded conditions are reached. Lights associated with ORV use would result in longshort-term, minor, adverse effects on night sky, especially in areas away from the villages.

Cumulative impacts would be long-term, negligible to minormoderate, and adverse to ORV users, and long-term, moderate, and adverse and beneficial for other Seashore users.

Impacts of Alternative B: No Action—Continuation of Management under Terms of the Consent Decree

Under alternative B, areas accessible to ORVs and pedestrians would be similar to alternative A, except that the area from ramp 43 to 0.4 mile north would be open to ORVs year-round instead of just seasonally and large pre-nesting closures would be implemented. Basically, all areas of the Seashore would continue to be open to ORV and pedestrian use, unless closures are established for resource protection, administrative, or safety reasons. However, under alternative B, resource closures would be based on buffers established under the consent decree, and these buffer distances are larger than those under alternative A (see table 4, chapter 2). In addition, the consent decree requires increasing resource protection buffer size if an area that was closed is deliberately violated, so buffers may be expanded and result in larger beach closures due to non-compliance. Also, under alternative B, the time of allowable ORV access would be regulated to eliminate night driving from May 1 to September 15, and to restrict it to only those with a permit from September 16 to November 15.

Resource Closures. Resource closures for birds would continue to be implemented annually, based on recent breeding activity, and an ORV and pedestrian corridor would be provided adjacent to closure areas unless species activity or safety issues required a closure. Because the resource closure buffers are larger than the buffers under alternative A, visitors could be restricted more often and for longer periods of time during the breeding season. A closure could temporarily limit ORV access through certain sections for an extended certain period, which would result in long-term, moderate impacts to users who wish to access a certain area that is closed.

Partial-beach resource closures on the spits and points would result in long–term, minor, adverse impacts because ORVs and their passengers would have access around these closures using ORV corridors and would not be impeded from reaching favored recreational destinations or fishing locations. However, if full-beach resource closures were implemented on the spits or along spit access routes, even though the closure may only be temporary, the inability to participate in recreational activities would result in long-term, moderate, adverse impacts to those visitors who regularly frequent that location. If full-beach closures occurred at more than one spit location at a time, which could occur more often under alternative B due to increased buffer sizes, moderate to major, adverse impacts to fishermen and other ORV users accessing these areas could occur, depending upon the location and time frame.

Resource closures for American oystercatchers, colonial waterbirds, and sea turtles may also occur in other areas throughout the Seashore, which would temporarily block access forand ORVs and other dispersed recreation users due to buffer sizewould generally negotiate around these smaller closures throughout the Seashore, usually resulting in longshort-term, negligible to minor to moderate and sometimes major impacts, depending upon the location of the closure, adverse impacts because ORV

Comment [mbm 32]: Typical resource closures last more than 3 weeks (i.e., several months). MBM

~~accessibility would remain~~. Full beach closures due to turtle nesting would sometimes occur after the nest reaches its hatch window. In some cases~~be unlikely, since~~, using alternative routes or applying the identified bypass criteria ~~or, if absolutely necessary, relocating nests following the NCWRC handbook~~ would help provide ~~ensure that~~ ORV and pedestrian access around the turtle closures.~~would continue to the points and spits and other portions of the beaches.~~ A temporary full-beach resource closure could occur in areas outside the spits, and would be more likely under alternative B than under alternative A because the buffers are larger, and deliberate non-compliance would result in expanded closures. The adverse impacts would be long-term and moderate because the expanded buffers could make more beaches inaccessible, and continued expansion of buffers due to incidents of deliberate noncompliance could exacerbate the impact.

Regarding time of use, under alternative B, the consent decree includes night-time restrictions to offer additional protection of sea turtles. Vehicles would be prohibited from using the beach during the hours of 10:00 p.m. to 6:00 a.m. from May 1 to September 15 (with commercial fisherman being able to access the Seashore at 5:00 a.m.) and would require a permit to access the beaches with a vehicle during those hours from September 16 to November 15. Night driving would be allowed all other times of the year (November 16 to April 30). These restrictions would have long-term, minor to major, adverse impacts on visitors, depending on the desired visitor use and experience; for example, those wishing to surf fish at night would not be able to do so during the summer season, which would be considered a major, long-term, adverse effect on that group of visitors.

Safety Closures. Similar to alternative A, alternative B c~~w~~ould continue the four existing safety closures, and would continue the two administrative closures near the lighthouse and Buxton Woods, and the village beaches would be closed to ORV use in the busy summer months. These restrictions would cause minor, long-term, adverse impacts to ORV users and would be a long-term benefit related to protecting visitor safety and to those non-ORV users desiring a vehicle-free experience with more natural views and no vehicle-related noise in more populated areas. One area, from ramp 43 to 0.4 miles north, would be open to ORVs year-round instead of just seasonally, which would open up a small area near Cape Point Campground to ORV use. Also, under alternative B, there would be an ORV-free zone established in the ocean backshore where beaches are wide enough to accommodate a nearly 60-foot (20 meter) ORV corridor above the mean high tide from March 15 to November 15. This would allow non-ORV users to use~~enjoy~~ an area of the upper beach without any direct disturbance from ORVs trying to access the same area, a long-term negligible benefit to the non-ORV users. However, since pedestrians and ORVs would be present on the same portion of the beach, the noise and the sight of vehicles would continue to decrease the visitor experience for those visitors seeking solitude and a natural setting, with short-term, minor, adverse impacts to those users.

Comment [MSOffice33]: Having the upper beach closed to ORVs while the lower beach is open to ORVs provide very little benefit to non-ORV users

Permitting and Carrying Capacity Requirements. Similar to alternative A, alternative B does not include any permitting requirements for daytime ORV use, and this would be beneficial to visitor experience for most ORV users because it eliminates paperwork and effort needed to get a permit. However, this alternative does not provide a permitting system or a mandatory review of rules and regulations for ORV users and therefore has no opportunities to ensure that ORV users are knowledgeable about the regulations and also has no “teeth” to revoke permits of regulatory offenders. This could result in a minor, adverse impact because of the effects of these violators on the experience of other visitors. Nighttime permits required from September 16 to November 15 would provide educational benefits and be revocable if rules are not followed, a short-term benefit to the park, as well as to visitors.

Alternative B has no formal carrying capacity provisions, although temporary closures could be enforced if traffic is impeded or if disorderly conduct occurs and continues, which has occurred during busy weekends. The lack of a defined carrying capacity would be viewed as a benefit in that there would be no restriction on numbers of ORVs allowed on the beach in open areas, so there would be less chance of

being turned away or not having the desired experience during a beach vacation. However, this could lead to crowding, and minor to moderate, short-term, adverse impacts to visitor experience or satisfaction, depending on the user's tolerance for a high density of use, as described under alternative A.

Other Recreational Pursuits. Similar to alternative A, pedestrian-based activities would be allowed outside of any resource closures. In most cases, the defined ORV and pedestrian corridors would overlap or be the same, raising the possibility of conflict between ORV and non-ORV users and a diminished visitor experience for visitors seeking solitude and freedom from vehicular distractions. Under alternative B, the speed limit would be lowered to 15 mph during the busiest tourist months, which would help reduce conflicts, both real and perceived, and accident potential, an issue of concern raised by the public during the scoping process, resulting in long-term benefits. Also, as previously noted, there would be an ORV-free zone established in the ocean backshore where beaches are wide enough to accommodate a 60-foot (20 meter) ORV corridor above the mean high tide from March 15 to November 15. This would slightly reduce the potential for direct conflicts between ORV and non-ORV users, a long-term benefit; however, the lack of designated non-ORV areas would result in long-term, moderate, adverse impacts to non-ORV users.

Like alternative A, recreational pursuits, such as kite flying, Frisbees, and ball throwing, would not be allowed within or above all bird closures. These restrictions would have long-term, negligible to minor, adverse impacts on visitor use since many other locations exist throughout the Seashore that accommodate these or similar activities. Pets would need to be confined or on a leash at all times in all areas and would be prohibited within any bird closure area. These restrictions would have long-term, minor, adverse impacts on pet owners because pets would be allowed in the Seashore, but would still need to be restrained following NPS policy. Also, similar to alternative A, there would be only short-term, negligible, adverse impacts to visitors participating in fishing tournaments because historical beach access for tournament fishermen would continue.

Night Sky. Regarding the visitor experience of viewing the night sky, under alternative B the restriction on night driving from May 15 to September 15 would eliminate impacts during that period of time due to vehicle lights on the beach and lighting from parked vehicles where people are fishing, especially in areas away from the villages, resulting in long~~short~~-term benefits for night sky experience. However, night driving would still occur under permit in the fall and during the remainder of the year, so impacts to night sky during those months would remain long~~short~~-term, negligible to minor, and adverse.

Overall Impact to Visitor Use. Those looking for an experience at the Seashore that includes ORV would have long-term negligible to minor adverse impacts as some areas would be closed for resource protection. These impacts could increase to long-term moderate adverse if a spit or point were to close for an extended period of time and short-term major adverse in the likely ~~unlikely~~ event that more than one spit or point closed. Those looking for a non-ORV experience at the Seashore would experience long-term ~~minor to~~ moderate adverse impacts as alternative B ~~provides for larger areas of closures than alternative A, but~~ does not provide for a specific separation of uses outside of seasonal ORV closures of village beaches and no ~~or~~ non-ORV areas would be designated. Since night driving would be seasonally restricted under alternative B, there would be long-term negligible to minor adverse impacts to night skies, with long~~short~~-term beneficial impacts during times of seasonal night-driving restrictions.

Cumulative Impacts. Under alternative B, the same past, present, and planned future activities within the Seashore that have the potential to affect visitors and the recreational opportunities within the Seashore would occur, and impacts would be the same as described under alternative A. The impacts of these actions, in combination with the mostly minor to potentially major impacts of alternative B, would result in long-term, moderate to major, adverse cumulative impacts to ORV users ~~and other visitors dependent on ORVs for access to particular areas of the Seashore~~. However, while there would be some benefits for

non-ORV users from the nighttime driving restriction and reduced speed limits, the lack of designated non-ORV areas and ~~beneficial impacts of~~ the other actions and restrictions on ORV use under alternative B would result in~~provide~~ long-term, ~~cumulative~~ minor to moderate adverse cumulative impacts~~inor to benefits~~ for visitors who desire an experience free of motorized vehicle presence, disturbance, lights, or noise.

Conclusion. Resource closures on the spits would result in long-term, negligible to minor, adverse impacts if there are partial resource closures where ORVs are able to negotiate around closure areas using ORV corridors and have continued access to favored destinations or fishing locations. Full-beach resource closures at the spits and points would be more likely than under alternative A and would result in long-term, moderate to potentially major, adverse impacts to those visitors who regularly frequent these locations because of the inability to participate in recreational activities. Those non-ORV users desiring a vehicle-free experience with more natural views and no vehicle-related noise or visual disturbance could experience long-term benefits due to restrictions on nighttime driving and reduced speed limits during busy seasons, and long-term, minor to moderate adverse impacts~~benefits~~ due to the lack of designated non-ORV areas within throughout the Seashore.~~from the ORV-free areas outside of resource closures and restrictions on nighttime driving and reduced speed limit during busy seasons.~~

Because pedestrian uses~~s~~ and most other recreational opportunities could occur outside resource closures, long~~short~~-term, minor to moderate, adverse impacts would occur to these users. The lack of a permit system or carrying capacity would be viewed as a benefit in that there would be no restriction on numbers of ORVs allowed on the beach in open areas or needed paperwork to drive an ORV on the beach, but could lead to minor to moderate, adverse impacts to visitor experience or satisfaction if conditions reached overcrowded conditions and no traffic-based closures occurred. Lights associated with ORV use would result in long~~short~~-term, negligible to minor, adverse effects to those visitors wishing to experience the night sky during the fall and winter periods when night driving is permitted or not restricted, and there would be long~~short~~-term benefits to night sky viewing during the summer season when night driving is prohibited. The impacts to visitor use and experience prior to the June 2008 modifications to the consent decree would be the same as the impacts after the modification.

Cumulative impacts would be long-term, moderate to major, and adverse to ORV users, and long-term, minor to moderate adverse impacts ~~beneficial~~ for other Seashore users.

Impacts of Alternative C: Seasonal Management

Under alternative C, areas accessible to ORVs and pedestrians would be determined by providing designated ORV use areas and pedestrian-free areas that are based largely on seasonal resource and visitor use characteristics, giving Seashore users a degree of predictability in knowing what areas are opened and what areas are closed. Under this alternative, ORV access would be prohibited in all areas of the Seashore except where an ORV route is specifically designated.

ORV routes and areas would be established seasonally (closed to ORV use from March 15 to October 15) in Rodanthe, Waves, Salvo, Avon, Frisco, Hatteras Village beaches, and Ocracoke Campground beach (0.5 mile NE to 0.5 mile SW of ramp 68). The area on Buxton beach south to 0.4 mile north of ramp 43 and the Ocracoke Day-Use Area beach from 1.2 miles NE to 0.5 mile NE of ramp 70 would be designated as non-ORV ~~closed to ORV use~~ year-round. In addition to these areas, SMAs would be established, as described in Chapter 2. All SMAs would be ~~closed~~ seasonally designated for ORV use from March 15 to October 15, consistent with the village beach closures. The majority of SMAs would be managed using ML1 measures, where both ORV and pedestrian activity would be prohibited during breeding activities. Bodie Island spit, Cape Point, and South Point would be managed under ML2 measures, which would provide a pedestrian corridor during the seasonal ORV closure.~~, but would not allow ORV access until~~

~~breeding activities are complete.~~ Hatteras Inlet spit and North Ocracoke Spit~~Inlet~~ would be managed under ML1 measures, and closed to ~~both ORV and~~ pedestrian use seasonally from March 15~~,~~ until breeding activities are complete.

In areas where ORV use areas are identified, new and/or improved ramps would be added to ensure access to these areas on the oceanside, and existing soundside ramps would remain open. Interdunal roads available to ORV use would be the same as under alternative A, with the addition of providing additional pull-outs or widening where appropriate to provide safe passage. On South Beach, the existing interdunal road would be extended west of ramp 45 to a new ramp 47.

Within the areas open to ORV use, if resource concerns are present, they would be subject to closure using applicable buffer distances (see table 4, chapter 2). These buffer distances are greater than under the no action alternatives. Also, under alternative C, the time of allowable ORV access would be regulated to eliminate night driving from May 1 to November 15, between 7:00 p.m. and 7:00 a.m. Because of the seasonal ORV closures, including the popular points and spits, increased buffers and night driving regulations, visitors could be restricted from popular areas depending on the duration and extent of the closure and the desired time of use, resulting in long-term, moderate to major, adverse impacts to ORV users because they would not be able to engage in the activity they desire.

*Resource Closures***.** Resource closures for birds would continue to be implemented annually, based on recent breeding activity~~,~~. ~~and an ORV and~~ A pedestrian corridor would be provided adjacent to closure areas in SMAs~~areas~~ managed under ML2 procedures (Bodie Island Spit, Cape Point, and South Point ~~Ocracoke~~) unless species activity or safety issues required a closure. In SMA~~area~~s designated for the use of ML1 measures (see table 4, chapter 2), pedestrian access would not be allowed in areas with closures, including pre-nesting closures. Under alternative C~~Because of the resource closure buffers~~, visitors using ORVs would be restricted from the popular points and spits during the summer months. As noted under alternative A, the spits and points are of particular concern for visitors who wish to use these areas for fishing and other recreational pursuits, such as walking and beachcombing, and these areas accounted for about 75% of total ramp usage (Loomis 2009axx). Therefore, seasonal resource-based closures and restrictions under alternative C could affect a majority of oceanside ramp users, and result in long-term, moderate to major, impacts for users wishing to access these points by ORV in the summer. Three~~Many~~ of the point and spit areas would be have a ~~open to~~ pedestrian access corridor, subject to resource closures during the breeding season ~~use during this time~~, resulting in a beneficial impact for visitors looking for a more solitude experience at the Seashore.

Resource closures for American oystercatchers, colonial waterbirds, and sea turtles may also occur in other areas throughout the Seashore. Depending upon the location of closures relative to ORV access ramps,~~,~~ and ORVs and other dispersed recreation users would generally negotiate around these smaller closures throughout the Seashore using alternate routes and access points, usually resulting in long-term, negligible to minor, adverse impacts because ORV accessibility would remain. Full beach closures due to turtle nesting would be lessened by the establishment of traffic detours behind nests, where appropriate. Under alternative C, turtle management activities would include creation of a “nest watch” program that would allow trained volunteers to watch nests that have reached their hatch windows to monitor hatchling emergence success. This would provide a new visitor experience, and one that is desired based on public comment, resulting in short-term, beneficial impacts to visitors who seek to participate in such a program.

A temporary full-beach resource closure could occur in areas open to ORV use, but would be much less likely under alternative D than under the no-action alternatives since known breeding/hatching areas are within the SMAs and would generally already be closed to ORV use during the breeding season. As a result, the chance of a full beach closure in areas open to ORVs outside the SMAs is decreased, with the potential for long-term minor to moderate adverse impacts if temporary closures of these areas were to

occur as it would further reduce the amount of area open for ORV use under alternative C and concentrate this use in different areas, subject to the parking restrictions.

A temporary full-beach resource closure could occur in areas open to ORV use, and would be less likely under alternative C than under the no-action alternatives since known breeding/hatching areas would be already closed to ORV use during the breeding season. The adverse impacts from the potential for a full beach closure would be long-term and minor because while there are expanded buffers under alternative C, the chance of a full beach closure outside already closed areas is decreased.

Alternative C would provide for a special use permit, to be authorized by the Superintendent, which would allow temporary use of an ORV in a non-ORV use area. This special use permit would be authorized in the following limited circumstances: temporary emergency ORV use of non-ORV areas if needed to by-pass sections of NC-12 that are closed for repairs; temporary non-emergency ORV use of non-ORV areas traditionally used by fishing tournaments that were established prior to January 1, 2009; and temporary non-emergency ORV use of non-ORV areas to transport mobility impaired individuals to join their family or friends on an open beach that is otherwise closed to ORV. In the~~is~~ instance of transporting a mobility impaired individual, ORV use would be limited to the shortest, most direct distance between the nearest designated ORV route and the location of the gathering. By providing for special use permits in these circumstances, short-term beneficial impacts would be realized by these user groups that would otherwise not be able to use an ORV in areas closed year-round or seasonally to ORV use.

To further address and facilitate access into non-ORV use areas, alternative C would include new or expanded parking lots to support pedestrian access as well as the consideration by the Seashore of applications for commercial use authorizations for a beach shuttle service. These elements would provide long-term beneficial impacts and work to mitigate the moderate to major adverse impacts that some user groups may experience as alternative ways to reach the Seashore would be provided if ORV use is not permitted.

Regarding time of use, under alternative C the seasonal night-time restrictions offer additional protection of sea turtles. Vehicles would be prohibited from using the beach during the hours of 7:00 p.m. to 7:00 a.m. from May 1 to November 15. Night driving would be allowed all other times of the year (November 16 to April 30). These restrictions would have long-term, beneficial to long-term, moderate to major, adverse impacts on visitors, depending on the desired visitor use and experience. F~~; f~~or example, those visitors wishing to experience the beach at night without ORVs present would have more opportunities to do so. Those visitors wishing to use ORVs to access surf fishing areas at night would not be able to do so during the summer and fall season, which would be considered a major long-term adverse effect on that group of visitors.

Safety Closures. Alternative C would establish specific criteria for implementation of a safety closure, including if there is debris on the beach, narrow beaches or congested areas. These closures would preclude ORV access, but allow pedestrian and commercial fishing access. No administrative closures would be established under this alternative. Although there is not an administrative closure at the former site of the Cape Hatteras~~Point~~ light house, no ORV route would be established in this area, thus ORVs would not be permitted and village beaches would be closed during the summer either as a seasonal or as part of a year-round closure.

These areas include a total of approximately 40.6 miles (11.9 miles that would be designated as non-ORV~~closed to ORV~~ year-round and 28.7 miles that would be ~~closed~~ seasonally designated for ORV use from October 15 until March 14), or about 60% of the total beach mileage, so these restrictions, particularly during the period from March 15 to October 14, would cause long-term, moderate to major,

adverse impacts to ORV users and would be a long-term minor benefit related to protecting visitor safety and to those non-ORV users desiring a vehicle-free experience with more natural views and no vehicle-related noise in more populated areas. Some areas that have been traditionally closed year-round due to seasonal restrictions and safety closures, such as Frisco Village beach and Hatteras Village beach, would now be open seasonally from October 15 to March 15. Access to these previously closed areas would provide ORV~~Seashore~~ users with a long-term benefit.~~, depending on their desire to access these areas by ORV. However, s~~ Since pedestrians and ORVs would be present on the same portion of the beach during the winter/spring season, the noise and the sight of vehicles would continue to decrease the visitor experience for those visitors seeking solitude and a natural setting, with long~~short~~-term, minor to moderate, adverse impacts to those users.

Alternative C would include improvements to ramp access areas throughout the Seashore, These improvements would include ensuring that ramps are two-lanes wide and have standard regulatory signs and information boards, gates are installed at all ramps, and a designated air down area (for adjustment of tire pressure on ORVs) with a hardened surface is provided. These improvements to ramps and the creation of designated ~~installation of amenities, such as an~~ air down areas, would have beneficial impacts to ORV users, who noted a desire for these conditions during public scoping.

*Permitting and Carrying Capacity Requirements***.** Alternative C would include permitting requirements for all ORV use, and could be viewed as a long-term, minor to moderate, adverse impact to visitor experience for most ORV users since it would result in paperwork and effort needed to get a permit. Permits would be available in person at designated areas or on-line and would be valid for 12 months from the purchase date, making the permit easy to obtain on an annual basis. There would be no limit on the number of permits issued, and, therefore, no adverse impacts from a perceived or actual scarcity of permits. The permit system would require ORV owners to complete a short education program in-person or on-line and pass a basic knowledge test. This requirement could be viewed by those seeking a permit as too cumbersome and would result in short-term, minor to moderate, adverse impacts to their experience. A fee would be charged to obtain a permit that would be based on cost recovery as described in the NPS Director's Order and Reference Manual #53. Depending on the level of fee, ORV users could experience minor to moderate impacts, depending on if they feel the fee would be cost prohibitive and impact their ability to access the Seashore.

Although some users may feel adverse impacts from implementation of a permit system, other users may see beneficial impacts as those visitors using ORV would be provided education and information with their permits that could influence their behavior and reduce potential for adverse resource impacts and conflicts with non-ORV visitors. Implementation of a permit system would provide the Seashore with a method to address those ORV users who violate Seashore policy, through revocation of permits, which could beneficially affect the experience of visitors through potentially fewer instances of encountering unlawful behavior of other visitor and associated conflicts.

Alternative C would not dictate parking configurations on the beach, but would include formal carrying capacity provisions, including the enforcement of temporary closures of areas once these limits are reached or if disorderly conduct occurs and continues, which has occurred during busy weekends. The implementation of a defined carrying capacity may be viewed as a benefit by those who feel that there are times when conditions are too crowded and that their visitor experience is adversely impacted by these crowded conditions. Others would view implementation of a carrying capacity as a short-term, moderate to major adverse impacts if they are unable to get to their desired area or are unable to participate in the planned recreational activity because capacity has been reached, as closures due to carrying capacity would be expected to occur for only a few hours on some ~~each~~ days during peak use summer holiday weekends, based on past, current, and estimated future use levels. ~~, which could be short or long-term~~

Comment [mbm 34]: The history heretofore has been that we have reached the use limit at a site for only a few hours on the busiest day of one or two holiday weekends (only once or twice ever and only at Bodie Island Spit). Hard to say what will happen in the future, but we would not expect the temporary closure to occur "each" day, at least initially. MBM

~~impacts depending on the duration that they visitor cannot reach their desired destination.~~ The determined carrying capacity would be subject to periodic review and may address these impacts if they arise.

*Other Recreational Pursuits***.** Similar to alternative A, pedestrian-based activities would be allowed outside of any resource closures, but unlike A, this would include seasonal closure to all users of seven SMAs managed under ML1 measures and would allow a pedestrian access corridor, subject to resource closures, at three SMAs~~be allowed only in areas that are not included in a seasonal closure or are in a seasonal closure but~~ managed under ML2 management measures (Bodie Island Spit, Cape Point, and South Point). In most cases, where ORVs are allowed~~outside areas under ML2 measures (where ORV are not permitted)~~, the defined ORV and pedestrian corridors would overlap or be the same, raising the possibility of conflict between ORV and non-ORV users and a diminished visitor experience for visitors seeking solitude and freedom from vehicular distractions. However, due to the amount of area designated as~~open to only~~ non-ORV ~~uses~~ under alternative C, these impacts would be expected to be negligible. Under alternative C, the speed limit would be lowered to 15 mph year-round, which would help reduce conflicts, both real and perceived, and accident potential, an issue of concern raised by the public during the scoping process, resulting in long-term benefits.

Like alternative A, recreational pursuits, such as kite flying, Frisbees, and ball throwing, would not be allowed within or above all bird closures. These restrictions would have long-term, negligible to minor, adverse impacts on visitor use since many other locations exist throughout the Seashore that accommodate these or similar activities. Also, similar to alternative A, there would be only short-term, negligible, adverse impacts to visitors participating in fishing tournaments because historical beach access for tournament fishermen would continue.

Pets would need to be confined or on a leash at all times in all areas and would be prohibited within any bird closure area. Further restrictions on pets would be implemented under alternative C, including a prohibition on pets within all designated SMAs from March 15 to October 15 and~~,~~ within all non-breeding shorebird SMAs that are otherwise open to recreational use~~, and in ORV access corridors during the pre-nesting period.~~ These restrictions would have long-term, moderate, adverse impacts on pet owners because of the limited areas that they would be able to go with their pets at the Seashore. In addition, restrictions would be placed on the use of horses at the Seashore, with a prohibition of horse use in SMAs. While this would be a long-term, adverse impact to visitors who want to ride horses within the SMAs, a long-term, beneficial impact would also be realized by allowing horses use on village beaches from September 16 to May 14 each year.

Additional restrictions on beach fires would be implemented under alternative C with a non-fee educational permit required in order to have a beach fire. Beach camping would be prohibited and ni~~Camping and ni~~ghttime use would also be addressed through a policy that would restrict any beach equipment on the Seashore at night and direct the NPS to remove this equipment after it has been left for 24 hours. Users may experience minor, short-term impacts from these restrictions due to the extra effort required to obtain a beach fire permit and the requirement to remove their beach equipment every night.

*Night Sky***.** Regarding the visitor experience of viewing the night sky, under alternative C the restriction on night driving from May 15 to November 15 would eliminate impacts during that period due to vehicle lights on the beach and lighting from parked vehicles where people are fishing, especially in areas away from the villages, resulting in long~~short~~-term benefits for night sky experience. However, night driving would still occur under permit ~~in the fall and~~ during the remainder of the year, so impacts to night sky during those months would remain long-term, negligible to minor, and adverse.

Overall Impact to Visitor Use. Those looking for an experience at the Seashore that includes ORV would have long-term moderate to major adverse impacts as the establishment of the SMAs would preclude

ORV use from some areas of the Seashore that are popular visitor use areas, both year-round and seasonally. While some areas under ML2 management procedures would have pedestrian access corridors, no ORV corridors would be provided in the SMAs, resulting in greater impacts to this user group. Those looking for a non-ORV experience at the Seashore would experience long-term benefits as alternative C provides for pedestrian corridors in three SMAs under ML2 procedures, as well as providing additional non-ORV use areas. Since night driving would be seasonally restricted under alternative C, there would be long-term negligible to minor adverse impacts to night skies, with longshort-term beneficial impacts during times of seasonal night-driving restrictions.

Cumulative Impacts. Under alternative C, the same past, present, and planned future activities within the Seashore that have the potential to affect visitors and the recreational opportunities within the Seashore would occur, and impacts would be the same as described under alternative A. The impacts of these actions, in combination with the mostly minor to moderate and potentially major adverse impacts of alternative C, would result in long-term, moderate to major, adverse cumulative impacts to ORV users and other visitors dependent on ORVs for access to particular areas of the Seashore. However, the beneficial impacts of other actions and restrictions on ORV use under alternative C would provide long-term cumulative benefits for visitors who desire an experience free of motorized vehicle presence, disturbance, lights, or noise.

Comment [MSOffice35]: Comment who use ORVs for access are "ORV users"

Text deleted to address.

Conclusion. Designating ORV use areas and closures based on seasonal resource and visitor use patterns would result in long-term, moderate to major, adverse impacts to ORV users because the areas most used by ORV and favored destinations or fishing locations would be closed to ORV use seasonally. These impacts may be reduced to minor to moderate due to the additional accommodations made for pedestrian use including more parking, a possible beach shuttle, and special use permits to shuttle the mobility impaired. Seashore visitors not using or relying on ORVs would not experience many, if any, adverse impacts from these closures or from other safety closures, and those non-ORV users desiring a vehicle-free experience with more natural views and no vehicle-related noise or visual disturbance could experience long-term benefits from the ORV-free areas and restrictions on nighttime driving and reduced speed limits throughout the Seashore. In addition, vVisitors desiring an ORV-free experience would have more areas open to them year-round, as well as seasonally, and would experience long-term beneficial impacts.

Because pedestrians and most other recreational opportunities could occur outside seasonally restricted SMAs and other closures, short-term, minor, adverse impacts would occur to these users. The implementation of an ORV permit system and carrying capacity would be viewed as a benefit by those who would like to see a system in place with consequences for non-law abiding ORV users, as well as those who may perceive crowded conditions that impact their visitor use and experience. For other ORV users, these elements would have a long-term, minor to moderate, adverse impact as the permit system could be viewed as too cumbersome and/or expensive, and shortlong-term, minor to moderate to major impacts to those who may not be able to access a beach that has reached capacity. Elements that restrict the type of activities (such as kite flying) or the ability of Seashore users to have a campfire or bring pets could have long-term, minor to moderate adverse impacts to specific user groups. Lights associated with ORV use would result in negligible to minor adverse effects to those visitors wishing to experience the night sky during winter when night driving is permitted or not restricted, and there would be longshort-term benefits to night sky viewing during the summer season when night driving is prohibited.

Cumulative impacts would be long-term, moderate to major, and adverse to ORV users, and long-term and beneficial for other Seashore users.

Impacts of Alternative D: Increased Predictability and Simplified Management

Under alternative D, areas accessible to ORVs and pedestrians would be determined by providing the maximum amount of predictability regarding areas available for ORV use and vehicle-free areas for pedestrian use. This would result in applying restrictions to larger areas of the seashore for longer periods of time to minimize changes in designated ORV and non-ORV areas over the course of a year. Under this alternative, ORV access would be prohibited in all areas of the Seashore, except where an ORV route is specifically designated.

All areas designated as a SMA would be closed to ORV use year-round, which would include high use areas such as all points and spits. In addition, all village beaches, life guarded beaches, and areas in front of campgrounds would have no ORV use year-round. This would result in 40.8 miles of beach being designated as non-ORV~~closed to ORV use year~~ year-round under alternative D. In areas where ORV use is permitted, ramps to the ocean side would be maintained and new ramps added or expanded. On the soundside, access would remain the same as under the no-action alternatives and there would also be no change to the existing system of interdunal roads. In areas closed to ORV use year-round, new or expanded parking would be added to facilitate pedestrian access. Under alternative D, there would be no consideration of commercial use authorizations for a beach shuttle and no special use permits would be issued for temporary ORV use in non-ORV areas. Although accommodations would be made for pedestrian use with additional parking, the designation of about 60% of the Seashore mileage for no ORV use year-round would have a long-term, major impact to those visitors wishing to engage in ORV activities. Without providing seasonal access in SMAs, those wishing to use the spits and~~,~~ points ~~, campground~~ with an ORV would need to engage in these activities elsewhere, resulting in a major, adverse impact. Pedestrians would be able to access SMA areas once breeding activities are completed, but ORV use would be prohibited year-round resulting in long-term benefits for non-ORV users.

In areas where ORV use areas are identified, new and/or improved ramps would be added to ensure access to these areas on the Oceanside. Within the areas open to ORV use, if resource concerns are present, they would be subject to closure using applicable buffer distances (see table 4, chapter 2). These buffer distances are greater than under the no-action alternatives. Also, under alternative D, the time of allowable ORV access would be regulated to eliminate night driving from May 1 to November 15, between 7:00 p.m. and 7:00 a.m., as described under alternative C; however, under alternative D, this policy would not undergo periodic review as it would under alternative C. Because of the extensive year-round ORV closures, including the popular points and spits, increased buffers and night driving regulations, ORV users~~visitors~~ would be restricted from popular areas, as well as other areas typically open to ORV use depending on the duration and extent of the closure and the desired time of use, resulting in long-term, major adverse impacts to these users because they are not able to engage in the activity they desire.

Resource Closures. Resource closures for birds would continue to be implemented annually, based on recent breeding activity, but no pedestrian corridor would be provided in areas closed to ORV use including the points and spits, during the breeding season. Pedestrian access would be permitted on village beaches, campgrounds, and life guarded beaches. All SMAs would under ML1 management procedures, and pedestrians would not be permitted in these areas once pre-nesting closures were established until after breeding activity is completed. This means that these areas, including the points and spits, would be closed to pedestrians seasonally, so these popular areas would not be available for a solitude visitor experience while breeding activities are occurring, This would result in long-term, moderate impacts to those visitors looking for a solitude experience as they may need to go elsewhere in the Seashore during this timeframe. Outside the breeding season, the SMAs would provide large areas accessible to pedestrian use only, resulting in beneficial impacts to these users as they would be able to obtain their desired experience in a wide variety of areas.

Resource closures for American oystercatchers, colonial waterbirds, and sea turtles may also occur in other areas throughout the Seashore, and ORVs and other dispersed recreation users would generally negotiate around these smaller closures throughout the Seashore using alternate routes and access points. This would typically result in short-term, minor adverse impacts because ORV accessibility would remain, but with limited area available for ORV use. Therefore impacts to ORV users would be greater than under the other alternatives. Full beach closures due to turtle nesting would be lessened by the establishment of traffic detours behind nests, where appropriate. Under alternative D, turtle management activities would include creation of a "nest watch" program that would allow trained volunteers to watch nests that have reached their hatch windows to monitor hatchling emergence success. This would provide a new visitor experience, and one that is desired based on public comment, resulting in long-term benefits to visitors who seek to participate in such a program.

A temporary full-beach resource closure could occur in areas open to ORV use, but would be much less likely under alternative D than under the no-action alternatives since known breeding/hatching areas are within the SMAs and would generally already be closed to ORV use during the breeding season. As a result, the chance of a full beach closure in areas open to ORVs outside the SMAs is decreased, with the potential for long-term minor to moderate adverse impacts if temporary closures of these areas were to occur~~A temporary full-beach resource closure could occur in areas open to ORV use, but would be less likely under alternative D than the no-action alternatives since known breeding/hatching areas would be already closed to ORV use year-round. The adverse impacts from the potential for a full beach closure would be long-term and minor to moderate~~ as ~~because while there are expanded buffers under alternative D, the chance of a full beach closure outside already closed areas is decreased. If a full beach closure were to occur,~~ it would further reduce the~~remove the already reduced~~ amount of area open for ORV use under alternative D and concentrate this use in different areas, subject to the parking restrictions~~ under alternative D~~.

To further address and facilitate access into non-ORV use areas, alternative D would include new or expanded parking lots to support pedestrian access. As discussed above, this element would provide beneficial impacts.

Regarding time of use, under alternative D the night-time restrictions offer additional protection of sea turtles. Vehicles would be prohibited from using the beach during the hours of 7:00 p.m. to 7:00 a.m. from May 1 to November 15. Night driving would be allowed all other times of the year (November 16 to April 30). These restrictions would have long-term beneficial to long-term, moderate to major, adverse impacts on visitors, depending on the desired visitor use and experience. For example, those visitors wishing to experience the beach at night without ORVs present would have more opportunities to do so. Those visitors wishing to use ORVs to access surf fishing areas at night would not be able to do so during the summer and fall season, which would be considered a major long-term adverse effect on that group of visitors~~; for example, those wishing to surf fish at night would not be able to do so during the summer and fall season, which would be considered a major, long-term, adverse effect on that group of visitors.~~.

*Safety Closures***.** Alternative D would not establish specific safety closures or criteria for safety closures. ORV drivers would be responsible for recognizing and avoiding ORV safety hazards and would drive at their own risk. No administrative closures would be established under this alternative. Although there would be no administrative closure at the Cape Point light house, no ORV route would be established in this area, thus ORVs would not be permitted and village beaches would be closed during the summer either as a seasonal or as part of a year-round closure. As with alternative B, the NPS would retain the authority to implement a temporary emergency ORV closure in the case that ORV traffic is backing up on the beach access ramps, either on or off-beach bound, which threatens to impede traffic flow; ORV traffic on the beach is parked in such as way that two-way traffic is impaired; and /or multiple incidents of disorderly behavior are observed or reported. The absence of safety closures and administrative closures

would have a beneficial impact by potentially opening up new areas for ORV use, but this impact would be negligible as many of these areas such as village beach and the lighthouse, are year-round non-ORV areas.

Additionally, by restrictingrestricting ORV use year-round in 60% of the Seashore and restricting pedestrian use in SMAs during the breeding seasonat points and spits, visitors would be concentrated in a smaller area. This could create real or perceived concerns for crowding or visitor safety as opportunities for separation of uses is not provided, and result in long-term, moderate to major, impacts to visitors who perceive crowded conditions or safety concerns.

Alternative D would include improvements to ramp characteristics throughout the Seashore. These improvements would include ensuring that ramps are two lanes wide and have standard regulatory signs and information boards, gates are installed at all ramps, and a designated air down area with a hardened surface is provided. These improvements to ramps and installation of amenities such as an air down area would have beneficial impacts to ORV users, who noted a desire for these conditions during public scoping.

Permitting and Carrying Capacity Requirements. Alternative D would include permitting requirements for all ORV use (as described under alternative C, except permits would be valid for a calendar year rather than for 12 months), and could be viewed as a long-term, minor to moderate, adverse impact to visitor experience for most ORV users since it would result in paperwork and effort needed to get a permit. As described under alternative C, the permit requirement could be viewed by those seeking a permit as too cumbersome and would result in minor to moderate, adverse impacts to their experience. Depending on the level of fee associated with the permit, ORV users could experience minor impacts, depending on if they feel the fee would prohibit their access and ability to experience the Seashore. As management costs are decreased under alternative D compared to other alternatives with permits, a lower permit fee and therefore lower level of impact would be expected. Although some users may feel adverse impacts from implementation of a permit system, other users may see beneficial impacts as those visitors using ORV would be provided education and information with their permits that could influence their behavior and reduce potential for conflicts with non-ORV visitors. Implementation of a permit system would provide the Seashore with a method to address those ORV users who violate Seashore policy, through revocation of permits. The permit system would give Seashore staff a system with "teeth" to revoke permits of regulatory offenders, which could beneficially affect the experience of other visitors.

Alternative D requires that parking within ORV routes is only one vehicle deep and would prohibit stacking of vehicles in more than one row. This requirement would create a *de facto* carrying capacity that, once the capacity of the one row is reached, no other vehicles would be permitted in that area. The parking restriction and associated carrying capacity would be expected to have long-term, moderate to major adverse impacts on ORV users because only 27.2 miles of beach potentially open to ORV use year-round, it is likely that this capacity would be reached during peak use periods such as holiay weekends and some users would not be able to reach locations or participate in the activities they desire. This effect would be amplified for those visitors that may be at the Seashore for a short period and do not get the opportunity to engaged in their desired activity while they are there resulting in short and long-term, moderate to major impacts, depending on the duration that visitors cannot access a desired area. For those visitors coming to the Seashore without an ORV, the parking and carrying capacity restrictions may have a beneficial impact as under alternative D all Seashore users would use open beaches, regardless of the activity, and limiting the number of ORVs could reduce the potential for any visitor use conflicts and safety concerns in these areas open to use. Under alternative D, the speed limit would be lowered to 15 mph year-round, which would also help reduce conflicts, both real and perceived, and accident potential, an issue of concern raised by the public during the scoping process.

*Other Recreational Pursuits***.** Like alternative A, recreational pursuits, such as kite flying, Frisbees, and ball throwing, would not be allowed within or above all bird closures. These restrictions would have long-term, minor, adverse impacts on visitor use since many other locations exist throughout the Seashore that accommodate these or similar activities. Also, similar to alternative A, there would be only short-term, negligible adverse impacts to visitors participating in fishing tournaments because historical beach access for tournament fishermen would continue.

Pets would need to be confined or on a leash at all times in all areas. Further restrictions on pets would be implemented under alternative D with pets prohibited within all designated SMAs year-round. ~~and prohibited in ORV access corridors during the pre-nesting period.~~ These restrictions would have long-term, minor to moderate, adverse impacts on pet owners because of the limitations placed on pets in ORV use areas.

Alternative D would not include additional restrictions on beach fires and no permit would be required for this activity. Beach camping would be prohibited and ~~Camping and~~ nighttime use would be addressed through a policy that would restrict any beach equipment on the Seashore at night and direct the NPS to remove this equipment after it has been left for 24 hours. Users may experience minor impacts from these restrictions due to the extra effort to remove their beach equipment every night, but would likely feel it is beneficial not to have to obtain a permit for beach fires.

Night Sky. Regarding the visitor experience of viewing the night sky, under alternative D the restriction on night driving from May 15 to November 15 would eliminate impacts during that period due to vehicle lights on the beach and lighting from parked vehicles where people are fishing, especially in areas away from the villages, resulting in long~~short~~-term benefits for night sky experience from May 1 to November 15. However, night driving would still occur under permit ~~in the fall and~~ during the remainder of the year, so impacts to night sky during those months would remain negligible to minor and adverse.

Overall Impact to Visitor Use. Those looking for an experience at the Seashore that includes ORV use would have long-term major adverse impacts as the establishment of year-round SMAs under ML1 procedures would prohibit the use of ORV in many popular visitor use areas year-round. Those looking for a non-ORV experience at the Seashore would experience long-term moderate benefits as alternative D provides for many non-ORV use areas throughout the Seashore, but does not provide for pedestrian corridors in the SMAs during the breeding season. ~~year-round.~~ Since night driving would be seasonally restricted under alternative D, there would be long-term negligible to minor adverse impacts to night skies, with short-term beneficial impacts during times of seasonal night-driving restrictions.

Cumulative Impacts. Under alternative D, the same past, present, and planned future activities within the Seashore that have the potential to affect visitors and the recreational opportunities within the Seashore would occur, and impacts would be the same as described under alternative A. Other actions, primarily construction-related, would have short-term, minor impacts. The impacts of these actions, in combination with the mostly moderate to major impacts of alternative D, would result in long-term, major, adverse cumulative impacts to ORV users. However, the beneficial impacts of other actions and restrictions on ORV use under alternative D would provide long-term cumulative benefits for visitors who desire an experience free of motorized vehicle presence, disturbance, lights, or noise.

Conclusion. Designating ORV use areas and closures based on simplified management and predictability would result in long-term, major adverse impacts to ORV users that would not be able to access SMA areas by ORV year-round. Pedestrians at the Seashore would experience long-term, minor ~~moderate~~ adverse impacts during the breeding season when they cannot access SMAs, but long-term moderate benefits ~~beneficial impacts~~ the remaining times of the year as the number of non-ORV experiences would increase.

Village beaches, campgrounds, and lifeguarded beaches would still be open to pedestrian use year-round, providing beneficial impacts to visitors who want to use these areas without ORVs during the breeding season. Additional accommodations made for pedestrian use including more parking would also be a beneficial impact.

The implementation of a permit system and carrying capacity would be viewed as a benefit by those who would like to see a system in place with consequences for non-law abiding ORV users, as well as those who may perceive crowded conditions that impact their visitor use and experience. For other ORV users, these elements would have a long-term minor adverse impact as the permit system could be viewed as too cumbersome and/or expensive, and with the lower fees as a result of lower management costs, these impacts would be expected to be mostly minor. Long-term, major adverse impacts may be felt by those ORV users who cannot access a beach that has reached capacity. Elements that restrict the type of activities (such as kite flying) or the ability of Seashore users to bring pets could have long-term, minor to moderate impacts to specific user groups. Lights associated with ORV use would result in negligible to minor adverse effects to those visitors wishing to experience the night sky during winter when night driving is permitted or not restricted, and there would be longshort-term benefits to night sky viewing during the summer and fall season when night driving is prohibited.

Cumulative impacts would be long-term, major, and adverse to ORV users, and long-term beneficial for other Seashore users.

Impacts of Alternative E: Variable Access and Maximum Management

Under alternative E, areas accessible to ORVs and pedestrians would be determined by providing by ensuring that there are a variety of experiences available to all Seashore users, with the necessary controls or restrictions to limit impacts on sensitive resources. Under this alternative, ORV access would be prohibited in all areas of the Seashore except where an ORV route is specifically designated.

ORV routes and areas would be established seasonally (closed to ORV use from April 1 to October 31) in Rodanthe, Waves, Salvo, Avon, Frisco, Buxton beaches, and Ocracoke Campground beach (0.5 mile NE to 0.5 mile SW of ramp 68). Non-ORV use areas would be designated on Bodie Island from ramp 1 to approximately 0.5 mile south of Coquina Beach; Frisco and Hatteras Village beaches; and the Ocracoke Day-Use Area beach, from 1.2 miles NE or ramp 70 to 0.5 mile NE of ramp 70. Seven SMAs would be closed to ORV use under ML1 measures during the breeding season from March 15 to August 31. Three pPopular visitor use areas within SMAs (, such as Bodie Island Spit, Cape Point, and South Point), would be seasonally closed to ORV use from March 15 to August 31, but would havean an ORV pass through zone (no stopping of ORVs), subject to resource closures under ML2 measures, would be provided to allow visitors opportunities to accessget these sites during portions of the breeding season.popular use areas, as well as to a pedestrian corridor. In designated ORV use areas, aAlternative E would also provide for an ORV corridor above the high tide line March 15 to August 31 on the ocean beach. wWhere the corridorit is at least 30 meters wide, it . This corridor would be posted 10 meters seaward of the toe of the dune to provide an ocean backshore closure.

In designated areas where ORV use areas are identified, new and/or improved ramps would be added to ensure access to these areas on the Oceanside. Soundside ORV access would be limited to designated boat ramps from the Cable Crossing and Spur Road. The remaining soundside ramps would be closed to ORV use and small parking areas would be constructed to better accommodate pedestrian access.

Interdunal roads available to ORV use would be the same as under alternative A, with the addition of providing additional pull-outs or widening where appropriate to provide safe passage. In addition, oOn

South Beach, the existing interdunal road would be extended west of ramp 45 to ramp 49, with a new ramp 48 established off of the interdunal road.

Within the areas open to ORV use, if resource concerns are present they would be subject to closure using applicable buffer distances (see table 4, chapter 2). These buffer distances are greater than under the no-action alternatives. Also, under alternative E, the time of allowable ORV access would be regulated to eliminate night driving from May 1 to November 15, between 10:00 p.m. and 6:00 a.m. Between September 16 and November 15, the areas that are closed to nighttime driving would be evaluated and those with low to no density of turtle nests may be reopened to ORV use.

The above measures~~seasonal closures and establishment of new interdunal roads~~ would result in 33.3 miles of beach designated for ORV use year-round, 20.2 miles seasonally designated for ORV use, and 14.5 miles designated as non-ORV ~~closed to ORV~~ year-round ~~and 26.1 miles closed seasonally~~. In three areas closed seasonally (Bodie~~s~~ Island Spit, Cape Point, and South Point)~~, specifically the spits and points~~, an ORV pass~~-~~through corridor would be provided at the start of the breeding season, subject to resource closures,~~,~~ which would allow access during portions of the breeding season and lessen the impact experienced by ORV users at these popular locations. Access provided by the designated routes and areas under alternative E would have long-term, minor to moderate, adverse impacts on ORV users, depending on the user's ability to reach a certain area and participate in the activities they desire. The nighttime restrictions would have long-term, minor to moderate, adverse impacts on ORV users as night driving would be restricted, but the restriction would be for a shorter period than other action alternatives, and there would be an opportunity for night driving to resume in some areas come the fall.

Resource Closures. Resource closures for birds would continue to be implemented annually, based on recent breeding activity, and an ORV pass~~-~~through zone and pedestrian corridor would be provided within three SMAs~~ adjacent to closure areas in areas~~ under ML2 management procedures (Bodie Island Spit, Cape Point, and South Point ~~Ocracoke~~), unless species activity or safety issues required a closure. In ~~a~~SMA~~rea~~s designated for the use of ML1 measures (see table 4, chapter 2), pedestrian access would not be allowed when resource closures~~in areas with closures~~, including pre-nesting closures, are in effect. Because of the resource closure buffers, visitors with ORVs would be precluded from the majority of the popular points and spits during the summer months. As noted under alternative A, the spits and points are of particular concern for visitors that wish to use these areas for fishing and other recreational pursuits such as walking and beachcombing, and these areas accounted for about 75% of total ramp usage (Loomis 2009axx). Therefore, seasonal closures at the points and spits under alternative E could affect a majority of oceanside ORV users; however, there would be ORV access at a number of other locations. Seasonal r~~R~~estrictions to popular areas of visitation would result in long-term moderate to major impacts for users wishing to access these points by ORV in the summer. Portions of s~~S~~ome of the point and spit areas may be open to pedestrian use during this time, resulting in a beneficial impact for visitors looking for a more solitude experience at the Seashore.

Resource closures for American oystercatchers, colonial waterbirds, and sea turtles may also occur in other areas throughout the Seashore, and ORVs and other dispersed recreation users would generally negotiate around these smaller closures throughout the Seashore using alternate routes and access points. This would typically result in short-term negligible to minor adverse impacts, because ORV accessibility would remain. Full beach closures due to turtle nesting would be lessened by the establishment of traffic detours behind nests, where appropriate. Under alternative E, turtle management activities would include creation of a "nest watch" program that would allow trained volunteers to watch nests that have reached their hatch windows to monitor hatchling emergence success. This would provide a new visitor experience, and one that is desired based on public comment, resulting in beneficial impacts to visitors who seek to participate in such a program.

A temporary full-beach resource closure could occur in areas open to ORV use, but would be much less likely under alternative E than under the no-action alternatives since known breeding/hatching areas would be within the SMAs and would generally already be closed to ORV use during the breeding season. As a result, the chance of a full beach closure in areas open to ORVs outside the SMAs is decreased, with the potential for long-term minor to moderate adverse impacts if temporary closures of these areas were to occur. The conditional ORV access corridors with pass-through zones, which would be allowed at the start of the breeding season in the Bodie Island Spit, Cape Point, and South Point SMAs under alternative E, are subject to resource closures and likely to be closed to access for some portion of the breeding season, resulting in long-term moderate to major adverse impacts to visitors wanting to access those locations during that period.

~~A temporary full-beach resource closure could occur in areas open to ORV use, and would be less likely under alternative E than the no action alternatives since known breeding/hatching areas would be already closed to ORV use during the breeding season. The adverse impacts from the potential for a full beach closure would be long-term and minor, because while there are expanded buffers under alternative E, the chance of a full beach closure outside already closed areas is decreased as most of the known nesting/breeding areas are included in the closures.~~

Alternative E would provide for a special use permit, to be authorized by the Superintendent, which would allow temporary use of an ORV in a non-ORV use area, as described under alternative C. By providing for special use permits in these circumstances, beneficial impacts would be realized by these user groups that would otherwise not be able to use an ORV in areas closed year-round or seasonally to ORV use.

To further address and facilitate access into non-ORV use areas, alternative E would include new or expanded parking lots to support pedestrian access as well as the consideration by the Seashore of applications for commercial use authorizations for a beach shuttle service. In addition to the shuttle system, under alternative E, the NPS would designate and post boat landing zones ("drop off" "area) near the inlet at Bodie Island Spit and South Point ~~Ocracoke~~ that could be used to drop off pedestrians if/when the inlet shoreline is not otherwise closed to protect park resources, with purpose of encouraging a water shuttle service. These elements would provide beneficial impacts and work to mitigate the minor to moderate to major adverse impacts that some user groups may experience as alternative ways to reach the Seashore would be provided if ORV use is not permitted.

Regarding time of use, under alternative E the night-time restrictions offer additional protection of sea turtles. Vehicles would be prohibited from using the beach during the hours of 10:00 p.m. to 6:00 a.m. from May 1 to November 15, with the potential for some areas to reopen after September 15 if there are no to low density of turtle nests in certain areas of the Seashore. Night driving would be allowed all other times of the year (November 16 to April 30). These restrictions would have long-term benefits or~~,~~ minor to moderate, adverse impacts on visitors, depending on the desired visitor use and experience. For example, those visitors wishing to experience the beach at night without ORVs present would have more opportunities to do so. Those visitors wishing to use ORVs to access surf fishing areas at night would not be able to do so during the summer and fall season, which would be considered a major long-term adverse effect on that group of visitors.~~For example, those wishing to surf fish at night would not be able to do so during the summer season and only in certain areas in the fall, which would be considered a moderate, long-term, adverse effect on that group of visitors. However, the flexibility of this alternative in regards to night driving may alleviate some visitor impacts.~~

Safety Closures. Alternative E would establish specific criteria for implementation of a safety closure, as detailed under alternative C. No administrative closures would be established under this alternative. Although there is not an administrative closure at the Cape Point light house, no ORV route would be

established in this area, thus ORVs would not be permitted. V~~ and v~~illage beaches would be closed during the summer either as a seasonal or as part of a year-round closure. Alternative E would also implement additional pedestrian safety measures, requiring that village beaches open to ORV use during the winter season be at least 65.6 feet (20 meters) wide from the toe of the dune seaward to the mean high tide line in order to be open for ORV use. The safety closure criteria and beach width requirements in front of villages would provide a beneficial impact to visitor safety with these measures.

These areas include a total of approximately 40.6 miles (14.5 designated as non-ORV~~closed to ORV~~ year-round and 26.1 ~~closed~~ seasonally designated for ORV use during the non-breeding season), or two-thirds of the total beach mileage during the peak summer season, so these restrictions would cause moderate adverse impacts to ORV users and would be a benefit related to protecting visitor safety and to those non-ORV users desiring a vehicle-free experience with more natural views and no vehicle-related noise in more populated areas. Some areas that have been traditionally closed to ORVs year-round due to seasonal restrictions and safety closures, such as village beaches, would now be open seasonally from November 1 to March 31. Access to these previously closed areas would provide ORV~~Seashore~~ users with a benefit, but would result in long-term minor to moderate adverse impacts to non-ORV users.~~depending on their desire to access these areas by ORV. However, s~~ Since pedestrians and ORVs would be present on the same portion of the beach during the winter/spring season, the noise and the sight of vehicles would continue to decrease the visitor experience for those visitors seeking solitude and a natural setting, with long~~short~~-term, minor to moderate, adverse impacts to those users.

Alternative E would include improvements to ramp characteristics throughout the Seashore, as described under alternative C. These improvements to ramps and creation of designated~~installation of amenities such as an~~ air down areas would have beneficial impacts to ORV users, who noted a desire for these conditions during public scoping.

Permitting and Carrying Capacity Requirements. Alternative E would include permitting requirements for all ORV use (as detailed under alternative C), and could be viewed as a long-term, minor to moderate, adverse impact to visitor experience for most ORV users since it would result in paperwork and effort needed to get a permit. Alternative E would differ from alternative C in that both weekly and 12-month permits would be available, with a lower fee for weekly permits than 12-month permits. This would provide flexibility to the visitor who may only be coming to the Seashore for a short period. Alternative E would also include additional permits that would permit "~~the following:~~ park-and-stay" overnight at designated locations and~~:~~ self-contained vehicle (SCV) camping at three NPS campgrounds during the off-season.~~; and night driving from September 16 to November 15.~~ Fees for park-and-stay and SCV camping permits would be determined separately from the ORV use permit.

As with alternative C, the educational and testing requirement under alternative E could be viewed by those seeking a permit as too cumbersome and would result in minor to moderate adverse impacts to their experience. A fee would be charged to obtain a permit that would be based on cost recovery as described in the NPS Director's Order and Reference Manual #53. Depending on the level of fee, which would be different for type and length of permit, ORV users could experience minor to moderate impacts, depending on if they feel the fee would prevent them from experiencing the Seashore. However, offering a weekly permit in addition to the 12-month permit would offer a lower cost option for short-term visitors and would be a beneficial impact. Although some users may feel adverse impacts from implementation of a permit system, other users may see beneficial impacts as those visitors using ORV would be provided education and information with their permits that could influence their behavior and reduce potential for conflicts with non-ORV visitors. For law-abiding visitors~~ORV users~~, implementation of a permit system would provide the Seashore with a method to address those ORV users who violate Seashore regulations~~policy~~, through revocation of permits. The permit system would give Seashore staff a system with "teeth" to revoke permits of regulatory offenders, which could beneficially affect the experience of

law-abiding visitors. Additional beneficial impacts would be realized as park-and-stay and SCV camping permits would allow visitors to engage in a previously prohibited use. ~~and a use that was requested to be added during public scoping.~~

Alternative E would not dictate parking configurations on the beach, but would include formal carrying capacity provisions, which are most likely to take effect during peak use periods such as summer holiday weekends and which would include~~, including~~ the enforcement of temporary closures of areas once these limits are reached or if disorderly conduct occurs and continues, which has occurred during busy weekends. The implementation of a defined carrying capacity may be viewed as a benefit by those who feel that there are times when conditions are too crowded and that their visitor experience is impacted by these crowded conditions. Others would view implementation of a carrying capacity as a short-term ~~and long-term~~, moderate to major, adverse impact~~s~~ if they are unable to get to their desired area because the capacity has been reached, depending on how often they are unable to access their desired area. As some visitors are only at the Seashore for a limited time during a vacation, not being able to participate in the planned recreational activity because capacity has been reached would result in a long-term, major, adverse impact for that visitor group. The determined carrying capacity would be subject to periodic review and may address these impacts if they arise.

Other Recreational Pursuits. Similar to alternative A~~A~~, pedestrian based activities would be allowed outside of any resource closures.~~,~~ U~~but u~~nlike A~~A~~, ORV routes and non-ORV areas would be formally designated under alternative E. Seven SMAs under ML1 measures would be closed to recreation during the breeding season and three SMAs under ML2 measures would allow an ORV access corridor during the breeding season, subject to resource closures.~~this would be allowed only in areas that are not included in a seasonal closure or are in a seasonal closure but under ML2 management procedures (Bodie Island Spit, Cape Point, and South Point).~~ In areas designated for ORV use, ~~most cases outside areas under ML2 management procedures (where ORVs are not permitted),~~ the defined ORV and pedestrian corridors would overlap or be the same, raising the possibility of conflict between ORV and non-ORV users and a diminished visitor experience for visitors seeking solitude and freedom from vehicular distractions. However, due to the amount of area open to only non-ORV uses under alternative E, these impacts would be expected to be negligible. Under alternative E, the speed limit would be lowered to 15 mph year-round, which would help reduce conflicts, both real and perceived, and accident potential, an issue of concern raised by the public during the scoping process.

Like alternative A, recreational pursuits, such as kite flying, Frisbees, and ball throwing, would not be allowed within or above all bird closures. These restrictions would have long-term, minor, adverse impacts on visitor use since many other locations exist throughout the Seashore that accommodate these or similar activities. Also, similar to alternative A, there would be only short-term, negligible, adverse impacts to ORV users~~visitors~~ participating in fishing tournaments because historical ORV~~beach~~ access for tournament fishermen would continue.

Restrictions on pets would be the same as alternative C, except that pets would be prohibited within all designated breeding shorebird SMAs, including pass-through zones, from March 15 to August 31. These restrictions would have long-term, minor to moderate, adverse impacts on responsible pet owners because of the limited areas that they would be able to go with their pets at the Seashore. In addition, restrictions would be placed on the use of horses at the Seashore, with a prohibition of horse use in SMAs. While this would be an adverse impact, a beneficial impact would also be realized by allowing horses use on village beaches from September 16 to May 14 each year.

Additional restrictions on beach fires would be implemented under alternative E with a non-fee educational permit required in order to have a beach fire. Camping and nighttime use would be modified by ~~based on~~ allowing SCV camping and park-and-stay camping at specific locations in the Seashore that

are detailed on table 2. Although Seashore users may feel a minor adverse impact from the requirement for a beach fire permit, beneficial impacts would be realized from the addition of the park-and-stay and SCV camping options to visitor experience.

Night Sky. Regarding the visitor experience of viewing the night sky, under alternative E the restriction on night driving from May 15 to November 15 would eliminate impacts during that period of time due to vehicle lights on the beach and lighting from parked vehicles where people are fishing, especially in areas away from the villages, resulting in long~~short~~-term benefits for night sky experience. However, night driving would still occur under permit in the fall and during the remainder of the year, so impacts to night sky during those months would remain negligible to minor and adverse from this use. Further night use that would be permitted under alternative E includes the "park and stay" permit option, which would result in vehicles on the beach overnight, and could contribute to interference with the night sky that would be noticeable and result in long-term moderate adverse impacts.

Overall Impact to Visitor Use. Those looking for an experience at the Seashore that includes ORV would have long-term moderate adverse impacts as the establishment of the SMAs would preclude ORV use from some areas of the Seashore that are popular visitor use areas, both year-round and seasonally. Areas under ML2 management procedures would provide an ORV pass-through corridor, lessening the impacts to this user group. Additional recreational opportunities such as park-and-stay and SCV camping would provide long-term benefits. Those looking for a non-ORV experience at the Seashore would experience long-term benefits as alternative E provides for year-round non-ORV use ~~areas~~ areas as well as~~through~~ seasonal ORV closures in areas such as village beaches and through SMAs. Since night driving would be seasonally restricted under alternative E, there would be long-term moderate adverse impacts to night skies due to the implementation of park-and-stay camping, with ~~short-term~~ beneficial impacts during times of seasonal night-driving restrictions.

Cumulative Impacts. Under alternative E, the same past, present, and planned future activities within the Seashore that have the potential to affect visitors and the recreational opportunities within the Seashore would occur, and impacts would be the same as described under alternative A. Other actions, primarily construction-related, would have short-term, minor impacts. The impacts of these actions, in combination with the mostly minor to moderate and potentially major impacts of alternative E, would result in long-term, moderate to major, adverse cumulative impacts to ORV users. ~~and other visitors dependent on ORVs for access to particular areas of the Seashore.~~ However, the beneficial impacts of other actions and restrictions on ORV use under alternative E would provide long-term cumulative benefits for visitors who desire an experience free of motorized vehicle presence, disturbance, lights, or noise.

Conclusion. Designating ORV use areas and closures based on providing maximum flexibility would result in long-term, minor to moderate, adverse impacts as many~~the~~ areas favored~~most used~~ by ORV users, such as the spits and points, are within SMAs that ~~and favored destinations or fishing locations~~ would be seasonally closed to ORV. ~~use seasonally.~~ Major adverse impacts could occur to ORV users of the popular points/spits if pass-throughs would be closed due to resource closures. Beneficial effects would result from the additional accommodations made for pedestrian use including more parking, a possible beach shuttle, and special use permits to shuttle the mobility impaired. Seashore visitors not using or relying on ORVs would not experience many, if any, adverse impacts from these closures or from other safety closures in areas managed under ML2 procedures where a pedestrian corridor would be provided, and those non-ORV users desiring a vehicle-free experience with more natural views and no vehicle-related noise or visual disturbance could experience benefits from the ORV-free areas and restrictions on nighttime driving and reduced speed limits throughout the Seashore. These users would experience long-term, moderate, adverse impacts in those SMA~~area~~s managed under ML1 procedures and closed ~~year-round or~~ or restricted during the breeding season~~seasonally~~, but would be able to obtain a non-ORV experience elsewhere at the Seashore during these times.

Because pedestrians and most other recreational opportunities could occur outside seasonal and other closures, as well as in pedestrian corridors in other seasonal closures, short-term, minor, adverse impacts would occur to these users. The implementation of an ORV permit system and carrying capacity would be viewed as a benefit by those who would like to see a system in place with consequences for non-law abiding ORV users, as well as those who may perceive crowded conditions that impact their visitor use and experience. For other users, these elements would have a long-term, minor to moderate, adverse impact as the permit system could be viewed as ~~too~~ cumbersome and/or expensive, and short ~~long~~-term, moderate to major impacts to those who may not be able to access a beach that has reached capacity. Elements that provide both weekly and 12-month permits would be beneficial as the user had some flexibility and choice in regard to permit cost.

Elements that restrict the type of activities (such as kite flying) or the ability of Seashore users to have a campfire or bring pets could have long-term minor to moderate impacts to specific user groups, with the addition of park-and-stay and SCV camping options providing a benefit through new visitor experiences. Lights associated with ORV use would result in negligible to minor adverse effects to those visitors wishing to experience the night sky during winter when night driving is permitted and moderate adverse impacts from implementation of the "park and stay" option or not restricted, and there would be short-term benefits to night sky viewing during the summer season when night driving is prohibited.

Cumulative impacts would be long-term, moderate to major, and adverse to ORV users, and long-term, beneficial for other Seashore users.

Impacts of Alternative F: Management Based on Advisory Committee Input

Under alternative F, input from the Negotiated Rule Making Committee was used to determine ORV routes and areas, with the goal of providinge a wide variety of access opportunities for both ORV and non-ORV users. In general, alternative F evaluated re-opening some areas to ORV use~~r~~ earlier (after shorebird breeding activity has concluded) ~~and for a longer period of time~~ than other action alternatives, as well as the addition of a pedestrian access trail and additional enhancements to the interdunal road system. Under this alternative, ORV access would be prohibited in all areas of the Seashore except where an ORV route is specifically designated.

ORV routes and areas would be established seasonally with ORV use prohibited in Rodanthe, Waves, Salvo, and Avon from May 15 to September 15; Frisco and Hatteras beaches from March 1 to November 30; and Ocracoke camp-ground beach (0.5 mile NE to 0.5 mile SW of ramp 68)~~,~~ and the Ocracoke Day-Use Area from April 1 to November 31. Although the different range of closure dates would not offer Seashore-wide uniformity, it would offer the visitor flexibility by making some beach and campground areas open earlier and some later in the season.

Bodie Island Spit, a popular use area, would be seasonally closed to ORV use from March 15 to July 31 or two weeks after fledging, but would include a pedestrian corridor. Hatteras Inlet Spit and North Ocracoke Spit would be designated as non-ORV year- ~~A year-round ORV closure would occur at Hatteras Inlet Spi~~round~~t~~, with interdunal roads to allow ORV users close access to the ocean beach, except when breeding closures are in effect.~~,~~ At Hatteras Inlet Spit, there would be ~~and~~ soundside access to the inlet via the Spur Road. At Cape Point and South Point, an ORV access corridor would be allowed at the start of the breeding season, subject to resource closures.~~from March 15 to July 31 or 2 weeks after fledging, but would be limited to an established ORV corridor.~~

W~~In areas w~~here ORV use areas are designated~~identified~~, new and/or improved ramps would be added to ensure access to these areas on the o~~O~~ceanside. Soundside access for ORV would be provided at current locations and would remain open with sufficient maintenance to provide clear passage. In addition, a new

soundside access point would be provided ~~on Bodie Island and one~~ on Ocracoke Island (approximately 0.65 mile south of ramp 72).

Interdunal roads available to ORV use ~~would be the same as~~ under alternative A would remain, with the addition of providing additional pull-outs or widening where appropriate to provide safe passage. Additional interdunal routes or route changes would occur. O~~O~~n Hatteras Inlet Spit, the Pole Road would be re-routed toward the sound west of the Overwash Fan to provide a natural barrier to the bird nesting area south of the road and a new interdunal road would be established from the southern terminus of Pole Road to provide access to the False Point and inlet. Another new interdunal road would be established on North Ocracoke Spit from ramp 59 for 0.3 mile northeast toward the inlet, with parking at the terminus.

Within the areas open to ORV use, if resource concerns are present the access route~~y~~ would be subject to closure using applicable buffer distances (see table 4, chapter 2). These buffer distances are greater than under the no-action alternatives. Also, under alternative F, the time of allowable ORV access would be regulated to eliminate night driving, ~~only~~ in locations of potential sea turtles nesting habitat (ocean intertidal zone, ocean backshore, and dunes), from May 1 to November 15, from one hour after sunset until the turtle patrol has checked the beach in the morning (approximately ½ hour after sunrise). Between September 16 and November 15, the areas that are closed to nighttime driving would be evaluated and those with low to no density of turtle nests may be reopened to ORV use, subject to the terms and conditions of the~~an~~ ORV permit.

The above seasonal closures provide flexibility and result in a range of dates during which~~providing a longer span of time that certain v~~ village beaches would be~~are~~ open to ORV access, while providing some areas that are ORV free for much of the year~~a long time~~ as well. Certain high visitor use areas such as Cape Point and South Point, would be designated as year-round ORV areas, with the likelihood that ORV access would be temporarily restricted when breeding season closures are in effect. These seasonal closures, combined with the improvement of and establishment of new interdunal roads would result in 29 miles designated for ORV use year-round, 23 miles designated for seasonal ORV use, and 16 miles designated as non-~~closed to~~ ORV year-round~~ and 25.8 miles closed seasonally.~~ Access provided by the designated ORV routes and areas under alternative F would have long-term, minor to potentially major, adverse impacts on ORV users, depending on the users' ability to reach a certain area and participate in the activities they desire. While there would be more areas closed to ORV use year-round than under some other alternatives, there is the potential that access would be provided to some~~many~~ of the popular visitor use areas during portions of~~in~~ the summer. The night driving~~time~~ restrictions would have long-term, minor to moderate, adverse impacts~~ impacts as night driving would be restricted~~, but the restriction c~~w~~ould be for a shorter period than under~~other~~ other action alternatives, as~~closures may not be in all areas depending on where turtle nesting habitat is identified, and~~ there would be an opportunity for night driving to resume in some areas come the fall.

Resource Closures. Resource closures for birds would continue to be implemented annually, based on recent breeding activity, with ORV corridors provided at the start of the breeding season in two SMAs~~areas~~ under ML2 management procedures (Cape Point and South Point~~ Ocracoke~~) and a pedestrian corridor at one SMA (Bodie Island Spit). All corridors at these locations would be subject to resource closures.~~ unless species activity or safety issues required a closure.~~ In SMA~~area~~s under ML1 management procedures (see table 4, chapter 2), pedestrian access would not be allowed ~~in areas with closures~~ during breeding season, including pre-nesting closures. ~~If no additional resource closures are needed, many of the popular visitor use areas would be accessible during the summer months through the ORV corridor.~~ No ORV access would be provided to Bodie Island Spit ~~for ORV~~ during breeding season, but a pedestrian corridor would be provided. Portions of Hatteras Inlet Spit would be designated as non-ORV~~closed~~ year-round ~~to ORV~~ and closed to all visitor use when breeding season closures are in effect. If additional resource closures are necessary, ORV and/or pedestrian use of these access corridors may be temporarily

closed. As noted under alternative A, the spits and points are of particular concern for visitors that wish to use these areas for fishing and other recreational pursuits such as walking and beachcombing, and these areas accounted for about 75% of total ramp usage (Loomis 2009axx). The seasonal ORV corridors under alternative F would allow ORV access for many oceanside ramp users, resulting in long-term, minor, adverse impacts as the entire area would not always be open, depending upon the location of resource closures~~but it would be accessible~~. For ORV users that wish to reach Bodie Island Spit in the summer or Hatteras Inlet Spit year-round, impacts would be long-term, moderate to major, and adverse because they would not be able to beach drive~~recreate~~ in that area, and they would need to walk from ORV parking areas or seek other areas open to ORV~~their~~ use, which may at times be limited. For users that desire a more solitude experience free of ORV, the Bodie Island Spit and Hatteras Inlet Spit closures with pedestrian corridor would have long-term beneficial impacts.

Resource closures for American oystercatchers, colonial waterbirds, and sea turtles may also occur in other areas throughout the Seashore, and ORVs and other dispersed recreation users would generally negotiate around these smaller closures throughout the Seashore using alternate routes and access points. This would typically result in short-term, negligible to minor, adverse impacts because ORV accessibility would remain. Full beach closures due to turtle nesting would be lessened by the establishment of traffic detours behind nests, where appropriate. Under alternative F, turtle management activities would include creation of a "nest watch" program that would allow trained volunteers to watch nests that have reached their hatch windows to monitor hatchling emergence success. This would provide a new visitor experience, and one that is desired based on public comment, resulting in beneficial impacts to visitors who seek to participate in such a program.

A temporary full-beach resource closure could occur in areas open to ORV use, but~~and~~ would be much less likely under alternative F than under the no-action alternatives since known ~~b~~breeding/hatching areas are within the SMAs and would generally ~~be~~ already be closed to ORV use during the breeding season. As a result, the chance of a full beach closure in areas open to ORVs outside the SMAs is decreased, with the potential for long-term minor to moderate adverse impacts if temporary closures of these areas were to occur. ~~As the ORV corridors at Cape Point and South Point would be subject to these closures, impacts could be short-term, moderate to major, and adverse if access to these areas becomes closed.~~ The ORV or pedestrian access corridors, which would be allowed in the Bodie Island Spit, Cape Point, and South Point SMAs at the start of the breeding season under alternative F, are subject to resource closures and likely to be closed to access for some portion of the breeding season, resulting in long-term moderate to major adverse impacts to visitors wanting to access those locations during that period.~~The adverse impacts from the potential for a full beach closure would be long-term and moderate to major because if one of the points with an ORV corridor would close, that visitor use opportunity would be greatly limited during the summer.~~

Alternative F would provide for a special use permit, to be authorized by the Superintendent, which would allow temporary use of an ORV in a non-ORV use area, as described under alternative C. By providing for special use permits in these circumstances, beneficial impacts would be realized by these user groups that would otherwise not be able to use an ORV in areas designated as non-ORV~~closed~~ year-round or seasonally~~ to ORV use~~.

To further address and facilitate access into non-ORV use areas, alternative F would include new or expanded parking lots to support pedestrian access, as well as the consideration by the Seashore of applications for commercial use authorizations for a beach shuttle service. These elements would provide beneficial impacts and work to mitigate the minor to moderate to major adverse impacts that some user groups may experience because alternative ways to reach the Seashore would be provided if ORV use is not permitted but pedestrian use is allowed.

Regarding time of use, under alternative F, the night-time restrictions offer additional protection of sea turtles. Vehicles would be prohibited from using the beach from one hour after sunset to approximately ½ hour after sunrise (after turtle patrols are complete) from May 1 to November 15, with the potential for some areas to reopen after September 15 if there are no to low density of turtle nests in certain areas of the Seashore, and permit terms and conditions are followed. Night driving would be allowed all other times of the year (November 16 to April 30). These restrictions would have long-term, minor to moderate, adverse impacts on visitors, depending on the desired visitor use and experience, but the flexibility of this alternative in regards to night driving may reduce some visitor impacts.

Safety Closures. Alternative F would establish specific criteria for implementation of a safety closure, as detailed under alternative C, but would add additional triggers, such as deep beach cuts, obstacles (e.g., stumps), severe beach slopes, and a high concentration of pedestrian users on a narrow beach (see table 2 for details). No administrative closures would be established under this alternative. Although there is not an administrative closure at the Cape Point lighthouse, no ORV route would be established in this area, thus ORVs would not be permitted and village beaches would be closed during the summer either designated as a seasonal ORV area and year-round non-ORV area.~~closure.~~ Alternative F would also implement additional pedestrian safety measures, including lowered speed limits when pedestrians are present and requiring ORVs to yield right-of-way to pedestrians, which would have beneficial impacts as concerns related to safety would be reduced.

These areas include a total of approximately 29 miles that would be designated for ORV use year-round and 39 miles ~~41.5 miles~~ (16 miles designated as non-ORV~~closed to ORVs~~ year-round and 23 miles~~5.8~~ designated for ~~closed~~ seasonal ORV use~~ly~~), or approximately 60%~~two-thirds of the~~ the total beach mileage, that would be closed to ORVs during the summer season~~, with some popular use areas potentially accessible year-round~~. T~~, so t~~hese restrictions would cause minor to moderate, adverse impacts to ORV users and be beneficial for ~~would be a benefit related to~~ protecting visitor safety and ~~to~~ those non-ORV users desiring a vehicle-free experience with more natural views and no vehicle-related noise in more populated areas. Some areas that have been traditionally closed to ORV use year-round due to seasonal restrictions and safety closures, such as village beaches, would now be open seasonally to ORV use. ORV a~~A~~ccess to these previously closed areas would provide ORV~~Seashore~~ users with a benefit, but would result in long-term, minor to moderate adverse impacts to pedestrians using these areas. ~~depending on their desire to access these areas by ORV. However, s~~Since pedestrians and ORVs would be present on the same portion of the beach during the winter/spring season, the noise and the sight of vehicles would continue to decrease the visitor experience for those visitors seeking solitude and a natural setting, with long~~short~~-term, minor to moderate, adverse impacts to those users.

Alternative F would include improvements to ramp characteristics throughout the Seashore, as described under alternative C, with the additional goal of establishing an ORV ramp at either end of an ORV route. These improvements to ramps and the creation~~installation of amenities, such as an~~ air down areas, would have beneficial impacts to ORV users.~~, who noted a desire for these conditions during public scoping.~~

Permitting and Carrying Capacity Requirements. Alternative F would include permitting requirements for all ORV use (as detailed under alternative C) and could be viewed as a long-term, minor to moderate, adverse impact to visitor experience for most ORV users since it would result in paperwork and effort needed to get a permit. Alternative F would differ from alternative C in that both weekly and 12-month permits would be available, with a lower fee for weekly permits than 12-month permits. This would provide flexibility to the visitor who may only be coming to the Seashore for a short period. Alternative F would also include an additional permit for night driving from September 16 to November 15.

As with alternative C, the educational and testing requirement under alternative F could be viewed by those seeking a permit as too cumbersome and would result in minor to moderate, adverse impacts to their

experience. A fee would be charged to obtain a permit that would be based on cost recovery as described in the NPS Director's Order and Reference Manual #53. Depending on the level of fee, which would be different for type and length of permit, ORV users could experience minor to moderate impacts, depending on if they feel the fee would prevent them from experiencing the Seashore; however, offering a weekly permit in addition to the 12-month permit would offer a lower cost option for short-term visitors. Although some users may feel adverse impacts from implementation of a permit system, other users may see beneficial impacts as those visitors using ORV would be provided education and information with their permits that could influence their behavior and reduce potential for conflicts with non-ORV visitors. For law-abiding visitors~~ORV users~~, implementation of a permit system would provide the Seashore with a method to address those ORV users who violate Seashore policy, through revocation of permits. The permit system would give Seashore staff a system with "teeth" to revoke permits of regulatory offenders, which could beneficially affect the experience of visitors.

Alternative F would not dictate parking configurations on the beach, but would include formal carrying capacity provisions, including the enforcement of temporary closures of areas once these limits are reached or if disorderly conduct occurs and continues, which has occurred during busy weekends. The implementation of a defined carrying capacity, which is most likely to take effect during peak use periods such as summer holiday weekends, may be viewed as a benefit by those who feel that there are times when conditions are too crowded and that their visitor experience is impacted by these crowded conditions. Others would view implementation of a carrying capacity as a short~~long~~-term, moderate to major, adverse impact if they are unable to get to their desired area because the capacity has been reached, especially if some of their preferred locations are closed, e.g. points and spits). As some visitors are only at the Seashore for a limited time during a vacation, not being able to participate in the planned recreational activity because capacity has been reached would result in a short- and long-term, major, adverse impact for that visitor group depending on the duration of time they cannot access an area. The determined carrying capacity would be subject to periodic review and may address these impacts if they arise.

Other Recreational Pursuits. Similar to alternative A, pedestrian based activities would be allowed outside of any resource closures. Unlike A, ORV routes and non-ORV areas would be formally designated under alternative F. Seven SMAs under ML1 measures would be closed to recreation during the breeding season and three SMAs under ML2 measures would allow an ORV or pedestrian access corridor during the breeding season, subject to resource closures. In areas designated for ORV use, the defined ORV and pedestrian corridors would overlap or be the same, raising the possibility of conflict between ORV and non-ORV users and a diminished visitor experience for visitors seeking solitude and freedom from vehicular distractions. However, due to the amount of area open to only non-ORV uses under alternative F, these impacts would be expected to be negligible. Under alternative F, the speed limit would be lowered to 15 mph year-round, which would help reduce conflicts, both real and perceived, and accident potential, an issue of concern raised by the public during the scoping process.

~~Similar to alternative A, pedestrian based activities would be allowed outside of any resource closures, but unlike alternative A, this would be allowed only in areas that are not included in a seasonal closure or are in a seasonal closure but under ML2 management procedures (Bodie Island Spit, Cape Point, and South Point). In most cases, outside areas under ML2 management procedures (where ORVs are not permitted), the defined ORV and pedestrian corridors would overlap or be the same, raising the possibility of conflict between ORV and non-ORV users and a diminished visitor experience for visitors seeking solitude and freedom from vehicular distractions. However, as under alternative F, Seashore visitors would have non-ORV options during the summer, such as Bodie Island Spit, and therefore, this impact would be negligible. Under alternative F, the speed limit would be lowered to 15 mph year-round, which would help reduce conflicts, both real and perceived, and accident potential, an issue of concern raised by the public during the scoping process.~~

Like alternative A, recreational pursuits, such as kite flying, Frisbees, and ball throwing, would not be allowed within or above all bird closures. These restrictions would have long-term, minor, adverse impacts on visitor use since many other locations exist throughout the Seashore that accommodate these or similar activities. Also, similar to alternative A, there would be only short-term, negligible, adverse impacts to ORV users~~visitors~~ participating in fishing tournaments because historical ORV~~beach~~ access for tournament fishermen would continue.

Restrictions on pets would be the same as alternative C, except that pets would be prohibited in all designated breeding shorebird SMAs from March 15 to August 31, or two weeks after all shorebird breeding activities have ceased or chicks have fledged, which ever comes later. These restrictions would have long-term, moderate, adverse impacts on pet owners because of the limited areas that they would be able to go with their pets at the Seashore. In addition, restrictions would be placed on the use of horses at the Seashore, with a prohibition of horse use in SMAs. While this would be an adverse impact, a beneficial impact would also be realized by allowing horses use on village beaches from September 16 to May 14 each year.

Additional restrictions on beach fires would be implemented under alternative F with a non-fee educational permit required in order to have a beach fire. These permits would only be available for Coquina Beach, Rodanthe, Waves, Salvo, Avon, Buxton, Frisco, Hatteras Village, and Ocracoke Day-Use Area from May 1 to November 15, during turtle nesting season. Visitors would also be prohibited from leaving belongings overnight at the Seashore, and items left for more than 24 hours may be removed. Seashore users may feel a minor, adverse impact from the requirement for a beach fire permit and being restricted to certain areas during the turtle nesting season, as well as requirements to remove their equipment from the beach each night.

Night Sky. Regarding the visitor experience of viewing the night sky, under alternative F, the restriction on night driving would occur from May 15 to November 15. This would eliminate impacts during that period from vehicle lights on the beach and lighting from parked vehicles where people are fishing, especially in areas away from the villages, resulting in long~~short~~-term benefits for night sky experience. However, night driving would still occur under permit in the fall and during the remainder of the year, so impacts to night sky during those months would remain negligible to minor and adverse.

Overall Visitor Use Impacts. Those looking for an experience at the Seashore that includes ORV would have long-term moderate adverse impacts as the establishment of the SMAs would preclude ORV use from some areas of the Seashore that are popular visitor use areas, both year-round and seasonally. Areas under ML2 management procedures would provide either a pedestrian or ORV access corridor at the start of the breeding season, subject to resource closures, lessening the impacts to this user group. Additional access would be provided to the soundside under this alternative as well. Those looking for a non-ORV experience at the Seashore would experience long-term benefits as alternative F provides for year-round non-ORV use areas as well as ~~through~~ seasonal non-ORV ~~closures in~~ areas such as village beaches ~~and through SMAs~~, and a new pedestrian trail. Since night driving would be seasonally restricted under alternative F, there would be long-term negligible to minor adverse impacts to night skies, with ~~short-term~~ beneficial impacts during times of seasonal night-driving restrictions.

Cumulative Impacts. Under alternative F, the same past, present, and planned future activities within the Seashore that have the potential to affect visitors and the recreational opportunities within the Seashore would occur, and impacts would be the same as described under alternative A.

Other actions, primarily construction-related, would have short-term minor impacts. The impacts of these actions, in combination with the mostly minor to moderate and potentially major impacts of alternative F, would result in long-term, moderate to major, adverse cumulative impacts to ORV users ~~and other visitors~~

Comment [MSOffice36]: See highlighted sections below. Shouldn't these all be the same ("moderate to major")? I don't think F would provide any less impact to ORVs users than E does, which is "moderate to major". MBM

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dependent on ORVs for access to particular areas of the Seashore. However, the beneficial impacts of other actions and restrictions on ORV use under alternative F would provide long-term cumulative benefits for visitors who desire an experience free of motorized vehicle presence, disturbance, lights, or noise.

Conclusion. Designating ORV use areas and closures based on input from the regulatory negotiation committee would result in long-term, minor to moderate impacts as ORV access would be permitted during the summer months at in some popular use SMA areas (Cape Point and South Point), subject to resource closures, but due to ORV closures at Bodie Island Spit being designated as non-ORV during breeding season, and Hatteras Inlet Spit and North Ocracoke Spit Inlet being designated non-ORV year-round, impacts to ORV users may be long-term, moderate to major, and adverse because more than one of these areas could be closed at one time during the summer season due to resource closures. There would be beneficial impacts from the additional accommodations made for pedestrian use including more parking, a possible beach shuttle, and special use permits to shuttle the mobility impaired. Seashore visitors not using or relying on ORVs would not experience many, if any, adverse impacts from these closures or from other safety closures where pedestrian corridors are provided, and those non-ORV users desiring a vehicle-free experience with more natural views and no vehicle-related noise or visual disturbance could experience long-term benefits from the ORV-free areas and restrictions on nighttime driving and reduced speed limits throughout the Seashore.

Because pedestrian uses and most other recreational opportunities could occur outside seasonal and other closures, as well as in pedestrian corridors in other seasonal closures, short-term, minor, adverse impacts would occur to these users. The implementation of an ORV permit system and carrying capacity would be viewed as a benefit by those who would like to see a system in place with consequences for non-law abiding ORV users, as well as those who may perceive crowded conditions that impact their visitor use and experience. For other ORV users, these elements would have a long-term, minor to major, adverse impact as the permit system could be viewed as too cumbersome and/or expensive, and short long-term, moderate to major, impacts to those who may not be able to access a beach that has reached capacity. Elements that provide both weekly and 12-month permits would be beneficial as the user had some flexibility and choice in regard to permit cost.

Elements that restrict the type of activities (such as kite flying) or the ability of Seashore users to have a campfire or bring pets could have long-term, minor to moderate impacts to specific user groups. Lights associated with ORV use would result in negligible to minor, adverse effects to those visitors wishing to experience the night sky during winter when night driving is permitted or not restricted, and there would be short-term benefits to night sky viewing during the summer season when night driving is prohibited.

Cumulative impacts would be long-term, moderate to major and adverse to ORV users, and long-term, beneficial for other Seashore users.

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1 **TABLE 53. SUMMARY OF IMPACTS TO VISITOR USE AND EXPERIENCE UNDER THE ALTERNATIVES**

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Those looking for an experience at the Seashore that includes ORV would have long-term negligible to minor adverse impacts as some areas would be closed for resource protection, but alternative A would provide the most ORV access ofthan any alternative. Should there be extensive resource closures in a given year, the potential for long-term moderate impacts exists. Those looking for a non-ORV experience at the Seashore would experience long-term moderate adverse impacts as alternative A does not provide for a specific separation of uses or non-ORV areas. Since night driving would be permitted under alternative A, there would be short-term minor adverse impacts to night skies. Cumulative Impacts: Long-term, negligible to minor, and adverse for ORV users and long-term, moderate, and adverse for non-ORV users beneficial	Those looking for an experience at the Seashore that includes ORV would have long-term negligible to minor adverse impacts as some areas would be closed for resource protection, particularly during the breeding season. These impacts could increase to long-term moderate adverse if a spit or point were to close for an extended period of time and short-term major adverse in the unlikely event more than one spit or point closed at the same time. Those looking for a non-ORV experience at the Seashore would experience long-term minor to moderate adverse impacts as alternative B provides for larger areas of closures than alternative A, but does not provide for a specific separation of uses or non-ORV areas. Since night driving would be seasonally restricted under alternative B, there would be long-term negligible to minor adverse impacts to night skies, with longshort-term beneficial impacts during times of seasonal night-driving restrictions. Cumulative Impacts: Long-term, moderate to major, and adverse to ORV users, and long-term, minor to moderate, and adverse beneficial for other Seashore users	Those looking for an experience at the Seashore that includes ORV would have long-term moderate to major adverse impacts as the establishment of the SMAs would seasonally preclude ORV use from some areas of the Seashore that are popular ORVvisitor use areas, both year-round and seasonally,. While some areas under ML2 management procedures would have pedestrian access corridors, no ORV corridors would be provided in the SMAs, resulting in greater impacts to ORVthis users group. Those looking for a non-ORV experience at the Seashore would experience long-term benefits as alternative C provides for pedestrian corridors in three SMAs under ML2 procedures, as well as providing additional non-ORV use areas. Since night driving would be seasonally restricted under alternative C, there would be long-term negligible to minor adverse impacts to night skies, with linglonglongshort-term beneficial impacts during times of seasonal night-driving restrictions. Cumulative Impacts: Long-term, moderate to major, and adverse to ORV users, and long-term, beneficial for other Seashore users	Those looking for an experience at the Seashore that includes ORV would have long-term major adverse impacts as all SMAs and village beaches would be designated as non-ORVs year-round, which the establishment of year-round SMAs under ML1 procedures would prohibit the use of ORV in many popular visitorvisitor use areas year-round. Those looking for a non-ORV experience at the Seashore would experience long-term benefits as alternative D provides for many non-ORV use areas throughout the Seashore, but does not provide for pedestrian corridors in the SMAs year-round, although pedestrian access would be prohibited in the SMAs during the breeding season. Since night driving would be seasonally restricted under alternative D, there would be long-term negligible to minor adverse impacts to night skies, with longshort-term beneficial impacts during times of seasonal night-driving restrictions. Cumulative Impacts: Long-term, major, and adverse to ORV users, and long-term, beneficial for other Seashore users	Those looking for an experience at the Seashore that includes ORV would have long-term moderate adverse impacts as the establishment of the SMAs would preclude ORV use, either seasonally or year-round, from some areas of the Seashore that are popular visitor use areas, both year-round and seasonally., SMAsAreas under ML2 management procedures would provide an ORV pass-through corridor at the start of the breeding season, subject to resource closures,, lessening the impacts to this user group. Additional recreational opportunities such as park-and-stay and SCV camping would provide long-term benefits. Those looking for a non-ORV experience at the Seashore would experience long-term benefits as alternative E provides for non-ORV use areas year-round, as well as seasonally through seasonal ORV closures in areas such as village beaches and through SMAs. Since night driving would be seasonally restricted under alternative E, there would be long-term moderate adverse impacts to night skies due to the hours of night driving allowed, implementation of park-and-stay camping, with longshort-term beneficial impacts during times of seasonal night-driving	Those looking for an experience at the Seashore that includes ORV would have long-term moderate adverse impacts as the establishment of the SMAs would preclude ORV use, either seasonally or year-round, from some areas of the Seashore that are popular visitor use areas, both year-round and seasonally. SMAAreas under ML2 management procedures would provide either a pedestrian or ORV access corridor at the start of the breeding season, subject to resource closures, lessening the impacts to this user group. Additional access would be provided to the soundside under this alternative as well. Those looking for a non-ORV experience at the Seashore would experience long-term benefits as alternative F provides for non-ORV use areas year-round as well as seasonally through seasonal closures in areas such as village beaches and through SMAs, and a new pedestrian trail. Since night driving would be seasonally restricted under alternative F, there would be long-term negligible to minor adverse impacts to night skies, with longshort-term beneficial impacts during times of seasonal night-driving restrictions. Cumulative Impacts: Long-term, moderate to major, and adverse to ORV users, and long-term, beneficial

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Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
				restrictions. Cumulative Impacts: Long-term, moderate to major, and adverse to ORV users, and long-term, beneficial for other Seashore users	for other Seashore users

SOCIOECONOMIC IMPACTS

ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS

The alternatives were evaluated for their potential direct, indirect, and induced impacts on the local economy, small businesses, and preservation values (values held by the general public across the United States for the Seashore and its plant and animal communities that are unrelated to visitor use of the park, also known as existence value or nonuse value in the economics literature). Impacts on the economy and on small businesses were assessed using estimates of change in revenue from any change in visitation that might result from the alternative.

Variation in nesting patterns from year to year makes the socioeconomic impacts of the alternatives more difficult to forecast. Impacts could be low in years when beach closures are minimal or short lived. Impacts would be higher if beach closures are widespread and long lasting. Widespread closures for several years in a row may discourage some visitors from returning in future years, while a series of years with minimal impacts on beach access may invite larger crowds.

The total cost of the proposed alternatives would depend in part on the response of the affected individuals and businesses to the changes brought about by the proposed rule. To the extent that local businesses can provide alternate products and services, they may be able to reduce the impact on their profits. In addition, the effect of the alternatives would depend on the willingness and ability of individuals to visit substitute sites for recreation and of businesses to adapt to the available opportunities and changes in visitor use patterns under whichever alternative is selected. If individuals visit other sites outside the Seashore, then these regions would experience an increase in business while businesses in the ROI would experience a decrease.

Assumptions and Methodology

Business revenue within the ROI is influenced by the Seashore management decisions, in addition to a number of other unpredictable factors. A range of impacts on business revenue was forecast for each alternative to address uncertainty. Important unpredictable factors beyond the control of the Seashore contributing to the uncertainty of future business revenue include national and regional economic trends, national and regional demographic trends, meteorological and geological events such as storms and erosion, nesting patterns of birds and turtles, transportation costs, and visitor and business responses to these changes. Considering the dramatic changes in fuel prices, the housing market, and the national economy since 2006, projections based on recent short-term trends are unlikely to yield precise estimates.

A range of changes in business revenue was developed based on a business survey conducted of a sample of potentially impacted businesses and informed by visitation statistics for the last 10 years at the Seashore and other coastal national parks in North Carolina and other economic indicators (see “Business Survey” below for more information). Many businesses found it difficult to provide a quantitative

estimate of the impact different features of the alternatives would have on their businesses because of the unpredictable factors discussed in the preceding paragraph. Currently, the analysis draws heavily from the business survey; however, data from an ongoing visitor survey will be used to supplement the business survey when the data are available in summer 2010.

Using both qualitative and quantitative information from these sources, a range of potential revenue changes was developed for four different business categories: commercial fishing in the Seashore, retail sporting goods in the Seashore villages (Ocracoke, Hatteras, Frisco, Avon, Buxton, Salvo, Waves, and Rodanthe), other tourism-related businesses in the Seashore villages, and the remaining tourism related business within the ROI. For each category, the range of revenue changes was applied to 2004 IMPLAN data (Minnesota IMPLAN Group 2004b) for Dare and Hyde counties as described below. IMPLAN is an input-output (I/O) model that simulates how changes in sales and employment in one industry can affect other industries and the regional economy as a whole, and it is widely used by the NPS for economic analyses (see "IMPLAN" section below for more information). Table 54 lists the low, mid, and high estimates of the impact of each alternative on businesses in different categories (a description of the additional assumptions used to create this table is below).

TABLE 54. RANGE OF PROJECTED ANNUAL BUSINESS REVENUE IMPACTS BY ALTERNATIVE, BUSINESS CATEGORY, AND AREA

		The Seashore Villages			Rest of ROI
Alternative	Estimate	Commercial Fishing	Sporting Goods	Other	All
A	Low	5%	5%	5%	1%
A	Mid	0%	0%	0%	0%
A	High	-5%	-5%	-5%	-1%
B	Low	0%	0%	0%	0%
B	Mid	-25%	-5%	-5%	-1%
B	High	-50%	-10%	-10%	-2%
C	Low	0%	0%	0%	0%
C	Mid	-25%	-5%	-5%	-1%
C	High	-50%	-10%	-10%	-2%
D	Low	0%	-20%	-15%	-2%
D	Mid	-25%	-30%	-20%	-4%
D	High	-50%	-40%	-25%	-6%
E	Low	0%	0%	0%	0%
E	Mid	-25%	-5%	-5%	-1%
E	High	-50%	-10%	-10%	-2%
F	Low	0%	0%	0%	0%
F	Mid	-25%	-5%	-5%	-1%
F	High	-50%	-10%	-10%	-2%

As discussed above, it is difficult to predict how visitors will change behavior over the long run in response to a particular alternative. The business community that caters to tourists has evolved over time as different activities rise and fall in popularity and as Seashore management affects the range of visitor experiences available in the park. If the alternatives further shift the mix of visitors who come to CAHA over the next decade, the mix of businesses in the community may change as well. In the short term, as the adjustment takes place, particular business sectors may experience significant impacts. In the long

term, adaptation by the business community may mitigate adverse long term impacts on the regional economy. In table 54, one of the scenarios for each alternative except alternative D includes no change (0% impact). The "no change" scenario, based in part on NPS visitation data, reflects the possibility that the visitor mix may change while the overall level of visitation does not, especially in the long run.

Another way to estimate the economic impacts is to start with a forecast of visitation under the no-action alternatives for different types of visitors, for example, ORV users and non-ORV users. For each of the action alternatives, a range of assumptions about visitation change under the alternative for the different visitor groups would provide an estimate of the incremental change in visitation to the park. Multiplying the incremental change in visitation by average visitor spending on different items would yield an estimate of the incremental change in revenue for different business categories under each alternative relative to the no-action alternatives. Unfortunately, the data on visitation, especially broken down by different types of park visitors, are not complete enough to provide reliable estimates of baseline visitation. As a result, the data sources discussed below were used to estimate directly the change in revenue under the different alternatives without first estimating the change in visitation.

The following assumptions were used to generate the ranges in table 54 and baseline revenue for the impact analysis:

Commercial Fishing. As of April 2009, 70 licenses had been issued for commercial fishing in the Seashore for FY 2009. To estimate the total revenue generated by commercial fishing in the park, it was assumed that each license was associated with the mean revenue for nonemployer[2] fishing establishments in Hyde County in 2004, $56,000 (U.S. Census Bureau 2004), which is not out of line with comments made during the business survey. Multiplying the number of fishermen by the mean revenue yielded an estimated $3.9 million in total revenue generated by commercial fishing in the Seashore. This is likely an overestimate, as not all commercial fishing licenses issued are used; however; data on how many licenses go partially or fully unused is unavailable. In addition, not all fishermen received 100% of their revenue from fishing activities in the Seashore. Based on responses to the business survey, a range of possible direct impacts to commercial fishing was set for each alternative. The range is the same across all the alternatives. Commercial fishermen can access any part of the park except lifeguarded beaches and when a full resource closure is in effect for breeding season regardless of restrictions on recreational ORV use. Resource closures vary somewhat in length and location under the different alternatives depending on whether areas are managed under ML1 or ML2, however the differences are not expected to be large enough to fall outside the range of direct impacts estimated from the business survey.

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Tourism-Related Business Categories. The IMPLAN 2004 estimate of economic output for Dare and Hyde counties was used to estimate economic impacts in the ROI. IMPLAN sectors were bridged to industries coded by the North American Industry Classification System (NAICS) (MIG 2004a). For the ROI, tourism-related business categories in IMPLAN include:

- real estate;
- hotels and motels;
- other amusement, gambling, and recreation industry;
- food services and drinking places;

2 From http://www.census.gov/econ/nonemployer/intro.htm : "Nonemployers are typically self-employed individuals operating very small businesses, which may or may not be the owner's principal source of income…Data are primarily comprised of sole proprietorship businesses filing IRS Form 1040, Schedule C, although some of the data is derived from filers of partnership and corporation tax returns that report no paid employees."

- food and beverage stores;
- gasoline stations;
- sporting goods, hobby, book and music stores; and
- other accommodations.

Adjustments to County-Level IMPLAN Data. The smallest geographic unit for IMPLAN analysis is the county, but the ROI and the Seashore villages include only parts of Dare and Hyde counties. To estimate the portion of the economic output in Dare and Hyde counties generated in the ROI and, within the ROI, the amount generated in the Seashore villages for each business sector, the county level values were adjusted by the percentage of employment by business sector in the ROI and the Seashore villages using block group data from the 2000 Census. In table 55, the first two columns define the industry sector by name and NAICS codes. The third column lists the number of employees by sector in all of Dare and Hyde counties. The following four columns compare employment by sector in the ROI and in the Seashore Villages to the total for all of Dare and Hyde counties. Census block groups are smaller geographical units than counties and the ROI and the Seashore villages can be constructed using blocks groups. Table 56 provides the total estimated economic output (based on the IMPLAN data). According to the data, the categories "Food service and drinking places" and "Real estate" are the largest areas of the economy that would be impacted by proposed management alternatives. These two categories alone account for an estimated 15% of the economic output in Dare and Hyde counties, 16.5% of the economic output in the ROI, and 20.7% of the estimated output in the Seashore villages (table 56).

Adjustments to the Real Estate Category. In addition, the estimate of economic output in the "Real estate" category was adjusted to estimate more accurately the economic output of vacation rentals within the ROI. The vacation rental companies in the business survey included offices of real estate agents (NAICS 5312), a subset of real estate (NAICS 531). The 2002 ratio for Dare County of revenue generated by offices of real estate to the revenue generated by the real estate category as a whole (58.7%) was used to adjust the IMPLAN estimate of real estate economic output for the ROI (real estate data for Hyde County data were not disclosed in the 2002 Economic Census). Further, several offices of real estate agents (NAICS 5312) in the InfoUSA database and located within the ROI were not included in the business survey because they do not manage vacation rental properties. The estimated economic output from real estate was further adjusted by the ratio of sales by real estate agents included in the survey (those with vacation property management) to the total sales by real estate agents in the ROI (48.5%) (InfoUSA 2008). Thus, the economic output associated with vacation rentals is estimated to be 28.5% of the total real estate economic output within the ROI.

TABLE 55. EMPLOYMENT BY BUSINESS SECTOR AND AREA WITHIN DARE AND HYDE COUNTIES

Industry Sector	NAICS	Employment in Dare and Hyde Counties	Employment in ROI (Number of employees)	Employment in ROI (Percent of employees)[a]	Employment in the Seashore Villages (Number of employees)	Employment in The Seashore Villages (Percent of employees)[a]
Agriculture; forestry; fishing and hunting	11	889	491	55%	167	19%
Mining	21	4	4	100%	0	0%
Utilities	22	187	162	87%	63	34%
Construction	23	2,322	2,102	91%	308	13%
Manufacturing	31-33	933	764	82%	73	8%

Industry Sector	NAICS	Employment in Dare and Hyde Counties	Employment in ROI (Number of employees)	Employment in ROI (Percent of employees)[a]	Employment in the Seashore Villages (Number of employees)	Employment in The Seashore Villages (Percent of employees)[a]
Wholesale trade	42	486	414	85%	83	17%
Retail trade	44–45	2,532	2,296	91%	367	14%
Transportation and warehousing	48-49	466	365	78%	122	26%
Information	51	416	379	91%	25	6%
Finance and insurance	52	443	365	82%	19	4%
Real estate and rental and leasing	53	1,167	1,078	92%	196	17%
Professional; scientific; and technical services	54	695	688	99%	88	13%
Management of companies and enterprises	55	0	0	--	0	--
Administrative and support and waste management services	56	488	432	89%	60	12%
Educational services	61	1,147	986	86%	120	10%
Health care and social assistance	62	1,108	890	80%	145	13%
Arts; entertainment; and recreation	71	476	453	95%	53	11%
Accommodation and food services	72	1,955	1,857	95%	328	17%
Other services (except public administration)	81	818	714	87%	115	14%
Public administration	92	1,400	992	71%	67	5%
Total	--	17,932	15,432	86%	2,399	13%

Source: U.S. Census Bureau 2000a; generated by RTI International; using American FactFinder; "Census 2000 Summary File 3 (SF3) – Sample Data" <http://factfinder.census.gov>; (December 5, 2008).

[a] Employment by sector in the ROI and Seashore Villages as a percent of total sector employment in all of Dare and Hyde counties.

1 **TABLE 56. ESTIMATED TOTAL ECONOMIC OUTPUT OF AFFECTED INDUSTRIES BY AREA**

Description	IMPLAN Codes	NAICS	Dare and Hyde Counties	ROI	The Seashore Villages
Fishing	16	11	$29.9	$16.5	$3.1
Real estate (vacation property rental only)[a]	431	53	$209.4	$193.4	$32.5
Hotels and motels, including casino hotels	479	72	$38.8	$36.9	$6.2
Other amusement, gambling, and recreation	478	71	$23.5	$22.4	$2.5

Food services and drinking places	481	72	$258.9	$245.9	$41.3
Food and beverage stores	405	44-45	$43.3	$39.3	$5.7
Gasoline stations	407	44-45	$28.5	$25.9	$3.7
Sporting goods, hobby, book and music stores	409	44-45	$19.0	$17.3	$2.5
Other accommodations	480	72	$13.1	$12.5	$2.1
Totals	Total	-	$3,094.4	$2,663.0	$356.3

Source: MIG 2004b

[a]Real estate modified to reflect portion of output attributable to rental properties.

Business Survey. To provide information for the economic analysis, a survey was conducted by RTI International of selected categories of potentially affected businesses. The results of this survey are currently being analyzed and will be addressed in the Final EIS. ~~[reader's note – survey report in progress].~~ This survey took place between June and September 2009. Businesses in the following categories were interviewed: Rental Agencies; Lodging Other than Rental Homes; Recreational Supply and Activities; and Commercial Fishermen. The results from interviews with all the sectors except commercial fishing were used to generate the range of impacts for tourism related businesses that were not part of the business survey such as food service, food and beverage stores, and gasoline stations. Table 57 shows the three-digit NAICS codes used to filter the InfoUSA database for these business categories. The Seashore provided the list of commercial fishermen with licenses to fish in the Seashore as of April 2009.

TABLE 57. BUSINESS CATEGORIES BY THREE-DIGIT NAICS

Business Category	NAICS	NAICS Definition
Rental agencies	531	Real estate
Lodging other than rental homes	721	Accommodation
Recreational supply	451	Sporting goods, hobby, book and music stores
Recreational supply	487	Scenic and sightseeing transportation
Recreational supply	713	Amusement, gambling, and recreation industries

Lists of all businesses in the selected categories were compiled using the yellow pages, web sites such as outerbanks.org, input from members of the regulatory negotiation committee, Seashore staff, and InfoUSA (InfoUSA 2008), a geocoded database of businesses. The lists were then manually filtered using web searches to determine if the businesses fit the business category definitions and if the business was still active. Duplicates and additional locations were excluded to ensure one entry per entity. From this list of businesses, the sample of businesses to be interviewed included all the Seashore commercial fishermen, all the relevant recreation businesses in the Seashore villages and all the rental agencies in the Seashore villages. Random samples of the remaining business categories and regions were selected. Table 58 provides the sample size for each category and the response rate. All the businesses in the sample were contacted by telephone. Multiple attempts were made to contact businesses and arrange interviews.

TABLE 58. SAMPLE SIZE AND RESPONSE RATE BY BUSINESS CATEGORY

Location	Business Category	Sample Size	Response Rate
The Seashore Villages	Commercial Fishermen[a]	27	22%
	Recreational Supply	52	42%

	Realty	11	55%
	Lodging	42	52%
Rest of ROI	Recreational Supply	20	30%
	Realty	16	25%
	Lodging	23	26%

[a] An additional 28 commercial fishermen with licenses to fish in the Seashore in 2009 had unlisted telephone numbers. They were mailed a letter about the survey with contact information, but no responses were received.

The business survey consisted of general questions regarding revenue and number of employees and how these numbers changed from 2007 to 2008 when the Consent Decree (alternative B) went into effect. At the time the survey was written, draft versions of Alternatives D and E represented the two extremes of management. The major features of these two action alternatives were used as the basis for questions about the possible impact of the alternatives on revenue in the future relative to revenue in 2008. The questions were designed to capture the features of the alternatives that might have the biggest impact on visitation. The responses provided information for analysis of alternatives C and F because of their similarity to alternative E. The alternatives were not discussed in detail to keep the interview short enough to complete in a reasonable amount of time and reduce the burden on respondents.

Even businesses that reported no decrease or an increase in revenue in 2008 under the consent decree were concerned about the long term impacts of the alternatives, even alternatives similar to the consent decree. Businesses that saw flat or increased revenue in 2008 even with the consent decree in place cited reasons why they thought that revenue would decrease in the future including: visitors did not know about the closures when they came in 2008, visitors had made down payments for 2008 so they came despite the closures, the business increased prices, and the business changed their inventory. Although the survey questions asked respondents to forecast the possible impacts of the two alternatives relative to 2008, many businesses also discussed 2009. In some cases, businesses said that visitors came in 2008 not knowing about the beach closures and did not return in 2009. However, some businesses reported that while business in the spring was down, they were seeing increased bookings for the fall or expected business in the fall to increase. Some visitors may reschedule trips from the spring to the fall to visit areas likely to be closed in the spring and early summer. Because the business survey was conducted during the summer, businesses did not have information about revenue in the fall 2009.

Business owners were generally worried about the future impacts of the action alternatives. In addition, businesses who want to influence the debate over the alternatives have an incentive to exaggerate the expected impacts of more restrictive alternatives on their revenue. This possibility was recognized, and the survey included questions to probe for the reasoning behind answers to some questions.

Some respondents were hesitant to give specific numbers on possible changes in revenue that could be attributed to ORV management actions because of the many other factors affecting the economy in the last few years, uncertainty about shorebird and turtle nesting patterns, and uncertainty about the long-term reactions of visitors to changes in visitor access to the Seashore. The ranges of possible impacts, which are large in some cases, reflect the uncertainty expressed by businesses and variation present in the survey data.

Publicly Available Data

According to NPS visitation statistics, visitation to the Seashore has remained relatively steady during implementation of the Interim Protected Species Management Strategy and the Consent Decree. In 2007, the year in which the Interim Protected Species Management Strategy was implemented, annual visitation

was similar to the average annual visitation over the previous five years (within one standard deviation from the mean) and an increase of 5.3% over the 2006 visitation (NPS 2008e). Visitation in 2008 was 4.1% lower than 2007 visitation, but 1.0% higher than 2006 visitation (NPS 2008e). Through September in 2009, visitation is 10.7% higher than 2006, -0.3% lower than 2007, and 5.5% higher than 2008 (table 59).

While this does not provide information of what visitation might have been without the Interim Protected Species Management Strategy or Consent Decree or how the mix of visitor spending may have changed in that time, the information does not support projections of decreases in visitation under the no action alternatives, and action alternatives with similar ORV restrictions. If the trends seen in the publicly available data continue, the economic impacts of the alternatives would likely occur in the lower range of projected impacts.

TABLE 59. VISITATION AT CAPE HATTERAS NATIONAL SEASHORE

Visitation	2002–2006 Average	2004–2006 Average	2007	2008	2009
Through September	2,021,046	1,812,343	1,943,264	1,835,599	1,936,738
Annual	2,435,650	2,197,941	2,237,378	2,146,392	NA

Source: NPS 2009.

Methodology

The following methods were used to assess impacts on the regional economy including the ROI and the Seashore villages, small businesses and preservation values.

- Regional economic impacts were calculated using the IMPLAN model as customized for the NPS (Michigan State University nd).
- Small business impacts were assessed using the range of forecast revenue changes in different industries and information on the size of local businesses. The assessment compares the impacts on small and large businesses.
- Preservation impacts were evaluated qualitatively.

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IMPLAN

Economic impact analyses trace the flows of spending associated with the affected industries to identify changes in sales, income, jobs, and tax revenues resulting from a policy action. An economic impact analysis typically examines the effect of a change in policy on the economy of a particular region. Economic impact analysis differs from benefit-cost analysis, which focuses on the change in economic efficiency resulting from a change in policy and includes both market and nonmarket values.

To measure the economic impacts of the proposed ORV management alternatives, RTI used IMPLAN, an I/O model that simulates how changes in sales and employment in one industry can affect other industries and the regional economy as a whole. The process for generating the impacts in the I/O model is illustrated in figure 35. This process can be separated into three types of impact:

- **Direct Impacts—**the immediate consequences in industries that experience a change in sales.

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- **Indirect Impacts**—responses in other industries to changes in the industries experiencing direct impacts.

- **Induced Impacts**—responses by households to the change in income received as the economy changes. Since wage payments adjust as the economy experiences impacts, households purchase more or less goods and services, which leads to greater expansion or contraction of the economy.

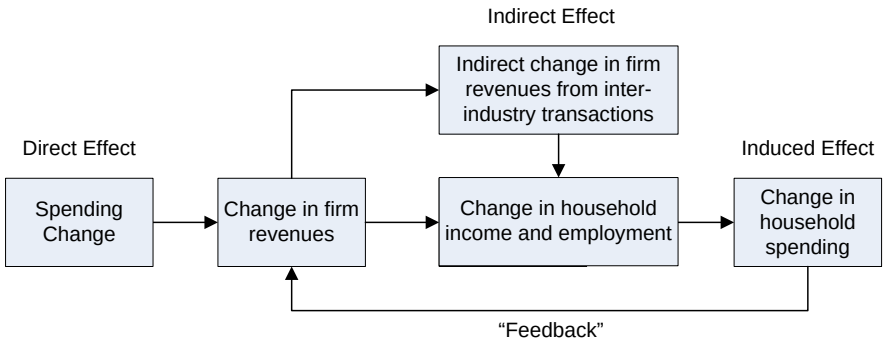

FIGURE 35. FEEDBACK PROCESS THAT GENERATES A PROGRAM'S TOTAL ECONOMIC IMPACT

For this analysis, RTI used a 2004 I/O model of the economy of Dare and Hyde counties that was constructed using IMPLAN economic modeling software. IMPLAN was used because it is one of the most widely used I/O modeling software packages in economic impact analysis, and has been used frequently in economic impact studies for the NPS (see examples of applications of IMPLAN to National Parks at http://web4.canr.msu.edu/mgm2/).

To apply IMPLAN, the analyst must estimate the direct impacts of an economic activity or policy and provide them as input. IMPLAN contains a data file with information on the region of interest that provides information, such as ratios of jobs to sales for each sector, the proportion of spending by individuals and firms located within the region, the amount that is spent within the region, and the amount that each sector purchases from all the other sectors within the region per unit of output. Applying the multipliers generated from the data file allows the IMPLAN program to estimate the total regional impacts resulting from a given direct impact.

The economic database that IMPLAN uses comes from official government statistics (e.g., the National Income and Product Accounts [NIPA] published annually by the Bureau of Economic Analysis [BEA], the BEA I/O accounts for the United States, along with numerous other data sources). These data are constructed to be internally consistent (i.e., county data sum to state totals and state data sum to national totals). In some cases, regional values are created where no data previously exist, and for other categories new values are calculated to replace existing data. Thus, IMPLAN contains comprehensive and consistent regional accounts but at the cost of making alterations to existing data and creating new data (Crihfield and Campbell 1991).

Small Business Impacts

The management of the Seashore would potentially affect the economic welfare of area businesses, organizations, and governmental jurisdictions, large and small through increases or reductions in revenue,

taxes, and employment. However, small entities may experience larger impacts than large entities because of decreased flexibility to respond to changes. Small businesses, such as recreation equipment, lodging, and restaurants, comprise the majority of businesses relying directly on ORV users as a major source of revenue. These small businesses may not have the resources to respond to increased fluctuation in visitation from year to year, and they may be disproportionately affected relative to large businesses.

The Small Business Administration sets general size standard definitions by industry (defined by their NAICS code) based on a company's revenue or number of employees, as described in "Chapter 3: Affected Environment." In 2008, the ROI contained 768 establishments in affected industries, with 222 located in Hatteras villages (InfoUSA 2008). Assuming each location is an independent company, 95% of these could be small entities of the ROI, and 98% could be small entities in the Seashore villages (U.S. SBA 2008). Nationally, a lower percent of the businesses in the different businesses categories are small than in the ROI. Applying the national average of establishments operated by small entities in each business category would suggest that between 78%–84% of establishments are operated by small entities in the ROI and 80%–84% in the Seashore villages (SUSB 2002).

The threshold for impacts on small businesses is lower than for the regional economy. Some federal agencies use a 3% threshold for the cost to sales ratio of a regulation to identify significant impacts (major impacts). Alternatively, major can be defined based on industry profit margins. Profit margins derived from 2005 tax data for the affected industries range in the ROI from 1.43% to 13.49% (IRS 2005), which would imply different thresholds for each affected industry. The impact analysis uses the 3% threshold, but includes qualitative discussion on where impacts might be larger or smaller.

Preservation Values

Individuals who hold preservation values for the plant and animal communities in the Seashore suffer adverse impacts when those communities are subject to adverse impacts. The impact on preservation values will be proportionate to the impact on important protected species. Piping plover impacts were used as the benchmark for preservation values.

Preservation values can be assessed by examining willingness to pay (WTP), or the value that people place on goods not normally traded in the marketplace, i.e., what they are willing to pay for these goods, given their level of income. There are studies that have tried to quantify preservation values, particularly for protected species (see the discussion in Chapter 3)~~,~~; however no studies have been done for the protected turtles and birds in CAHA.

Additional Data Collection

Additional data are being collected that would be used to confirm or update the assumptions used for the economic analysis. First, a 12-month count of vehicle use of ocean beach access ramps and pedestrian use of ocean beaches is being conducted and is expected to be completed in early 2010 ~~[reader's note – expected completion in early 2010]~~. The survey was designed to provide an estimate with confidence intervals of annual vehicle use of the beach access ramps and the number of visitors on different sections of beach. Second, a survey of ocean beach visitors is being conducted to gather information about the characteristics of visitors and trips, as well as reported visitation under scenarios based on alternatives D and E and is expected to be completed in 2010 ~~[reader's note – expected completion in mid 2010]~~. To minimize burden on visitors selected for the survey, the survey was designed to be as short as possible while still collecting the needed information. The survey questions focused on alternatives D and E—the two most extreme action alternatives at the time the survey was written—and the features of these alternatives expected to have the greatest impact on the visitors' trips. The similarities between alternatives C, E, and F allow the use of the information gathered about alternative E to assess alternatives

C and F as well. These surveys would provide data that would help park managers better understand current and possible future use of the beaches in the Seashore. For the economic analysis, the data from the two surveys would be used to generate "bottom up" impact projections for tourism related industries in the ROI according to changes in visitation and types of visitors at the Seashore. When completed, these data would be compared with the "top down" impact projections in the current analysis.

Thresholds

The following thresholds for evaluating impacts on socioeconomic resources were defined.

Negligible: *Regional Economic Impacts*. The effect would not be detectable and would not change the socioeconomic environment, including individuals, businesses, and communities with economic linkages to the park. An overall change in employment and personal income of less than 1%.

Small Business Impacts. No impact on small businesses.

Preservation Value Impacts. General population in Outer Banks and in US unaware of changes.

Minor: *Regional Economic Impacts*. At the county level, the effects would be considered minor if there could be an overall change in employment and personal income of 1% to less than 6%.

Small Business Impacts. Very small impact on small businesses, ratio of change in revenue to total sales less than 1%. No business closures or disproportionate impacts on small businesses would result.

Preservation Value Impacts. Population aware of changes, however they perceive that the changes would be minor and there would be no measurable change in willingness to pay (WTP).

Moderate: *Regional Economic Impacts*. At the county level, the effects would be considered moderate if there could be an overall change in employment and personal income greater than or equal to 6% but less than 10%.

Small Business Impacts. Noticeable impact on small businesses, ratio of change in revenue to total sales between 1% and 3% (based on standards used by some federal agencies for small business impact analysis under the Regulatory Flexibility Act of 1980, as amended in 1996). No business closures or disproportionate impacts on small businesses would result.

Preservation Value Impacts. Population aware of changes and perceive possibility of moderate impacts on park resources. There would be a measurable change in WTP, but change in WTP would be less than 50%.

Major: *Regional Economic Impacts*. The effect would be substantial, highly noticeable, potentially permanent influence on the socioeconomic environment. At the county level, the effects would be considered major if there could be an overall change in employment and personal income of greater than 10%.

Small Business Impacts. Significant impact on substantial number of small businesses, ratio of change in revenue to total sales over 3% (based on standards used by some federal agencies for small business impact analysis under the Regulatory Flexibility Act). Business closures or disproportionate impacts on small businesses are possible.

Preservation Value Impacts. Population aware of changes and perceive possibility of major impacts on park resources. There would be a measurable change in WTP, and change in WTP would be greater than 50%.

Duration: Short-term: Temporary and typically transitional impacts associated with implementation of an action.

Long-term: Permanent impacts on the social and economic environments.

Impacts of Alternative A: No Action—Continuation of Management under the Interim Protected Species Management Strategy

Regional Economic Impacts. The impacts of alternative A depend on how the alternative would affect the number of visitors to the Seashore over the next 10 years and the activities these visitors would pursue. Using the experience with alternative A in 2007 to forecast future visitation trends as a result of alternative A in isolation is difficult because of the many other factors that influence visitation from year to year. However, alternative A would allow the most potential for access to the Seashore by ORVs compared to the other alternatives.

Beach closure to ORVs would be contingent upon bird and turtle nesting behavior except for pre-nesting closures at the points and spits and administrative and safety closures. As discussed in "Visitor Use and Experience", restrictions on large areas of each of the spits would likely begin in April as a result of pre-nesting closures for shorebirds, but ORV corridors and pedestrian paths to the spits and Cape Point would most likely remain open throughout the early parts of the spring and summer. Full-beach closures are most likely to occur in July or August and could last from 3 to 5 weeks at the spit and point areas and a few other areas of the beach, based on past shore bird breeding seasons. ORV users and, in many cases, pedestrians would not be able to reach these areas for fishing or other recreational pursuits unless alternate access were available via an existing interdunal road or bypass.

Turtle nests can cause partial and full-beach closures anywhere along Seashore beaches throughout the summer and fall months. Full beach closures would be unlikely because using alternative routes or applying the identified bypass criteria, when appropriate, would increase the chances that ORV and pedestrian access would continue to the spits, Cape Point, and South Beach.

Under alternative A, the amount of beach ORV users and pedestrians can access would change from year to year. In 2007, the year in which the Interim Protected Management Strategy was implemented, annual visitation was similar to the average annual visitation over the previous five years (within one standard deviation from the mean) and an increase of 5.3% over the 2006 visitation (NPS 2008e). While visitation did not decrease in 2007, implementation of alternative A could lead to decreases in visitation in future

years if there were wide-spread and/or long-lasting closures due to changes in the nesting behavior of shorebirds and turtles. Visitor uncertainty about which areas of the Seashore would be open for ORV use may also deter potential ORV users from planning trips in advance. Conversely, several years with shorter closures due to changes in nesting behavior might lead to increases in visitation. Visitors who enjoy using beaches without ORVs may also increase their visitation to the area. The true effect on visitation may lag the implementation and would depend on nesting patterns in the future as visitors incorporate the uncertainty of beach closure into their decision to visit.

The impact of alternative A on commercial fishermen would be less than for recreational ORV users. Commercial fishermen have access to Seashore beaches except during full resource closures for breeding and at lifeguarded beaches.

From table 60, the range of forecast revenue impacts by business category over the next 10 years would vary from an increase of 5% to a decrease of 5% in the Seashore villages (the villages bordering the Seashore), and an increase of 1% to a decrease of 1% in the rest of the ROI under alternative A. The low impact end of the range, an increase in revenue of 5% in the Seashore villages (1% in the rest of the ROI), reflects the 5% increase in visitation in 2007 versus 2006 and the possibility that non-ORV recreation could increase in the future as a result of the ORV management changes. The mid value for the impacts was set at 0% or no change based on feedback from the businesses that responded to the business survey, who reported little or no impact from implementation of the Interim Protected Management Strategy in 2007. The High end of the range, a 5% decrease in revenue in the Seashore villages (or 1% in the rest of the ROI), captures the possibility that 2007 was not a typical year for nesting-related beach closures and that in future years closures could be more widespread and longer lasting, which would reduce visitation.

TABLE 60. RANGE OF PROJECTED ANNUAL BUSINESS REVENUE IMPACTS FOR ALTERNATIVE A BY BUSINESS CATEGORY AND AREA

	The Seashore Villages			Rest of ROI
Revenue Impact Estimate	Commercial Fishing	Sporting Goods	Other	All
Low	5%	5%	5%	1%
Mid	0%	0%	0%	0%
High	-5%	-5%	-5%	-1%

The changes in revenue were input into IMPLAN to calculate the direct, indirect, and induced changes in economic output and employment. Table 61 presents the direct impacts, the total impacts (the sum of direct, indirect, and induced impacts) on output and employment and the impacts as a percent of total economic output and employment in Dare and Hyde counties. The Seashore villages would experience the majority of the direct impacts (the direct changes in revenue from changes in visitation). The direct impacts range from a 0.4% ($10 million) increase to a 0.4% decrease in total economic output, and a gain or loss of 0.5% of employment (135 employees) in the ROI. Total impacts in Dare and Hyde counties, which include direct, indirect, and induced impacts, are a 0.5% ($13.5 million) increase or decrease to economic output, and a gain or loss of 0.4% (170) in employment.

TABLE 61. ECONOMIC IMPACT SUMMARY ESTIMATED BY IMPLAN

Revenue Impact Estimate	Direct Output Impact (in millions of dollars)[a]	Total Output Impact (in millions of dollars)	Impact as a percent of total for Dare and Hyde Counties	Direct Employment Impact [a]	Total Employment Impact	Impact as a percent of total for Dare and Hyde Counties
Low	$9.99	$13.48	0.4%	135	170	0.5%
Mid	$0.00	$0.00	0.0%	0	0	0.0%
High	-$9.99	-$13.48	-0.4%	-135	-170	-0.5%

[a]Fifty percent of the direct impacts are expected to occur in the Seashore Villages.

The economic impact of alternative A would likely vary from year to year with varying nesting behavior resulting in different areas of the Seashore being available to ORV and pedestrian use. The regional economy may experience negligible adverse or long-term impacts or beneficial impacts depending on nesting patterns. It is possible that in a year when there are long, widespread beach closures there could be bigger declines in visitation causing larger, but short term, adverse impacts. On the other hand, in years when closures are fewer, visitation increases could be larger, causing larger, but short term, beneficial impacts.

Small Business Impacts. Under alternative A, small businesses would experience negligible to minor long-term, adverse impacts or beneficial impacts over the next 10 years. The thresholds for impacts on small businesses are much lower than for the regional economy and are based on similar analyses conducted under the Regulatory Flexibility Act (see methodology section above). Small businesses may not have the resources to adjust to changes or new regulations compared to larger businesses, so impacts may have a larger affect on small businesses. From table 61, a 0.5% decrease would be a minor impact for small businesses, but only a negligible impact for the regional economy. As with the regional economy, negligible or even beneficial impacts would occur if alternative A resulted in no change or an increase in variation, which would be consistent with the 2007 visitation data. However, a minor adverse impact would occur if visitation declined during or after years in which there were more widespread and long lasting beach closures from nesting. In addition, small businesses may suffer larger, short-term impacts if nesting patterns resulted in widespread and extended beach closures for ORVs and pedestrians that reduced visitation or changed the composition of visitors in a way that reduced revenue for particular small businesses. Businesses that depend on visitors using specific beach access ramps, in particular fishing supply and some food service businesses may experience localized impacts that could be larger or smaller than small businesses in the rest of the ROI depending on year to year variation in nesting by shorebirds and turtles at specific ramps.

Preservation Value Impacts. The impact of alternative A on preservation values depends on the impact alternative A has on protected species. For piping plover, alternative A could result in long-term, moderate, adverse impacts. This implies that alternative A's impact on preservation values for the United States as a whole could be long term, moderate, and adverse.

Cumulative Impacts. Other past, present and future trends and activities can affect the socioeconomic resources in the region. Because the economic health of the area depends on tourism, the trends and actions, beneficial and adverse, discussed in "Visitor Use and Experience" would have an impact on the economy of the ROI.

In the future, a number of park initiatives would likely affect visitation and the local economy. Based on "Visitor Use and Experience," future actions that result in an increase in park visitors should also have

positive impacts on the local economy, while actions that decrease visitation could have negative impacts. Local planning actions include the Development of Cape Lookout National Seashore ORV management plan/EIS, the Corridor Management Plan for the Outer Banks Scenic Byway, and the Land Use Development Plans for Dare and Hyde Counties. The implementation of these plans would affect visitor use in the ROI, with long-term benefits from improved access, but indeterminate beneficial or adverse impacts relating to limits placed on ORV use and land development under county plan revisions if they further restrict or encourage ORV use or provide any new visitor opportunities. The extent of the impacts would depend on the final plans. Other actions planned for the region that would also affect visitation and the local economy include the Bonner Bridge replacement, continued maintenance of NC-12 and NC-12 Improvements on Bodie Island, all of which should have very short-term, negligible, adverse impacts on tourism numbers due to construction delays or inconveniences, short-term beneficial impacts related to employment during construction, and long-term benefits because of the provision of reliable and continued access for tourists and local businesses.

Storms can affect visitation and the local economy. In recent years, hurricanes and storms and the subsequent recovery time required following these events have adversely affected visitor attendance, resulting in short-term, minor to major, adverse impacts on tourism and fishing and associated businesses.

In addition, current and future national economic conditions would affect the ROI as they affect the entire United States. Tourism is sensitive to the cost of fuel, and gasoline prices increased to more than $4.00 per gallon during summer 2008. In 2008, Dare County had the 5th highest rate of foreclosures for counties in North Carolina. For June 2009, the North Carolina (seasonally unadjusted) unemployment rate rose to 11.1%, higher than Dare and Hyde counties (6.7% and 5.5%, respectively). These monthly rates are elevated relative to the June 2004-2006 average (“Chapter 3: Affected Environment”). Analysts do not expect the economy to recover until late 2009 at the earliest. The effects of national economic conditions would vary over time, but those similar to what has been experienced in 2008–2009 are expected to have a minor to moderate, adverse long-term impact on the ROI.

In the long-term, cumulative impacts from all other actions affecting the regional economy would be beneficial based on economic growth despite storms and plans that would improve visitor access to the beaches in the future. However, a continued economic recession at the national level could cause minor to moderate adverse long-term impacts. Adding in the potential negligible, adverse or beneficial long-term impacts associated with the actions under alternative A, overall cumulative impacts could be long-term, negligible to minor, and beneficial or adverse due to the normal and uncertain fluctuation in park visitation and depending on national economic conditions.

Conclusion. Businesses linked to ORV use at the Seashore would experience uncertain impacts based on protected wildlife~~animal~~ nesting behavior changes from year to year. The impact on these businesses, either positive or negative, may ripple through the economy on the Outer Banks as a whole. This uncertainty may impact small businesses disproportionately. Overall, it is expected that the regional economy would experience negligible, adverse or beneficial long-term impacts depending on the extent of beach closures.

The long run impact of alternative A would depend in part on how current and future visitors adjust their trips and spending in response to the management changes and the adaptations made by the business community to these changes. To the extent that businesses adapt to changing visitation patterns, the long term impacts on the overall economy would be lessened. The impact on individual businesses would vary more than the impacts on the regional economy as a whole if the mix of visitors changes. Some businesses may experience a long term drop in customers, while others may experience no change or a long term increase.

Preservation value impacts would depend on the success of alternative A in protecting the environment and threatened and endangered species, but are expected to be long-term, moderate, and adverse. Cumulative impacts could be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.

Impacts of Alternative B: No Action—Continuation of Management under Terms of the Consent Decree

Regional Economic Impacts. Alternative B would allow less ORV access to the Seashore than alternative A, due to restrictions on night driving and an increased probability of beach closures due to overall increased buffer distances and mandated increases in buffers that occur when resource closures have been violated.

Beach closure to ORVs and pedestrians would be contingent upon bird and turtle nesting behavior and would not follow a pre-determined closure pattern, except for administrative and safety closures, as descried under alternative A, with pre-nesting closures beginning 15 days earlier for both piping plover and American ~~oystercatcher~~oystercatchers. Under alternative B, there would be potential for full-beach closures in April to August that could last several months~~from 3 to 5 weeks~~, with past closures lasting as long as 3.5 months at Cape Point. Due to increased buffers under alternative B, the chance of a full-beach closure is greater than under alternative A. The potential for beach closures from turtle nests under alternative B would be slightly higher than under ~~the same as~~ alternative A. The impact of these closures would be a potential change in visitation by those who come to the Seashore to visit but cannot reach their desired destination because the beaches are closed in popular visitor use areas (decreased visitation) and visitors who want an ORV-free experience (increased visitation), the direct impact of their change in spending in the region, and the subsequent indirect and induced impacts on the regional economy.

Comment [MSOffice37]: e.g., because of the full beach closure requirement after Sept 15 under the consent decree

The amount of beach that ORV users can access would change from year to year under alternative B, as would occur under alternative A. In 2008, the year in which the consent decree was implemented, annual visitation was similar to the average annual visitation over the previous five years (within one standard deviation from the mean). Visitation in 2008 was 4.1% lower than 2007 visitation, but 1.0% higher than 2006 visitation (NPS 2008e). Uncertainty about visitor experience and which areas of the Seashore would be open for ORV use may deter potential ORV users from planning trips in advance. At the same time, visitors who enjoy using beaches without ORVs may increase their visitation to the area. The true effect on visitation may lag the implementation and would depend on nesting patterns in the future as visitors incorporate the uncertainty of beach closure into their decision to visit.

The seasonal night driving restrictions in alternative B relative to alternative A would impact commercial and recreational anglers who would otherwise fish for longer hours (in 2009 the consent decree was modified to allow commercial fishermen to access the Seashore beaches at 5 a.m. rather than 6 a.m. when the general public is allowed back on the beach). Commercial fishermen raised this concern during the business survey. The night driving restrictions may also deter potential recreational anglers from visiting the Seashore, resulting in a direct loss of their spending on regional businesses, and the subsequent indirect and induced impacts on the regional economy

The impact of alternative B on commercial fishermen would be less than for recreational ORV users. Commercial fishermen have access to Seashore beaches except during full resource closures for breeding and at lifeguarded beaches, so they would not be substantially affected by the longer seasonal closures. In areas outside of existing resource closures, the Superintendent will be able to modify the night-driving restrictions (by allowing access at 5 a.m. rather than 6 a.m.), subject to terms and conditions of the fishing permit, for commercial fishermen who are actively engaged in authorized commercial fishing activity and

can produce fish house receipts from the past 30 days. Such modifications would be subject to review~~ed~~, but would not have systematic periodic review, as under the action alternatives.

As presented in table 62, the range of direct impacts by business category would be projected to vary from 0% to a 50% decrease for commercial fishermen, from 0% to a 10% decrease for other businesses in the Seashore villages, and from 0% to a 2% decrease in the rest of the ROI under alternative B over the next 10 years.

TABLE 62. RANGE OF PROJECTED ANNUAL BUSINESS REVENUE IMPACTS FOR ALTERNATIVE B BY BUSINESS CATEGORY AND AREA

	The Seashore Villages			Rest of ROI
Revenue Impact Estimate	Commercial Fishing	Sporting Goods	Other	All
Low	0%	0%	0%	0%
Mid	-25%	-5%	-5%	-1%
High	-50%	-10%	-10%	-2%

The low impact of no change (0% increase or decrease) reflects the visitor statistics for 2008, which were within normal yearly variation. Under the low impact assumptions, visitation changes during 2008 are assumed to be mostly the result from an increase in fuel prices and national economic conditions. The low impact scenario also assumes there may be fewer closures in years to come, and that visitors, businesses, and commercial fishermen would adjust to changes in beach access. Isolated businesses may experience adverse impacts, but the number of affected businesses would be too low to have an impact on the regional economy.

The middle scenario reflects a decline in revenue across all sectors and areas of the ROI. The percent impacts reflect responses from the business survey and a comparison between 2007 and 2008 visitation data. For commercial fishermen, the middle scenario reflects a situation in which closures are longer and the night driving restrictions have a bigger impact.

The high impact scenario forecasts larger losses in revenue. The scenario incorporates the upper end of revenue changes mentioned in the business survey. It assumes that after 2008, as visitors became aware of the ORV restrictions, visitation would decline further and would not recover. The high impact scenario could also occur if there were widespread and long-lasting resource closures based on nesting patterns that lasted several years. Longer closures could have a bigger impact on visitation and the ability of commercial fishermen to access the beach.

The distribution of economic impact estimates across different economic sectors for alternative B are presented by sector in table 63.[3] The values in table 63 represent the middle estimates from table 62 for changes in output in millions of dollars and changes in employment in full and part time jobs estimated by IMPLAN by sector. The range of economic impacts for output and employment under alternative B are provided in table 64.

3 Because the middle estimate of change for alternative A was 0%, a more detailed table for alternative A was not prepared. However, the pattern of impacts across different sectors of the economy predicted for alternative B would be similar under alternative A.

1 **TABLE 63. ECONOMIC IMPACTS OF THE MID REVENUE IMPACT FOR ALTERNATIVE B BY INDUSTRY ESTIMATED BY IMPLAN ($2008)**

NAICS		Direct Output Impacts (in millions of dollars)	Indirect Output Impacts (in millions of dollars)	Induced Output Impacts	Total Output Impacts	% of NAICS Output in Dare and Hyde Counties	Direct Employ-ment Impacts	Indirect Employ-ment Impacts	Induced Employ-ment Impacts	Employ-ment Total	% of NAICS Employ-ment in Dare and Hyde Counties
11	Agriculture, Forestry, Fishing and Hunting	-$0.98	-$0.03	$0.00	-$1.01	-1.0%	-30	0	0	-30	-2.1%
21	Mining	$0.00	$0.00	$0.00	$0.00	-	0	0	0	0	-
22	Utilities	$0.00	-$0.14	-$0.05	-$0.18	-0.4%	0	0	0	0	0.0%
23	Construction	$0.00	-$0.24	-$0.02	-$0.25	-0.1%	0	-5	0	-5	-0.1%
31-33	Manufacturing	$0.00	-$0.08	-$0.02	-$0.10	-0.1%	0	0	0	0	0.0%
42	Wholesale Trade	$0.00	-$0.15	-$0.07	-$0.22	-0.4%	0	0	0	0	0.0%
44-45	Retail Trade	-$1.30	-$0.12	-$0.30	-$1.72	-0.6%	-20	0	-5	-25	-0.7%
48-49	Transportation and Warehousing	$0.00	-$0.09	-$0.02	-$0.11	-0.5%	0	0	0	0	0.0%
51	Information	$0.00	-$0.17	-$0.07	-$0.24	-0.4%	0	0	0	0	0.0%
52	Finance and Insurance	$0.00	-$0.14	-$0.11	-$0.25	-0.2%	0	0	0	0	0.0%
53	Real Estate and Rental and Leasing	-$3.23	-$0.45	-$0.12	-$3.81	-0.5%	-25	-5	0	-30	-0.5%
54	Professional, Scientific, and Technical Services	$0.00	-$0.17	-$0.05	-$0.22	-0.3%	0	0	0	0	0.0%
55	Management of Companies and Enterprises	$0.00	-$0.01	$0.00	-$0.01	-0.5%	0	0	0	0	0.0%
56	Administrative and Support and Waste Management and Remediation Services	$0.00	-$0.14	-$0.02	-$0.16	-0.2%	0	-5	0	-5	-0.3%
61	Education Services	$0.00	$0.00	-$0.01	-$0.01	-0.3%	0	0	0	0	0.0%

NAICS		Direct Output Impacts (in millions of dollars)	Indirect Output Impacts (in millions of dollars)	Induced Output Impacts	Total Output Impacts	% of NAICS Output in Dare and Hyde Counties	Direct Employ-ment Impacts	Indirect Employ-ment Impacts	Induced Employ-ment Impacts	Employ-ment Total	% of NAICS Employ-ment in Dare and Hyde Counties
62	Health Care and Social Assistance	$0.00	$0.00	-$0.20	-$0.20	-0.3%	0	0	-5	-5	-0.5%
71	Arts, Entertainment, and Recreation	-$0.32	-$0.03	-$0.04	-$0.40	-1.0%	-5	0	0	-5	-0.6%
72	Accommodation and Food Services	-$4.93	-$0.07	-$0.17	-$5.18	-1.7%	-85	0	-5	-90	-1.7%
81	Other Services (except Public Administration)	$0.00	-$0.06	-$0.11	-$0.16	-0.2%	0	0	0	-5	-0.3%
Other	Misc. Industries (including Public Administration)	$0.00	-$0.07	-$0.39	-$0.47	-0.1%	0	0	0	0	0.0%
Total		**-$10.77**	**-$2.16**	**-$1.77**	**-$14.70**	**-0.5%**	**-160**	**-20**	**-15**	**-200**	-0.6%

Adverse direct impacts of the mid revenue scenario for alternative B are expected to occur in retail, recreation, lodging and food service and real estate businesses, as well as the fishing industry if unpredictability in beach closures reduced Seashore visitation. Most industries may face some decrease in output through indirect impacts, totaling $2.16 million lost. The waste management, real estate, and construction industries would also experience adverse indirect employment impacts amounting approximately 20 jobs lost. While many industries may face some reduction in output through induced impacts, only the retail, healthcare and accommodation and food service industries are predicted to experience additional job loss due to reduced spending.

The greatest total adverse effects under the mid revenue scenario on output and employment are estimated to occur in the accommodation and food services industry, with a $5.18 million reduction in output and the loss of 90 jobs estimated under the middle scenario. Real estate, retail, and fishing in Dare and Hyde counties are also estimated to have output losses of $1 million or more.

The projected range of business impacts for alternative B across the three scenarios, presented in table 64, is estimated to result in direct impacts of between no change and a 0.8% ($21.54 million) decrease to economic output, and no change to a loss of 1.1% in employment (320 employees) in the ROI. Total impacts resulting from the direct impacts, which include indirect and induced impacts, would be between a no change and $29.4 million decrease to economic output, and no change to a loss of 400 employees. These total impacts would represent no change to a 1% decrease relative to the total economic output in Dare and Hyde counties and no change to a 1.2% loss of employment.

TABLE 64. RANGE OF ECONOMIC IMPACTS OF ALTERNATIVE B ESTIMATED BY IMPLAN ($2008)

Revenue Impact Estimate	Direct Output Impact (in millions of dollars)	Total Output Impact (in millions of dollars)	Impact as a percent of total for Dare and Hyde Counties	Direct Employment Impact	Total Employment Impact	Impact as a percent of total for Dare and Hyde Counties
Low	$0.00	$0.00	0.0%	0	0	0.0%
Mid	-$10.77	-$14.70	-0.5%	-160	-200	-0.6%
High	-$21.54	-$29.40	-1.0%	-320	-400	-1.2%

[a]Fifty-four percent of the direct impacts are expected to occur in the Seashore Villages.

The economic impact of alternative B would likely vary from year to year with the nesting behavior of protected species. The ROI may experience negligible to minor, adverse, long-term economic impacts and Seashore villages may experience larger short-term adverse impacts if there are years with long-lasting and widespread beach closures or larger short-term beneficial impacts in years with minimal closures.

Small Business Impacts. Under alternative B, small businesses would experience negligible to moderate, adverse, long-term impacts. The night driving restrictions and higher probability of beach and/or ramp closures due to larger required buffers would result in an upper end of moderate adverse impacts compared to minor adverse impacts in the high impact scenario for alternative A.

Preservation Value Impacts. The increased required buffers and introduction of night driving restrictions under alternative B would lessen~~s~~ the impacts to preservation values relative to alternative A. Based on the impacts predicted for piping plover, the impacts to preservation value could be long-term, minor to moderate, and adverse.

Cumulative Impacts. Socioeconomic impacts of cumulative actions unrelated to ORV management under alternative B would be the same as those under alternative A. In the long-term, cumulative impacts from all other actions affecting the regional economy would be negligible to minor and beneficial based on economic growth despite storms and plans that would improve visitor access to the beaches in the future. However, a continued economic recession at the national level could cause minor to moderate adverse long-term impacts. Adding in the potential negligible to minor, adverse long-term impacts to the regional economy of the ROI associated with the actions under alternative B, overall cumulative impacts could be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.

Conclusion. Businesses linked to ORV use at the Seashore would experience variable impacts based on the location and extent of species closures from year to year. The impact on these businesses may ripple through the economy on the Outer Banks as a whole. This uncertainty may impact small businesses disproportionately.

Overall, it is expected that businesses would experience negligible to minor, adverse, long-term impacts, with the potential for larger impacts on individual businesses located in the Seashore villages that are tied most directly to ORV users and to traffic at vehicle access ramps. Small businesses are expected to experience negligible to moderate, adverse, long-term impacts. Based on the visitation statistics, the probability of negligible impacts is greater than the probability of minor adverse impacts.

The long run impact of alternative B would depend in part on how current and new visitors adjust their trips and spending in response to the proposed management changes and the adaptations made by the business community to these changes. To the extent that businesses adapt to changing visitation patterns, the long term impacts on the overall economy would be lessened. The impact on individual businesses would vary more than the impacts on the regional economy as a whole if the mix of visitors changes. Some businesses may experience a long term drop in customers, while others may experience no change or a long term increase.

Preservation value impacts would depend on the success of alternative B in protecting the environment and threatened and endangered species, but could be long-term, minor and adverse. Cumulative impacts could be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.

Impacts of Alternative C: Seasonal Management

Regional Economic Impacts. Similar to other alternatives, under alternative C the local economy would be impacted primarily through a change in the trend of the number of visitors to the region or a change in the activities visitors participate in while in the region. This alternative would provide for less ORV access to the Seashore than the no-action alternatives, due to designated year-round non-ORV areas and due to specified seasonal closures that would be larger in area and duration than alternatives A and B.

Under alternative C, areas of high resource sensitivity, e.g., points and spits, and areas of high visitor use, e.g., village beaches, would be closed to recreational ORVs from March 15 to October 14. For areas of high resource sensitivity, this alternative would impose pre-nesting closures in the spring similar to the those under alternative B. ORV closures, however, would be more restrictive under alternative C than the no-action alternatives in the fall months, with closures extending to October 14. This may affect the extent to which visitors who cancel their spring trips to the Seashore decide to reschedule their trips to the fall. Peak-use limits on the number of vehicles parked in a location might limit visitation by ORV users on holiday or crowded summer weekends, but would improve the visitor experience for those who were on the beaches because of the decrease in crowding.

Other areas and pedestrian use of the Seashore would be not be managed similarly to the no-action alternatives as buffers for protected species would be larger and ramp 27-30 would be managed as a SMA. Pedestrian access corridors at Bodie Island Spit, Cape Point, and South Point, as well as the construction and relocation of ORV access ramps would improve access to open beaches relative to the no-action alternatives, particularly alternative B. Alternative C would also require users to purchase an ORV use permit, the fee of which would be based on NPS guidelines for cost recovery. For visitors who prefer beaches without ORVs, alternative C provides more vehicle-free beach than alternative B.

Reduced ORV access to areas of high resource sensitivity in the fall and areas of high visitor use in the spring and fall, as well as the addition of the ORV permit system, would adversely affect visitation by ORV users relative to the no-action alternatives because of reduced vehicular access and the introduction of a new cost associated with the ORV permit~~use~~. The addition of pedestrian access corridors and construction and relocation of ORV access ramps, as well as increased predictability of ORV access, could beneficially impact visitation relative to alternative B, but likely less than alternative A which provided for pedestrian access throughout the Seashore. The net impacts of these actions relative to the no-action alternatives are uncertain.

The seasonal night driving restrictions in alternative C relative to alternative A and even alternative B would impact commercial and recreational anglers who would otherwise fish for longer hours, since the restrictions would be from 7 p.m. to 7 a.m. and from May 1 to November 15, with the option to modify (reduce) the restricted hours for commercial fishermen. Commercial fishermen raised this concern during the business survey. The night driving restrictions may also deter potential recreational anglers from visiting the Seashore resulting in a direct loss of their spending on regional businesses, and the subsequent indirect and induced impacts on the regional economy.

The impact of alternative C on commercial fishermen would be less than for recreational ORV users. Commercial fishermen have access to Seashore beaches except during full resource closures for protected species and at lifeguarded beaches, so they would not be affected by the longer seasonal closures. Commercial fishermen would not be required to obtain an ORV permit that would be required for recreational ORVs. In areas outside of existing resource closures, the Superintendent will be able to modify the night-driving restrictions, subject to terms and conditions of the fishing permit, for commercial fishermen who are actively engaged in authorized commercial fishing activity and can produce fish house receipts from the past 30 days. Such modifications would be subject to periodic review.

Similar to alternative B, the range of direct impacts by business category is projected to vary from 0% to −50% for commercial fishermen, 0% to -10% for other businesses in the Seashore villages, and 0% to -2% in the rest of the ROI under alternative C (table 65). The longer seasonal closures make the probability of higher impacts greater under alternative C differ compared to alternatives A and B for the reasons discussed above.

TABLE 65. RANGE OF PROJECTED ANNUAL BUSINESS REVENUE IMPACTS FOR ALTERNATIVE C BY BUSINESS CATEGORY AND AREA

	The Seashore Villages			Rest of ROI
Revenue Impact Estimate	Commercial Fishing	Sporting Goods	Other	All
Low	0%	0%	0%	0%
Mid	-25%	-5%	-5%	-1%
High	-50%	-10%	-10%	-2%

The projected range of business impacts for alternative C is estimated by IMPLAN to result in direct impacts of between no change and a 0.8% ($21.54 million) decrease to economic output, and no change to a loss of 1.1% in employment (320 employees) in the ROI (table 66). Total impacts resulting from the direct impacts, which would include indirect and induced impacts, would be between a no change and $29.4 million decrease to economic output, and no change to a loss of 400 employees. These total impacts would represent no change to a 1% decrease relative to the total economic output in Dare and Hyde Counties and no change to a 1.2% loss of employment.

TABLE 66. RANGE OF ECONOMIC IMPACTS OF ALTERNATIVE C ESTIMATED BY IMPLAN ($2008)

Revenue Impact Estimate	Direct Output Impact (in millions of dollars)	Total Output Impact (in millions of dollars)	Impact as a Percent of Total for Dare and Hyde Counties	Direct Employment Impact	Total Employment Impact	Impact as a percent of total for Dare and Hyde Counties
Low	$0.00	$0.00	0.0%	0	0	0.0%
Mid	-$10.77	-$14.70	-0.5%	-160	-200	-0.6%
High	-$21.54	-$29.40	-1.0%	-320	-400	-1.2%

[a]Fifty-four percent of the direct impacts are expected to occur in the Seashore Villages.

Similar to alternative B, the economy could experience negligible to minor, adverse, long-term impacts, and Seashore villages may experience larger short-term adverse impacts if there are longer, more widespread closures or beneficial short-term impacts if closures are less wide-spread. However due to increased fall ORV closures, larger adverse impacts would be more likely under alternative C than alternatives A or B.

Small Business Impacts. Similar to alternative B, under alternative C, it is expected that small businesses would experience negligible to moderate, adverse, long-term impacts.

Preservation Value Impacts. Alternative C could provide negligible to moderate benefits to piping plover relative to A and B, but with negligible to minor, adverse impacts in the piping plover population overall. Relative to alternatives A and B, the impacts of alternative C on preservation values could be minor adverse to the species from recreational use, with moderate beneficial and long-term impacts related to Seashore efforts to provide management and protection for the species. The increased required night driving restrictions under alternative C would increase the probability of beneficial impacts to preservation values relative to alternative A or B. Negligible impacts to preservation values could occur if the piping plover experienced minor adverse impacts and thus the alternative did not improve their circumstances.

Cumulative Impacts. Socioeconomic impacts of cumulative actions unrelated to ORV management under alternative C would be the same as those under alternative A. In the long-term, cumulative impacts from all other actions affecting the regional economy would be negligible to minor and beneficial based on economic growth despite storms and plans that would improve visitor access to the beaches in the future. However, a continued economic recession at the national level could cause minor to moderate adverse long-term impacts. Adding in the potential negligible to minor, adverse long-term impacts to the regional economy of the ROI associated with the actions under alternative C, overall cumulative impacts could be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.

Conclusion. Businesses linked to ORV use at the Seashore would experience uncertain adverse impacts based on protected animal nesting behavior changes from year to year. The impact on these businesses may ripple through the economy on the Outer Banks as a whole; however, the economy would likely adapt over time to the implementation of this alternative. This uncertainty may impact small businesses disproportionately.

Overall, it is expected that the regional economy of the ROI would experience negligible to minor, adverse, long-term impacts, with the potential for larger short-term impacts in the Seashore villages. Efforts to improve access through pedestrian corridors, when compared to alternative B, and changes to access ramps would decrease the impacts on businesses that rely on visitors using the beaches affected by the new corridors and ramps relative to alternative B. However, the longer ORV~~beach~~ closure in the fall months may reduce visitation under alternative C relative to B and make the mid to high impact scenarios more likely.

Small businesses are expected to experience negligible to moderate, adverse, long-term impacts. Preservation value impacts would depend on the success of alternative C in protecting the environment and protected species. Relative to alternatives A and B, the impacts of alternative C on preservation values could be negligible to moderate, beneficial and long-term. Cumulative impacts could be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.

The long run impact of the alternative would depend in part on how current and new visitors adjust their trips and spending in response to the management changes and the adaptations made by the business community to these changes. To the extent that businesses adapt to changing visitation patterns, the long term impacts on the overall economy would be lessened. The impact on individual businesses would vary more than the impacts on the regional economy as a whole if the mix of visitors changes. Some businesses may experience a long term drop in customers, while others may experience no change or a long term increase.

Impacts of Alternative D: Increased Predictability and Simplified Management

Regional Economic Impacts. Similar to other alternatives, under alternative D, the local economy would be impacted primarily through a change in the trend of the number of visitors to the region or a change in the activities visitors participate in while in the region. This alternative would provide for the least ORV access to the Seashore relative to the other alternatives, as well as reduced access for pedestrians as areas where ML1 measures apply would be seasonally closed to pedestrians until protected species breeding activity ceases.

Under alternative D, areas of high resource sensitivity and visitor use would not be designated as ORV routes and would be managed under ML1 measures during the breeding season. This would result in all points and spits at the Seashore being closed year-round to ORV use and closed during the breeding season to pedestrian use. Similar to the alternative B, beaches open to ORV use would still be subject to temporary resources closures according to protected species behavior, which could result in larger areas of resource closure when compared to alternative A. Relative to the other action alternatives, alternative D would have the most certainty and least costly ORV permits. This alternative would decrease visitation by ORV users relative to the other alternatives.

Seasonal night driving restrictions in alternative D relative to alternative A and even alternative B would impact commercial and recreational anglers who would otherwise fish for longer hours, since the restrictions would be from 7 p.m. to 7 a.m. from May 1 to November 15. Commercial fishermen raised this concern during the business survey. The night driving restrictions may also deter potential recreational anglers from visiting the Seashore resulting in a direct loss of their spending on regional

businesses, and the subsequent indirect and induced impacts on the regional economy. However, as alternative D closes all points and spits year-round, the impacts of night driving under this alternative would be secondary compared to the impacts from the establishment of year-round SMAs at all points and spits under ML1 procedures.

The impact of alternative D on commercial fishermen would be less than for recreational ORV users. Commercial fishermen have access to Seashore beaches except during full resource closures and at lifeguarded beaches, so they would not be affected by the year-round closures. Commercial fishermen would not be required to obtain an ORV permit that would be required for recreational ORVs, but would be managed under the commercial fishing special use permit. In areas outside of existing resource closures, the Superintendent would be able to modify the night-driving restrictions, subject to terms and conditions of the fishing permit, for commercial fishermen who are actively engaged in authorized commercial fishing activity and can produce fish house receipts from the past 30 days. Such modifications would be subject to periodic review.

The range of direct impacts by business category is projected to vary from no change to a decrease of 50% for commercial fishermen, a decrease of 15% to a decrease of 40% for businesses in the Seashore villages, and a decrease of 2% to a decrease of 6% in the rest of the ROI under alternative D (table 67). The impacts on individual businesses that depend on visitors to SMAs could be larger. The impacts on revenue from alternative D would depend on how visitors react to the closure of SMAs to ORVs year-round and how visitors and potential visitors adjust to the new conditions over time. With year-round ORV closures, there are no opportunities for visitors to reschedule their trips to the fall as in the other alternatives.

TABLE 67. RANGE OF PROJECTED ANNUAL BUSINESS REVENUE IMPACTS FOR ALTERNATIVE D BY BUSINESS CATEGORY AND AREA

	The Seashore Villages			Rest of ROI
Revenue Impact Estimate	**Commercial Fishing**	**Sporting Goods**	**Other**	**All**
Low	0%	-20%	-15%	-2%
Mid	-25%	-30%	-20%	-4%
High	-50%	-40%	-25%	-6%

The economic impact estimates for the mid value of revenue impacts from table 67 for different industry sectors under alternative D are presented in table 68. The values in table 68 represent the middle estimates for changes in output in millions of dollars and changes in employment in full and part time jobs estimated in IMPLAN. The range of economic impacts for output and employment under alternative D are provided in table 69.

1 **TABLE 68. ECONOMIC IMPACTS OF ALTERNATIVE D FOR MID RANGE REVENUE IMPACTS BY INDUSTRY ESTIMATED BY IMPLAN ($2008)**

NAICS		Direct Output Impacts (in millions of dollars)	Indirect Output (in millions of dollars)	Induced Output Impacts	Total Output Impacts	% of NAICS Output in Dare and Hyde Counties	Direct Employ-ment Impacts	Indirect Employ-ment Impacts	Induced Employ-ment Impacts	Employ-ment Total	% of NAICS Employment in Dare and Hyde Counties
11	Agriculture, Forestry, Fishing and Hunting	-$0.98	-$0.11	-$0.01	-$1.10	-1.1%	-30	-5	0	-35	-2.4%
21	Mining	$0.00	$0.00	$0.00	$0.00	-	0	0	0	0	-
22	Utilities	$0.00	-$0.56	-$0.17	-$0.72	-1.6%	0	0	0	0	0.0%
23	Construction	$0.00	-$0.53	-$0.06	-$0.58	-0.1%	0	-5	0	-5	-0.1%
31-33	Manufacturing	$0.00	-$0.33	-$0.07	-$0.39	-0.2%	0	0	0	0	0.0%
42	Wholesale Trade	$0.00	-$0.44	-$0.25	-$0.69	-1.2%	0	-5	-5	-5	-0.9%
44-45	Retail Trade	-$5.46	-$0.42	-$1.09	-$6.97	-2.4%	-80	-5	-15	-100	-2.6%
48-49	Transportation and Warehousing	$0.00	-$0.23	-$0.07	-$0.30	-1.3%	0	-5	0	-5	-1.4%
51	Information	$0.00	-$0.68	-$0.24	-$0.92	-1.4%	0	-5	0	-5	-1.8%
52	Finance and Insurance	$0.00	-$0.54	-$0.40	-$0.94	-0.8%	0	0	0	-5	-0.8%
53	Real Estate and Rental and Leasing	-$12.93	-$1.76	-$0.46	-$15.15	-2.0%	-95	-15	-5	-110	-2.0%
54	Professional, Scientific, and Technical Services	$0.00	-$0.66	-$0.19	-$0.85	-1.1%	0	-5	0	-10	-1.2%
55	Management of Companies and Enterprises	$0.00	-$0.02	$0.00	-$0.02	-1.8%	0	0	0	0	0.0%
56	Administrative and Support and Waste Management and Remediation Services	$0.00	-$0.54	-$0.09	-$0.63	-0.9%	0	-15	0	-15	-0.9%
61	Education Services	$0.00	$0.00	-$0.03	-$0.03	-1.0%	0	0	0	0	0.0%
62	Health Care and Social Assistance	$0.00	$0.00	-$0.74	-$0.74	-1.0%	0	0	-10	-10	-1.1%
71	Arts, Entertainment, and Recreation	-$1.29	-$0.11	-$0.15	-$1.55	-3.8%	-15	-5	-5	-20	-2.5%

NAICS		Direct Output Impacts (in millions of dollars)	Indirect Output (in millions of dollars)	Induced Output Impacts	Total Output Impacts	% of NAICS Output in Dare and Hyde Counties	Direct Employ-ment Impacts	Indirect Employ-ment Impacts	Induced Employ-ment Impacts	Employ-ment Total	% of NAICS Employment in Dare and Hyde Counties
72	Accommodation and Food Services	-$19.74	-$0.29	-$0.64	-$20.66	-6.6%	-335	-5	-10	-355	-6.7%
81	Other Services (except Public Administration)	$0.00	-$0.22	-$0.40	-$0.62	-0.7%	0	-5	-10	-10	-0.6%
Other	Misc. Industries (including Public Administration)	$0.00	-$0.23	-$1.45	-$1.69	-0.5%	0	0	0	0	0.0%
Total		**-$40.40**	**-$7.65**	**-$6.52**	**-$54.57**	**-1.8%**	**-560**	**-75**	**-65**	**-700**	-2.1%

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TABLE 69. RANGE OF ECONOMIC IMPACTS OF ALTERNATIVE D ($2008)

Revenue Impact Estimate	Direct Output Impact (in millions of dollars)	Total Output Impact (in millions of dollars)	Impact as a percent of total for Dare and Hyde Counties	Direct Employment Impact	Total Employment Impact	Impact as a percent of total for Dare and Hyde Counties
Low	-$24.53	-$33.01	-1.1%	-330	-415	-1.3%
Mid	-$40.40	-$54.57	-1.8%	-560	-700	-2.1%
High	-$56.27	-$76.13	-2.5%	-790	-985	-3.0%

[a]Between 47-59% of the direct impacts are expected to occur in the Seashore Villages.

Adverse direct impacts of alternative D are expected to occur in largest in retail, recreation, lodging and food service and real estate businesses as well as the fishing industry. Most industries may face some decrease in output and employment through indirect and induced impacts, totaling $14.17 million and 140 jobs lost.

The greatest total adverse effects on output and employment are estimated to occur in the accommodation and food services industry, with a $20.66 million reduction in output and the loss of 355 jobs estimated under the middle scenario. Real estate, and retail in Dare and Hyde counties are also estimated to have output losses of $15 and $7 million respectively.

This projected range of business impacts for alternative D is estimated to result in direct impacts of between a 0.9% ($24.53 million) and a 2.1% ($56.27 million) decrease to economic output, and a loss of 1.2% of employment (330 employees) to a loss of 2.8% of employment (790 employees) in the ROI. Total impacts resulting from the direct impacts, which include ~~indirect and~~ induced impacts, would be between a $33.01 million to $76.13 million decrease to economic output, and between a 415 and 985 loss of employees. These total impacts would represent a 1.1% to a 2.5% decrease relative to the total economic output in Dare and Hyde counties and a 1.3% to a 3.0% loss of employment. Compared to alternative A, the middle value of the range of losses is 1.8% ($54.57 million) larger for alternative D. The regional economic impact of alternative D is expected to be minor, adverse and long-term in the ROI. Seashore villages would experience larger short-term adverse impacts.

Small Business Impacts. Under alternative D, it is expected that small businesses would experience moderate to major, adverse, long-term impacts.

Preservation Value Impacts. To the extent that alternative D provides enhanced long-term protection for the plant and animal communities in the Seashore, the impact on preservation values would be long-term, beneficial for the United States as a whole. The closure of sensitive areas to ORVs under alternative D year-round should substantially increase the probability of beneficial impacts for piping plover and therefore to preservation values relative to all other~~the no action~~ alternatives.

Cumulative Impacts. Socioeconomic impacts of cumulative actions unrelated to ORV management under alternative D would be the same as those under alternative A. In the long-term, cumulative impacts from all other actions affecting the regional economy would be negligible to minor and beneficial based on economic growth despite storms and plans that would improve visitor access to the beaches in the future. However, a continued economic recession at the national level could cause minor to moderate adverse long-term impacts. Adding in the potential minor, adverse long-term impacts to the regional economy of the ROI associated with the actions under alternative D, overall cumulative impacts could be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.

Conclusion. Businesses linked to ORV use at the Seashore would experience adverse impacts under alternative D. The impact on these businesses would ripple through the economy on the Outer Banks as a whole. Overall, it is expected that the ROI could experience minor, adverse long-term impacts.

Under alternative D, it is expected that small businesses would experience moderate to major, adverse, long-term impacts. Preservation value impacts would depend on the success of alternative D in protecting the environment and threatened and endangered species, but should be, moderate to major, beneficial and long term. Cumulative impacts could be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.

The long run impact of alternative D would depend in part on how current and new visitors adjust their trips and spending in response to the management changes and the adaptations made by the business community to these changes. To the extent that businesses adapt to changing visitation patterns, the long term impacts on the overall economy would be lessened. The impact on individual businesses would vary more than the impacts on the regional economy as a whole if the mix of visitors changes. Some businesses may experience a long term drop in customers, while others may experience no change or a long term increase.

Impacts of Alternative E: Variable Access and Maximum Management

Regional Economic Impacts. Similar to other alternatives, under alternative E, the local economy would be impacted primarily through a change in the trend of the number of visitors to the region or a change in the activities visitors participate in while in the region. Alternative E would provide similar ORV and pedestrian access to the Seashore as alternative B, by providing flexibility in what areas are opened or closed seasonally and providing a wide range of experiences for Seashore users year-round.

Under alternative E, beach closure to ORVs and pedestrians would be contingent upon protected species nesting behavior, as well as by pre-determined seasonal closures. Areas of high resource sensitivity would follow seasonal ORV closures from March 15 to August 31; however, additional pedestrian and ORV access would be facilitated by construction and relocation of access ramps, designation of ORV pass-through zones, and the promotion of water taxi service to popular areas. Areas of high visitor use (outside of SMAs) would either be open to ORVs seasonally from November 1 to March 31 or closed to ORVs. Similar to the no-action alternatives, beaches open to ORV use would still be subject to temporary resources closures according to protected species behavior, with the potential for a full beach closure greater than under alternative A.

The seasonal night driving restrictions in alternative E would be similar to those under alternative B and would impact commercial and recreational anglers who would otherwise fish for longer hours. Commercial fishermen raised this concern during the business survey. The night driving restrictions may also deter potential recreational anglers from visiting the Seashore resulting in a direct loss of their spending on regional businesses, and the subsequent indirect and induced impacts on the regional economy

Alternative E would include implementation of an ORV permit system, with the fee based on cost recovery per NPS guidelines. The addition of the ORV permit system would adversely affect visitation by ORV users relative to the no action alternatives because of the introduction of a new costs associated with ORV use in the Seashore. The addition of pedestrian access corridors, construction, and relocation of ORV access ramps, other efforts to improve beach access would beneficially impact visitation relative to the no action alternatives.

The impact of alternative E on commercial fishermen would be less than for recreational ORV users. Commercial fishermen have access to Seashore beaches except during full resource closures for breeding and at lifeguarded beaches, so they would not be affected by the ORV-specific closures. Commercial fishermen would not be required to obtain an ORV permit that would be required for recreational ORVs. In areas outside of existing resource closures, the Superintendent will be able to modify the night-driving restrictions, subject to terms and conditions of the fishing permit, for commercial fishermen who are actively engaged in authorized commercial fishing activity and can produce fish house receipts from the past 30 days. Such modifications would be subject to periodic review.

Similar to alternative B, the range of direct impacts on revenue by business category is projected to vary from 0% to a decrease of 50% for commercial fishermen, 0% to a decrease of 10% for other businesses in the Seashore villages, and 0% to a decrease of 2% in the rest of the ROI under alternative E (table 70). The range of revenue impacts is the same as alternatives B and C. Compared to alternative C and D, alternative E provides for more ORV access and the impacts would likely be on the lower end of the range.

TABLE 70. RANGE OF PROJECTED ANNUAL BUSINESS REVENUE IMPACTS FOR ALTERNATIVE E BY BUSINESS CATEGORY AND AREA

	The Seashore Villages			Rest of ROI
Revenue Impact Estimate	Commercial Fishing	Sporting Goods	Other	All
Low	0%	0%	0%	0%
Mid	-25%	-5%	-5%	-1%
High	-50%	-10%	-10%	-2%

This projected range of business impacts for alternative E is estimated to result in direct impacts of between no change and a 0.8% ($21.54 million) decrease to economic output, and no change to a loss of 1.1% of employment (320 employees) in the ROI (table 71). Total impacts resulting from these direct impacts, which include indirect and induced impacts, are between a no change and $29.4 million decrease to economic output, and no change to a loss of 400 employees. These total impacts represent no change to a 1% decrease relative to the total economic output in Dare and Hyde Counties and no change to a 1.2% loss of employment. The detailed breakdown of impacts by industry sector would be the same as alternative B (table 63). Similar to alternative B, the economy may experience negligible to minor, adverse long-term impacts, while Seashore villages may experience larger short-term adverse impacts.

TABLE 71. RANGE OF ECONOMIC IMPACTS OF ALTERNATIVE E ESTIMATED BY IMPLAN ($2008)

Revenue Impact Estimate	Direct Output Impact (in millions of dollars)	Total Output Impact (in millions of dollars)	Impact as a percent of total for Dare and Hyde Counties	Direct Employment Impact	Total Employment Impact	Impact as a percent of total for Dare and Hyde Counties
Low	$0.00	$0.00	0.0%	0	0	0.0%
Mid	-$10.77	-$14.70	-0.5%	-160	-200	-0.6%
High	-$21.54	-$29.40	-1.0%	-320	-400	-1.2%

[a] Fifty-four percent of the direct impacts are expected to occur in the Seashore Villages.

Small Business Impacts. Under alternative E, it is expected that small businesses would experience negligible to moderate adverse, long-term impacts. The impacts would be similar to alternative B, but would be larger than the impacts under alternative A. The ORV corridors with pass-through zones and modification to vehicle access ramps would increase the probability that impacts would be lower under alternative E than under alternative B.

Preservation Value Impacts. Alternative E could provide moderate benefits to piping plover relative to A and B, but with long-term, minor, adverse impacts to the piping plover population overall. Relative to alternatives A and B, the impacts of alternative E on preservation values could be moderate, beneficial and long-term. The ~~increased hours~~ seasonal night driving restrictions under alternative E ~~, compared to alternative C,~~ would increase the probability of beneficial impacts to preservation values relative to alternatives ~~A or B~~. More beach access by ORVs compared to alternatives C and D would increase the probability of lower benefits for alternative E. Negligible impacts to preservation values could occur if the piping plover experienced adverse impacts and thus the alternative did not improve their circumstances.

Comment [MSOffice38]: The comparison of benefits was confused and confusing. Restricted hour are same for B and E, so night driving restrictions under E is only better than no night driving restrictions under A.

Cumulative Impacts. Socioeconomic impacts of cumulative actions unrelated to ORV management under alternative E would be the same as those under alternative A. In the long-term, cumulative impacts from all other actions affecting the regional economy would be negligible to minor and beneficial based on economic growth despite storms and plans that would improve visitor access to the beaches in the future. However, a continued economic recession at the national level could cause minor to moderate adverse long-term impacts. Adding in the potential negligible to minor, adverse long-term impacts to the regional economy of the ROI associated with the actions under alternative E, overall cumulative impacts could be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.

Conclusion. Businesses linked to ORV use at the Seashore would experience uncertain adverse impacts based on protected species nesting behavior changes from year to year. The impact on these businesses may ripple through the economy on the Outer Banks as a whole; however, the economy would likely adapt over time to the implementation of this alternative. This uncertainty may impact small businesses disproportionately. Overall, it is expected that the ROI would experience negligible to minor adverse long term impacts and the Seashore village businesses would experience negligible to minor adverse long-term impacts, with the potential for larger short-term impacts especially for businesses that cater directly to ORV users in the Seashore villages. Small businesses are expected to experience negligible to major, adverse, long-term impacts. Preservation value impacts would depend on the success of alternative E in protecting the environment and threatened and endangered species, but could be moderate, beneficial and long-term. Cumulative impacts could be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions. Alternative E more structured and predicable and with the establishment of SMAs would be more protective of resources than alternative B, but is similar in some ~~has many features in common with~~ respects to alternative B. ~~B and b~~ased on the visitation statistics for 2008, the probability of negligible impacts is greater than the probability of minor adverse impacts.

Comment [MSOffice39]: E is only superficially similar to B and would be more effective for resource protection and would provide more predictable access than B.

The long run impact of the alternative would depend in part on how current and new visitors adjust their trips and spending in response to the management changes and the adaptations made by the business community to these changes. To the extent that businesses adapt to changing visitation patterns, the long term impacts on the overall economy would be lessened. The impact on individual businesses would vary more than the impacts on the regional economy as a whole if the mix of visitors changes. Some businesses may experience a long term drop in customers, while others may experience no change or a long term increase.

Impacts of Alternative F: Management Based on Advisory Committee Input

Regional Economic Impacts. Similar to the no action alternatives, beach closure to ORVs and pedestrians would be contingent upon protected species nesting behavior. However additional pedestrian and ORV access would be facilitated by construction and relocation of access ramps, and the designation of ORV access corridors at Cape Point and South Point. Areas of high visitor use (outside of SMAs) would be open to ORVs seasonally from November 1 to March 31, September 16 to May 14, or closed to ORVs year round. Cape Point and Ssouth Point would have an ORV corridor, subject to resource closures, to provide limited access in the summer (through July 31 or end of fledging), but some of the points and spits would be closed to ORVs year-round (Hatteras Inlet Spit, North Ocracoke SpitInlet) and Bodie Island spit would be closed to ORVs in the summer months, but with a pedestrian access corridor. Similar to alternative B and the other action alternatives, beaches open to ORV use would still be subject to temporary resources closures according to protected species behavior.

The seasonal night driving restrictions in alternative F fall between the other alternatives. Night driving restrictions would be in effectforce between May 1 and September 15 and would prohibit ORV use from with restrictions between one hour after sunset until a turtle patrol checks the area in the morning (approximately half an hour after sunrise). Night driving restrictions would impact commercial and recreational anglers who would otherwise fish for longer hours. Commercial fishermen raised this concern during the business survey. The night driving restrictions may also deter potential recreational anglers from visiting the Seashore resulting in a direct loss of their spending on regional businesses, and the subsequent indirect and induced impacts on the regional economy. Under alternative F, restricted hours and fall restrictions would be based on the hours of darkness or presence of turtle nests in the fallmore on turtle activity or presence as opposed to set times, which may allow for more flexibility.

The addition of the ORV permit system would potentially reduce visitation by ORV users relative to the no action alternatives because of the introduction of a new cost associated with ORV use in the Seashore. The addition of pedestrian access corridors, construction, and relocation of ORV access ramps, other efforts to improve beach access and the addition of pedestrian trails would beneficially impact visitation relative to the no action alternatives. Peak use limits for ORVs on busy holiday and summer weekends could limit visitation, but would also improve the experience for ORVs using the restricted areas.

The impact of alternative F on commercial fishermen would be less than for recreational ORV users. Commercial fishermen have access to Seashore beaches except during full resource closures for breeding and at lifeguarded beaches, so they would not be affected by the longer seasonal closures. Commercial fishermen would not be required to obtain an ORV permit that would be required for recreational ORVs, and would continue to be managed by the commercial fishing special use permit. In areas outside of existing resource closures, the Superintendent will be able to modify the night-driving restrictions, subject to terms and conditions of the fishing permit, for commercial fishermen who are actively engaged in authorized commercial fishing activity and can produce fish house receipts from the past 30 days. Such modifications would be subject to periodic review.

The range of direct impacts by business category is projected to vary from 0% to a decrease of 50% for commercial fishermen, 0% to a decrease of 10% for other businesses in the Seashore villages, and 0% to a decrease of 2% in the rest of the ROI under alternative F (table 72). Alternative F provides less access by ORVs to the beach compared to alternatives A or B, especially in SMAs, and has more restricted SMA areas than alternative E. However, some popular ORV areas open sooner in the late summer than alternative E and allows for an ORV corridor instead of just pass-through access at Cape Point and South Point. There are more vehicle-free areas for pedestrians because of the closures as well as increased parking. Compared to the no action alternatives, these measures could increase visitation and increase the probability that revenue impacts would be at the low end of the estimated range rather than the high end.

TABLE 72. RANGE OF PROJECTED ANNUAL BUSINESS REVENUE IMPACTS FOR ALTERNATIVE F BY BUSINESS CATEGORY AND AREA

Revenue Impact Estimate	The Seashore Villages			Rest of ROI
	Commercial Fishing	Sporting Goods	Other	All
Low	0%	0%	0%	0%
Mid	-25%	-5%	-5%	-1%
High	-50%	-10%	-10%	-2%

The projected range of business impacts for alternative F is estimated to result in direct impacts of between no change and a 0.8% ($21.54 million) decrease to economic output, and no change to a loss of 1.1% of employment (320 employees) in the ROI (table 73). Total impacts, which include direct, indirect and induced impacts, are between no change and a $29.4 million decrease to economic output, and no change to a loss of 400 employees. These total impacts represent no change to a 1% decrease relative to the total economic output and no change to a 1.2% loss of employees in Dare and Hyde Counties. Again, the detailed changes by industry would be similar to alternative B (table 63). Similar to alternative B, the economy may experience negligible to minor long-term impacts, while the Seashore villages may experience larger short-term adverse impacts.

TABLE 73. RANGE OF ECONOMIC IMPACTS OF ALTERNATIVE F ESTIMATED BY IMPLAN ($2008)

Revenue Impact Estimate	Direct Output Impact (in millions of dollars)	Total Output Impact (in millions of dollars)	Impact as a percent of total for Dare and Hyde Counties	Direct Employment Impact	Total Employment Impact	Impact as a percent of total for Dare and Hyde Counties
Low	$0.00	$0.00	0.0%	0	0	0.0%
Mid	-$10.77	-$14.70	-0.5%	-160	-200	-0.6%
High	-$21.54	-$29.40	-1.0%	-320	-400	-1.2%

[a]Fifty-four percent of the direct impacts are expected to occur in the Seashore Villages.

Small Business Impacts. Under alternative F, it is expected that small businesses would experience negligible to moderate adverse long-term impacts. The extra efforts to increase ORV access and pedestrian access should increase the probability that the impacts are low rather than high compared to alternatives D and E.

Preservation Value Impacts. Alternative F could provide moderate benefits to piping plover relative to alternative A, but with long-term, minor, adverse impacts to the piping plover population overall. Relative to alternatives A and B, the impacts of alternative F on preservation values could be moderate, beneficial and long-term. The increased required night driving restrictions under alternative F would increase the probability of beneficial impacts to preservation values relative to alternatives A and B. More beach access by ORVs compared to alternatives C and D would increase the probability of lower benefits for preservation under alternative F. Negligible impacts to preservation values could occur if the piping plover experienced adverse impacts and thus the alternative did not improve their circumstances.

Cumulative Impacts. Socioeconomic impacts of cumulative actions unrelated to ORV management under alternative F would be the same as those under alternative A. In the long-term, cumulative impacts from all other actions affecting the regional economy would be negligible to minor and beneficial based

on economic growth despite storms and plans that would improve visitor access to the beaches in the future. However, a continued economic recession at the national level could cause minor to moderate adverse long-term impacts. Adding in the potential negligible to minor, adverse long-term impacts to the regional economy of the ROI associated with the actions under alternative F, overall cumulative impacts could be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.

Conclusion. Businesses linked to ORV use at the Seashore would experience uncertain adverse impacts based on protected animal nesting behavior changes from year to year. The impact on these businesses may ripple through the economy on the Outer Banks as a whole; however, the economy would likely adapt over to the implementation of this alternative. This uncertainty may impact small businesses disproportionately.

Overall it is expected that the ROI could experience negligible to minor adverse long term impacts and Seashore villages could experience larger short-term impacts especially for businesses that cater directly to ORV users in the Seashore villages. Small businesses are expected to experience negligible to moderate, adverse, long-term impacts. Preservation value impacts would depend on the success of alternative F in protecting the environment and threatened and endangered species, but should be moderate beneficial and long-term. Cumulative impacts would be long-term, negligible to minor, and adverse. Alternative F is more structured and predicable and with the establishment of SMAs would be more protective of resources than alternative B, but is similar in some~~many~~ respects to alternative B. Based on the visitation statistics from 2008, the probability of negligible impacts is greater than the probability of minor adverse impacts.

Comment [MSOffice40]: E is only superficially similar to B and would be more effective for resource protection and would provide more predictable access than B.

The long run impact of the alternative would depend in part on how current and new visitors adjust their trips and spending in response to the management changes and the adaptations made by the business community to these changes. To the extent that businesses adapt to changing visitation patterns, the long term impacts on the overall economy would be lessened. The impact on individual businesses would vary more than the impacts on the regional economy as a whole if the mix of visitors changes. Some businesses may experience a long term drop in customers, while others may experience no change or a long term increase.

TABLE 74. SUMMARY OF IMPACTS TO SOCIOECONOMICS UNDER THE ALTERNATIVES

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Socioeconomics					
Overall, it is expected that the regional economy would experience negligible, adverse or beneficial long-term impacts depending on the extent of beach closures. This uncertainty may impact small businesses disproportionately. Preservation value impacts would be long-term, moderate, and adverse.	Overall, it is expected that businesses would experience negligible to minor, adverse, long-term impacts, with the potential for larger impacts on individual businesses located in the Seashore villages that are tied most directly to ORV users and to traffic at vehicle access ramps. Small businesses are expected to	Overall, it is expected that the regional economy of the ROI would experience negligible to minor, adverse, long-term impacts, with the potential for larger short-term impacts in the Seashore villages. Efforts to improve access through pedestrian corridors, when compared to alternative B, and changes to access ramps would decrease the	Overall, it is expected that the ROI could experience minor, adverse long-term impacts. Under alternative D, it is expected that small businesses would experience moderate to major, adverse, long-term impacts. Preservation value impacts would depend on the success of alternative D in protecting the environment and	Overall, it is expected that the ROI would experience negligible to minor adverse long term impacts and the Seashore village businesses would experience negligible to minor adverse long-term impacts, with the potential for larger short-term impacts especially for businesses that cater directly to ORV users in the Seashore villages. Small businesses are expected to experience negligible	Overall it is expected that the ROI could experience negligible to minor adverse long term impacts and Seashore villages could larger short-term impacts especially for businesses that cater directly to ORV users in the Seashore villages. Small businesses are expected to experience negligible to moderate, adverse, long-term impacts. Preservation value impacts would depend on the success of alternative F in protecting the

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Cumulative Impacts would be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.	experience negligible to moderate, adverse, long-term impacts. Based on the visitation statistics, the probability of negligible impacts is greater than the probability of minor adverse impacts. Preservation value impacts would depend on the success of alternative B in protecting the environment and threatened and endangered species, but could be long-term, minor and adverse. Cumulative Impacts would be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.	impacts on businesses that rely on visitors using the beaches affected by the new corridors and ramps relative to alternative B. However, the longer ORV~~beach~~ closure in the fall months may reduce visitation under alternative C relative to B and make the mid to high impact scenarios more likely. Small businesses are expected to experience negligible to moderate, adverse, long-term impacts. Preservation value impacts would depend on the success of alternative C in protecting the environment and protected species. Relative to alternatives A and B, the impacts of alternative C on preservation values could be negligible to moderate, beneficial and long-term. Cumulative impacts would be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.	threatened and endangered species, but should be, moderate to major, beneficial and long term. Cumulative impacts would be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions.	to m~~oderate~~ajor, adverse, long-term impacts. Preservation value impacts would depend on the success of alternative E in protecting the environment and threatened and endangered species, but could be moderate, beneficial and long-term. Cumulative impacts would be long-term, negligible to minor, and beneficial or adverse, depending on national economic conditions. Alternative E is more structured and predicable and with the establishment of SMAs would be more protective of resources than alternative B, but is similar in some respects ~~has many features in common with~~ to alternative B. B ~~and b~~ased on the visitation statistics for 2008, the probability of negligible impacts is greater than the probability of minor adverse impacts.	environment and threatened and endangered species, but should be moderate beneficial and long-term. Cumulative impacts would be long-term, negligible to minor, and adverse. Alternative F is more structured and predicable and with the establishment of SMAs would be more protective of resources than alternative B, but is similar in some respects to alternative B. ~~is similar in many respects to alternative B.~~ Based on the visitation statistics from 2008, the probability of negligible impacts is greater than the probability of minor adverse impacts.

Comment [MSOffice41]: Impacts of E should be similar to B, C, and F.

Comment [MSOffice43]: E is only superficially similar to B and would be more effective for resource protection and would provide more predictable access than B.

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Comment [MSOffice42]: E is only superficially similar to B and would be more effective for resource protection and would provide more predictable access than B.

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SEASHORE MANAGEMENT AND OPERATIONS

GUIDING REGULATIONS AND POLICIES

Direction for management and operations at the Seashore is set forth in the- National Park Service Organic Act, the Seashore's enabling legislation, General Management Plan (NPS 1984), Strategic Plan (NPS 2005b), and the current Superintendent's Compendium. Specifically, related to the ORV management plan/EIS, the General Management Plan includes the following management objectives for the Interpretation and Resources Management divisions (NPS 1984):

- foster awareness, appreciation, and understanding of the natural and cultural resources of the Outer Banks and their interrelationships;
- make visitors aware of the hazards associated with living and recreating in a coastal environment;
- encourage visitors to safely pursue only those recreational activities that are compatible with and not detrimental to the natural and cultural resources;
- provide, through an active education program, for the nonconsumptive use of the Seashore as an outdoor classroom by educational organizations;
- strengthen within visitors and park employees an environmental ethic;
- promote understanding of and support for NPS goals and policies; and
- preserve the dynamic physiography and characteristic ecological communities of the Outer banks.

The GMP also states that the Seashore would review and update as necessary an existing "action plan" regulating ORV use to reduce visitor conflicts and to protect dunes, vegetation, wildlife, and cultural resources. The "action plan" would designate ORV routes as well as sensitive resource areas periodically closed to ORV use. It is believed that the "action plan" mentioned in the GMP referred to the 1978 draft interim ORV management plan, which was never finalized or issued as a special regulation.

The Strategic Plan identified the following goals in relation to the ORV management plan/EIS (NPS 2005a):

- identify and assess native plant and animal species of management concern (SMC) populations and identify needed management actions to sustain the populations;
- ensure that 85% of the 2005 species habitat protection protocols are in place;
- continue to make progress on an ORV management plan to ensure species breeding/germination habitats are able to function under natural processes; and
- ensure Seashore visitor satisfaction with the appropriate park facilities, services, and recreational opportunities.

The Superintendent's Compendium: Closures, Permit Requirements, and Other Restrictions (NPS 2009f) sets forth the closure and public use limits that the Seashore staff are required to enforce, thus determining levels of park operations. For the purposes of this plan/EIS, applicable sections of title 36 CFR include but are not limited to the following:

- Section 1.1: Purpose;
- Section 1.2: Applicability and Scope:
- Section 1.3: Penalties;
- Section 1.4: Terms
- Section 1.5: Closure and Public Use Limits;
- Section 1.6: Permits;
- Section 2.1: Preservation of natural, cultural, and archeological resources;
- Section 2.2: Wildlife Protection;
- Section 2.3: Fishing;

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- Section 2.4: Fires;
- Section 2.15: Pets;
- Section 2.22: Property;
- Section 2.30: Misappropriation of Property and Services;
- Section 2.31: Trespassing, tampering, vandalism;
- Section 2.32: Interfering with agency functions;
- Section 2.33: Report of injury or damage;
- Section 2.34: Disorderly conduct;
- Section2.35: Alcoholic beverage and controlled substances;
- Section 4.2: State Law Applicable (regarding vehicles and traffic safety);
- Section 4.10: Travel on Roads and Designated Routes;
- Section 4.15: Safety belts;
- Section 4.21: Speed Limits;
- Section 4.22 Unsafe operation; and
- Section 4.23: Operating under the influence of alcohol or drugs.

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 in relationship to ORV management under each of the alternatives, 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 Ppark Mmanagement (the superintendent's staff), and the divisions of Aadministration, Iinterpretation, Rresource Mmanagement, Ffacility Mmanagement (Mmaintenance), and Vvisitor Pprotection- at the Seashore. Seashore ~~staff from each of the divisions w~~staff from each of the divisions was~~as~~ members of the interdisciplinary team and were consulted regarding expected staffing and funding needs under each alternative. The impact analysis is based on the current description of park operations presented in "Chapter 3: Affected Environment" of this document. The required level of effort is discussed in terms of "full-time equivalents" or FTE, which represent the hours worked by staff. One FTE equals 2080 hours, the equivalent of one person working full-time year-round, or two part-time staff each working 6 months of the year.

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 park 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 park 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—Continuation of Management under the Interim Protected Species Management Strategy

Table 75 provides the total staffing and funding needs under alternative A.

TABLE 75 STAFFING AND FUNDING—ALTERNATIVE A

Division	Assumptions	Annual Costs
Park Management / Administration	4.75 FTE would be required, and no materials, to account for overhead costs to provide overall program support.	Staff = $428,750 Supplemental Costs = $0 Total Annual Costs = $428,750
Visitor Protection	13.0 FTE for 13 law enforcement rangers would be required, as well as vehicles to support this staff. No other equipment or materials would be required.	Staff = $1,047,500 Supplemental Costs = $100,000 Total Annual Costs = $1,147,500
~~Natural~~ Resources Management	9.5~~0~~ FTE would be needed, which could include one full-time wildlife biologist, seasonal biological technicians, and administrative support. Vehicles, signs, and field gear ~~would~~ would be required to support these staff. ~~, as well as signs, field gear, and ATV~~.	Staff = $423,500 Supplemental Costs = $85,000 Total Annual Costs = $508,500

Comment [MSOffice44]: Need to do global search for "resource management" and change them all to "resources management"

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Comment [MSOffice45]: ATVs and UTVs are vehicles

Division	Assumptions	Annual Costs
Facility Management	0.6~~0~~ FTE would be needed, which could include the facility manager, heavy equipment operators, mechanics, and other maintenance workers.	Staff = $45,600 Supplemental Costs = $10,000 Total Annual Costs = $55,600
Interpretation	1.5~~0~~ FTE would be needed, which could include the division chief, interpretive rangers, and a visual information specialist. Other costs would include printing and distributing informational materials.	Staff = $58,500 Supplemental Costs = $10,000 Total Annual Costs = $68,500
Total Staffing and Annual Costs	29.35 FTE	Total Staff Costs = $2,003,850 Total Supplemental Costs = $205,000 Total Annual Costs = $2,208,850
~~Total Annual Cost~~		~~Total Staff Costs = $2,003,850~~ ~~Total Supplemental Costs = $205,000~~ ~~Total Annual Costs = $2,208,850~~

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Park Management / Administration. Under alternative A, park management staff would be directly involved in ORV management activities and all divisions would require administrative support. This support reflects overhead costs such as payroll, human resource functions, involvement of the superintendent, and other similar costs. Support would also include assisting in distributing weekly updates of ORV access areas during the spring and summer months. Actions under alternative A would require approximate 4.75 FTE, or almost five~~slightly more than three~~ full-time staff, to support field operations related to ORV management. Total approximate costs of these staff would be $428,750 with no additional materials required. Under alternative A, park management and administrative functions related to ORV management would be accomplished within the existing Seashore budget, resulting in long-term, negligible, adverse impacts to park management and administrative operations at the Seashore.

Visitor Protection. Under alternative A, Seashore law enforcement rangers would be responsible for enforcing visitor compliance with ORV regulations and resource closures. Law enforcement staff would perform routine patrols of beach areas, respond to violations, conduct investigations, and assist in public education through visitor contacts.

No restrictions on night driving would occur; however, 24-hour coverage would not be provided. Resource closures under alternative A would be subject to change on a regular basis, and the areas open to ORV use would be unpredictable, resulting in a need for a high level of enforcement related to ORV management. All recreational users would have access to this area, and there would be variation in the areas available for ORV use, resulting in some users not having advance notice of what areas are open or closed. Under this alternative, the opportunity for resource closure violations would be relatively high due to this unpredictability. Law enforcement would also continue existing resource protection activities such as fielding violation calls and responding to violation incidents.

In order to accomplish the above activities, as well as enforce all applicable regulations at the Seashore, 13 FTE would be required, which would be filled by law enforcement rangers. Total approximate labor for these positions would equal $1,047,500 a year with an additional $100,000 needed for materials (vehicles, travel, field supplies, fuel, radio support, and training costs) for these rangers, for a total approximate annual cost to the law enforcement division of $1,147,500. The Seashore would use currently available funding to fill the 13 field law enforcement positions, which would be able to address all needs related to ORV management under alternative A.

Under alternative A, visitor protection functions related to ORV management would be accomplished within the existing Seashore budget, resulting in long-term, negligible, adverse impacts to visitor protection operations at the Seashore.

Resources Management. Under alternative A, resources management staff would be responsible for all monitoring and establishment of buffers for protected birds, turtles, and seabeach amaranth. Resources management staff would also be responsible for determining monitoring requirements, hiring, training and supervising field staff, and conducting all field surveys. These staff would also provide input into the weekly resource management report updates and access updates that are provided to the public.

For birds, resources management staff would be responsible for conducting an annual habitat assessment in February or March of each year and establish pre-nesting resource closures based on this assessment and the known breeding habitat over the past three years. While these pre-nesting closures may be used by any species, they would be based on the data and habitat for piping plover only. Surveying of piping plover by resources management staff would begin by March 15 and occur at least once a week, and increase to three times a week on April 1. Other species would be observed twice a week. If no bird activity is observed by July 15, or after the area has been abandoned for a two-week period, whichever comes later, the pre-nesting closures would be reopened by resources management staff.

After pre-nesting, surveying requirements of the resources management staff would vary based on the species and the life stage of the species and range from observing unfledged piping plover chicks continuously during daylight hours for the first week, to observing three times a week for courtship and mating behavior (for all bird species). In addition to observations, resources management staff would establish buffers for protection of these bird species, again with the size and adjustments of these closures related to the bird species in question, as well as the life stage of the bird species. These buffers could be relatively stable once established, such as the 150-foot buffer established for nesting piping plovers, or highly variable, such as buffers for nesting American oystercatchers, which would be based on bird disturbance and behavior.

Resources management staff under alternative A would also be responsible for conducting daily surveys for sea turtles nesting from May 1 to September 15 each year, with periodic surveys (e.g., every two to three days) extending to November 15 in areas of high visitation. Once a nest is found, resources management staff would establish a 30-foot by 30-foot buffer around the next, and expand this closure to the shoreline approximately 50 to 55 days into incubation. Some nest relocation occurs by resources management staff, following the guidance in the NCWRC handbook.

Surveying requirements for seabeach amaranth would occur starting April 1 of each year and would be done during surveying for other species, with an annual survey of potential habitat occurring in August. If a plant is found, resources management staff is responsible for establishing a 30-foot by 30-foot (9.1-meter by 9.1-meter) buffer around the plant.

In addition to regular surveying, monitoring, and establishment of closures, resources management staff would also dedicate time to predator management under alternative A.

In order to accomplish the above activities, the resources management division would require approximately 9.50 FTE, which could include the chief of resources management, a wildlife biologist, seasonal or full-time biological technicians, a GIS specialist, and seasonal administrative assistant support. These positions would equal approximately $423,500 in labor costs. In order to support these positions, overhead costs, computers, uniforms, vehicles, and other equipment (e.g., signs, field gear, UTVs) would be needed, resulting in approximately $85,000 in support costs. The total approximate cost of implementing alternative A to the resources management division would be $508,500.

Under alternative A, resources management functions related to ORV management would be accomplished within the existing Seashore budget, resulting in long-term, negligible, adverse impacts to resources management operations at the Seashore.

Facility Management. The facility management division at the Seashore would be responsible for all maintenance activities related to ORV management. Facility management personnel would provide routine maintenance and emergency repairs of beach ramps and parking lots and would also be responsible for maintaining the vehicles used by law enforcement, resources management and other staff associated with ORV management related activities. Approximately 0.60 FTE of facility management time would be needed to carry out ORV management activities, equaling approximately $45,600 of labor. In addition to the labor, approximately $10,000 of supplies would be required that could include ramp fill material, vehicle parts, and vehicle maintenance supplies. Total annual costs for facilities management staff related to ORV management would be approximately $55,600.

Under alternative A, facility management functions related to ORV management would be accomplished within the existing Seashore budget and no other divisions would be impacted by those activities. Impacts to facility management operations at the Seashore would be long-term, negligible, and adverse.

Interpretation. Under alternative A, staff in the interpretation division would provide materials to Seashore visitors related to ORV use, as well as species management. Staff time would be required to develop these materials, as well as funds to print and distribute the materials. Interpretive staff under alternative A could include the division chief, park rangers to provide interpretive programs and manage volunteer programs, and a visual resource specialist to produce articles, displays, brochures, and exhibits. In order to carry out these functions, alternative A would require approximately 1.50 FTE of staff time, equaling approximately $58,500. Printing and other supporting costs would be approximately $10,000, resulting in total approximate annual costs of $68,500 to the interpretive division.

Under alternative A, the Seashore would be able to conduct interpretive activities related to ORV use and species protection within existing funding sources, and no other divisions of the Seashore would be impacted by these operations. Because there would be no change to Seashore operations, there would be long-term, negligible, adverse impacts to interpretive activities at the Seashore.

Overall Impacts to Seashore Operations: Overall, each division could accomplish within current funding, without shifting priorities or having a noticeable change in operations, resulting in long-term negligible adverse impacts to all areas of Seashore operations.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative A would include implementation of the existing General Management Plan and development of the General Management Plan revision, development of the predator management plan, implementation of the long-range interpretive plan, implementation of the resource management plan, development of the interim protected species management strategy, and the implementation of the consent decree modifying the interim protected species management strategy. The creation of these plans and their implementation would require varying levels of staff time. For example, the current implementation of the General Management Plan would have negligible impacts to staff time since this document is dated and much of the management has been replaced by more updated planning documents. The expected revision of the General Management Plan could have minor to moderate impacts to staff resources, depending on the amount of time and resources devoted to this plan and whether this planning effort detracts from other efforts at the Seashore. The implementation of the consent decree is a current effort that could also have up to moderate impacts to park management and operations since it required additional staff resources from the document it modified. In general, depending on the amount of staff time needed and the number of these efforts occurring at the same time,

these planning efforts and their implementation would have long-term, negligible to moderate, cumulative impacts to park operations and maintenance since it would be expected that existing and future funding sources would provide the required staff for these activities, and in rare instances, staff may be redirected from one activity to another to develop and implement these plans.

Certain ongoing activities within the Seashore also contribute to cumulative impacts including commercial fishing, response to storms and other weather events (including hurricane recovery), and ongoing Seashore operations for law enforcement, research studies, maintenance, and visitor center operations. These activities are generally all accounted for in the current staff and budget of the Seashore and represent negligible, adverse impacts to park operations and maintenance. Storms and other weather-related events, including hurricanes, are not regularly scheduled and planned for, and the preparation for and recovery from these events can have short-term, moderate to major, impacts to Seashore operations since certain functions of Seashore staff may cease while preparation and recovery occurring. As soon as these events and the staff commitment associated with them have passed, there are long-term, negligible, adverse impacts to park operations.

Past, present, and reasonably foreseeable future construction projects that would have cumulative impacts with alternative A include ongoing dredging of the federally authorized navigation channel at Oregon Inlet and the replacement of Bonner Bridge~~,~~. Projects being implemented by the NPS (NC-12 improvements and campground upgrades) would require staff time during the planning, implementation, and maintenance, which would be expected to be within the regular duties of Seashore staff, resulting in long-term, negligible impacts since additional funding would not be needed and Seashore staff would be able to address regular operations. Those projects being implemented by other agencies in the area would require Seashore staff to coordinate with these agencies; this coordination would be expected to be within the regular duties of Seashore staff, resulting in long-term, negligible impacts.

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

Conclusion. Implementation of alternative A would require approximately 29.35 FTE across park management and the administration, visitor protection, resources management, facility management, and interpretation divisions. Staff costs would equal approximately $2,003,850, with an additional $205,000 in support costs (e.g., signs, vehicles, materials). Total approximate cost to implement alternative A would be $2,208,850. All staff and equipment requirements in all divisions would be accommodated by existing funding sources and would not require the Seashore to remove any activities or shift resources around to accommodate ORV management related activities in these divisions, resulting in long-term, negligible impacts to all Seashore operations and management. Cumulative impacts to Seashore operations and management under alternative A would be long-term, negligible, and adverse.

Impacts of Alternative B: No-action—Continuation of Management under Terms of the Consent Decree

Table 76 provides the total staffing and funding needs under alternative B, Continuation of Management under the Consent Decree.

TABLE 76. STAFFING AND FUNDING—ALTERNATIVE B

Division	Assumptions	Annual Costs

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Division	Assumptions	Annual Costs
Park Management / Administration	5.35 FTE would be required, and no materials, to account for overhead costs to provide overall program support.	Staff = $480,950 Supplemental Costs = $3,000 Total Annual Costs = $483,950
Visitor Protection	16.5 FTE for would be required, as well as support materials for law enforcement staff such as vehicles, travel, field supplies, fuel, radio support and training.	Staff = $1,321,500.00 Supplemental Costs = $160,000 Total Annual Costs = $1,481,500
~~Natural~~ Resources Management	15.0 FTE would be needed, which could include one full-time wildlife biologist, full-time and seasonal biological technicians, and administrative support. Vehicles, signs, and field gear would be required to support these staff, ~~, as well as signs, field gear, and ATV.~~	Staff = $778,000 Supplemental Costs = $35,000 Total Annual Costs = $813,000
Facility Management	3.6~~0~~ FTE would be needed, which could include the facility manager, heavy equipment operators, mechanics, and other maintenance workers.	Staff = $158,600 Supplemental Costs = $20,000 Total Annual Costs = $178,600
Interpretation	3.0~~0~~ FTE would be needed, which could include the division chief, interpretive rangers, and a visual information specialist. Other costs would include printing and distributing informational materials.	Staff = $181,500 Supplemental Costs = $12,000 Total Annual Costs = $193,500
Total Staffing and Annual Costs	43.45 FTEs	Total Staff Costs = $2,920,550 Total Supplemental Costs = $230,000 Total Annual Costs = $3,150,550
~~Total Annual Cost~~		~~Total Staff Costs = $2,920,550~~ ~~Total Supplemental Costs = $230,000~~ ~~Total Annual Costs = $3,150,550~~

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Park Management / Administration. Under alternative B, park management staff would be routinely involved in ORV management activities and all divisions would require administrative support. This support reflects overhead costs, such as payroll, human resource functions, involvement of the superintendent, and other similar costs. Support would also include assisting in distributing weekly updates of ORV access areas during the spring and summer months. Actions under alternative B would require approximate 5.35 FTE, or over five~~approximately three and a half~~ full-time park management and administrative staff, to support field operations related to ORV management activities. The total approximate cost of these staff would be $480,950, with $3,000 of additional materials required for a total of $483,950. This increase from alternative A would occur due to the varying requirements for when and how buffers are established. Under alternative B, these buffers are larger and subject to more frequent changes—such as when violations occur—and additional updates completed by management~~administrative~~ staff would be required. Further administrative effort would be required due to the addition of a nighttime driving permit. Although this permit can be obtained on-line and at no cost, minimal administrative support would be needed for the hardcopy production and provision to visitors of this permit. Under alternative B, administrative functions related to ORV management would be accomplished within the existing Seashore budget, but would require re-prioritizing work and re-allocating staff time away from other activities, resulting in long-term, moderate, adverse impacts to park

management and administrative operations at the Seashore. These same impacts would be applicable to the administration of the consent decree prior to June 2008, when it was modified.

Visitor Protection. Under alternative B, Seashore law enforcement rangers would be responsible for enforcing visitor compliance with ORV regulations and resource closures. Law enforcement staff would perform routine patrols of beach areas, respond to violations, conduct investigations, and assist in public education through visitor contacts.

Resource closures under alternative B would be larger than those provided under alternative A and would be subject to change on a regular basis, such as when new shorebird breeding is observed or when closures are expanded as a result of deliberate violations or vandalism, resulting in a need for a high level of enforcement related to ORV management. The prohibition of night driving from May 1 through September 15, along with the night driving permit from September 16 through November 15, would require enforcement effort to ensure compliance but would also allow the law enforcement staff to focus its patrol efforts on the hours of allowable use. All recreational users would have access to areas adjacent to resource closures, and there would be variation in the areas available for ORV use, resulting in some users not knowing in advance what areas are open or closed. Under this alternative, the opportunity for resource closure violations would be relatively high due to this unpredictability. Law enforcement would also continue existing resource protection activities such as fielding violation calls and responding to violation incidents.

In order to accomplish the above activities, as well as enforce all applicable regulations at the Seashore, 16.50 FTE would be required, which would be filled by law enforcement rangers. Total approximate labor for these positions would equal $1,321,500 a year with an additional $160,000 needed for materials (e.g., vehicles, travel, field supplies, fuel, radio support, and training costs) for these rangers, for a total approximate annual cost to the law enforcement division of $1,481,500. The increase in effort for law enforcement would be primarily related to the variability of the protected species buffers and secondarily to the implementation of night driving restrictions, as described above.

The Seashore would use currently available funding to fulfill the 16.5 law enforcement positions, and would be able to address all needs related to ORV management under alternative B, but would require re-prioritizing work and re-allocating staff time away from other activities. With this level of funding and staffing, most field law enforcement staff would spend the majority of their time focused on ORV-management related activities and spend less time patrolling other portions of the park such as roads, campgrounds, and parking areas, resulting in long-term, moderate, adverse impacts to law enforcement operations under alternative B. These same impacts would be applicable to the administration of the consent decree prior to June 2008, when it was modified.

Resources Management. Under alternative B, resources management staff would be responsible for all monitoring and establishment of buffers for protected birds, turtles, and seabeach amaranth. Resources management staff would also be responsible for determining monitoring requirements, hiring, training and supervising field staff, and conducting all field surveys. These staff would also provide input into the weekly resource management report updates and access updates that are provided to the public.

For birds, the responsibilities of the resources management staff would be the same as those under alternative A, except that for certain species, such as American oystercatchers and breeding colonial waterbirds, buffer distances would be those used under the consent decree, rather than based on best professional judgment. These buffers would continue to vary with the life cycle of the species and would be expanded if violations of the closures are noted. Resources management responsibilities for turtles and seabeach amaranth would be the same under alternative B as under alternative A.

In addition to regular surveying, monitoring, and establishment of closures, resources management staff would also dedicate time to predator management under alternative B.

In order to accomplish the above activities, the resources management division would require approximately 15.0 FTE, which could include the chief of resources management, a wildlife biologist, seasonal or full-time biological technicians, a GIS specialist, and seasonal administrative assistant support. These positions would equal approximately $778,000 in labor costs. In order to support these positions, overhead costs, computers, uniforms, vehicles, and other equipment (e.g., signs, field gear, UTVs) would be needed, resulting in approximately $35,000 in support costs. The total approximate cost of implementing alternative B to the resources management division would be $813,000. The addition of 5.5 FTE under alternative B, when compared to alternative A, results primarily from the need to establish pre-nesting closures at an earlier date (~~,~~two weeks earlier for most species and~~;~~ monitor pre-nesting areas more frequently than under alternative A, as well as the need to frequently install or modify resource protection areas once shorebird breeding activity is observed. Additional effort would be needed for resources management staff to react to the more variable nature of the resource closures (i.e., expanding buffers for resource violations) and to expand buffers if disturbance to species is noted, per the consent decree. Resources management staff would also have additional responsibilities under alternative B from requirements that direct staff to establish appropriate buffers within eight daylight hours if pre-nesting and/or breeding behavior is observed for piping plover, American ~~oystercatcher~~oystercatchers, or colonial waterbirds, as well as enhanced reporting requirements for resources management staff.

Under alternative B, the Seashore would have noticeable changes in staffing of the resources management division and would require re-prioritizing work and re-allocating staff time away from other activities. With this level of funding and staffing, most resources management field staff would spend the majority of their time focused on ORV-management related species management activities and would have little time to address other field resources management needs, resulting in long-term, moderate, adverse impacts to resources management activities in the Seashore. These same impacts would be applicable to the administration of the consent decree prior to June 2008, when it was modified.

Facility Management. The facility management division at the Seashore would be responsible for all maintenance activities related to ORV management. Facility management personnel would provide routine maintenance and emergency repairs of beach ramps and parking lots and be responsible for maintaining the vehicles used by law enforcement, resources management and other staff associated with ORV management related activities. Approximately 3.6 FTE of facility management time would be needed to carry out ORV management related activities, equaling approximately $158,600 of labor. In addition to the labor, approximately $20,000 of supplies would be required that could include ramp fill material, vehicle parts, and vehicle maintenance supplies. Total annual costs for facility management staff related to ORV management would be approximately $178,600. Under alternative B, the increase in maintenance responsibilities, when compared to alternative A, would be primarily related increased maintenance of ramps and interdunal roads in high ORV use areas.

Under alternative B, the Seashore would be able to conduct facility management activities related to ORV use within existing funding sources, and no other divisions of the Seashore would be impacted by these operations. Because there would be no significant change to Seashore facility management activities, impacts to facility management operations at the Seashore would be long-term, negligible, and adverse. These same impacts would be applicable to the administration of the consent decree prior to June 2008, when it was modified.

Interpretation. Under alternative B, staff in the interpretation division would provide materials to Seashore visitors related to ORV use, as well as species management. Staff time would be required to develop these materials, as well as funds to print and distribute the materials. Interpretive staff under

alternative B could include the division chief, park rangers to provide interpretive programs and manage volunteer programs, and a visual resource specialist to produce articles, displays, brochures, and exhibits. In order to carry out these functions, alternative B would require approximately 3.0 FTE of staff time, equaling approximately $181,500. Printing and other supporting costs would be approximately $12,000, resulting in total approximate annual costs of $193,500 to the interpretive division. Compared to alternative A, specific activities that would require additional staff under alternative B would include assisting in preparing the educational materials that are related to restrictions on nighttime driving, providing additional educational materials on species management and any associated user restrictions, providing protected species information at ORV access points, redesigning and updating the beach access brochure, and continually updating the park's website with access information.

Under alternative B, interpretive functions related to ORV management would be accomplished within the existing Seashore budget, resulting in long-term, negligible, adverse impacts to interpretive operations at the Seashore. These same impacts would be applicable to the administration of the consent decree prior to June 2008, when it was modified.

Overall Impacts to Seashore Operations: Overall, there would be an increase in duties related to ORV management for staff in the Park Management/Administration, Visitor Protection, and ~~Natural~~ Resources Management divisions. Although these staff could accomplish these duties with existing budgets, it would require them to re-prioritize and re-allocate staff, and would not leave staff with adequate time to address other needs at the park outside of ORV management, resulting in long-term moderate adverse impacts. Staff in Facilities Management and Interpretation would not see a large change in operations would be able to accomplish ORV related tasks within current funding, without shifting priorities or having a noticeable change in operations, resulting in long-term negligible adverse impacts to these two divisions.

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, which 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, negligible to moderate impacts of alternative B, are expected to have long-term, negligible to minor, adverse cumulative impacts to park operations and maintenance.

Conclusion. Implementation of alternative B would require approximately 43.45 FTE across the park management, administration, visitor protection, resources management, facilities management, and interpretation divisions. Staff costs would equal approximately $2,920,950, with an additional $230,000 in support costs (e.g., signs, vehicles, materials). Total approximate cost to implement alternative B would be $3,150,550. All staff and equipment requirements in all divisions would be accommodated by existing and expected funding sources; however, alternative B would require that some divisions re-prioritize work and re-allocate staff time away from other activities in order to accommodate ORV management related activities. Overall, impacts to Seashore operations would be long-term moderate adverse.

Cumulative impacts to Seashore operations and management under alternative B would be long-term, minor to moderate, adverse impacts.

Impacts of Alternative C: Seasonal Management

Table 77 provides the total staffing and funding needs under alternative C, Seasonal Management.

TABLE 77. STAFFING AND FUNDING—ALTERNATIVE C

Division	Assumptions	Annual Costs
Park Management / Administration	4.60 FTE would be required, as well as materials, to account for overhead costs to provide overall program support.	Staff = $363,200 Supplemental Costs = $16,900 Total Annual Costs = $380,100
Visitor Protection	21.7 FTE for would be required for law enforcement and visitor use assistant staff, as well as support materials for this staff such as vehicles, travel, field supplies, fuel, radio support and training.	Staff = $1,529,900 Supplemental Costs = $177,000 Total Annual Costs = $1,706,900
~~Natural~~ Resources Management	12.6 FTE would be needed, which could include one full-time wildlife biologist, full-time and seasonal biological technicians, and administrative support. Vehicles, signs, and field gear would be required to support these staff~~,~~ ~~as well as signs, field gear, and ATV.~~	Staff = $645,000 Supplemental Costs = $59,000 Total Annual Costs = $704,000
Facility Management	3.80 FTE would be needed, which could include the facility manager, heavy equipment operators, mechanics, and other maintenance workers.	Staff = $173,800 Supplemental Costs = $25,000 Total Annual Costs = $198,800
Interpretation	3.00 FTE would be needed, which could include the division chief, interpretive rangers, and a visual information specialist. Other costs would include printing and distributing informational materials.	Staff = $181,500 Supplemental Costs = $12,000 Total Annual Costs = $193,500
Total Staffing and Annual Costs	45.7 FTEs	Total Staff Costs = $2,893,400 Total Supplemental Costs = $289,900 Total Annual Costs = $3,183,300
~~Total Annual Cost~~		~~Total Staff Costs = $2,893,400~~ ~~Total Supplemental Costs = $289,900~~ ~~Total Annual Costs = $3,183,300~~

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Park Management / Administration. Under alternative C, park management staff would be routinely involved in ORV management activities and all divisions would require administrative support. This support reflects overhead costs, such as payroll, human resource functions, involvement of the superintendent, and other similar costs. Support would also include assisting in distributing weekly updates of ORV access areas during the spring and summer months, as well as assisting in the administration of the ORV permit system. Actions under alternative C would require approximately 4.60 FTE, or approximately four and a half full-time park management and administrative staff, to support field operations related to ORV management. The total approximate cost of these staff would be $363,200, with an additional $16,900 required for materials. This increase over the no-action alternatives would occur related to the various new programs requiring administrative assistance that would be implemented under alternative C. One such program is the ORV permit, which has a fee subject to cost recovery, that would be distributed in-person or online. Development and administration of the ORV permit system would require park management and administrative staff support. This permit system would also include an educational component requiring the user to pass a basic knowledge test, the administration of which would require support from administrative staff.

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Alternative C also includes the potential for alternative transportation, such as a beach shuttle, through the consideration of a commercial use authorization, which is a kind of permit. Park management support would be required to process and follow up with these permit applications. A requirement for a beach fire permit under alternative C would also require administrative support. In addition to these new requirements, administrative staff would continue to assist with the distribution of weekly resources closure and ORV access updates during the summer breeding season, which may be more consistent since alternative C includes the use of seasonal ORV restrictions in all SMAs, rather than just buffers that vary based on bird behavior.

Under alternative C, the above-described park management and administrative functions related to ORV management would be accomplished within the existing Seashore budget, but would require re-prioritizing work and re-allocating staff time away from other activities, resulting in long-term, minor, adverse impacts to park management and administrative operations at the Seashore.

Visitor Protection. Under alternative C, Seashore law enforcement rangers would be responsible for enforcing visitor compliance with ORV regulations and resource closures. Law enforcement staff would perform routine patrols of beach areas, respond to violations, conduct investigations, and assist in public education through visitor contacts. Alternative C would expand the responsibilities of law enforcement staff since new regulations would be implemented, as described further below.

Under alternative C, resource closures would be implemented on a seasonal basis and remain constant. With more consistency, it would be expected that the number of resource violations would decline from current levels since park users would know what to expect, and accidental resource violations related to not being aware of their location would, in turn, be less. This would reduce the level of effort required by law enforcement staff related to resource violations under alternative C.

Alternative C would implement additional or new park regulations such as requiring an ORV use permit, lowering the speed limit, adding restrictions related to pets and horses, requiring a beach fire permit, monitoring possible beach shuttle permittees, establishing vehicle characteristic and equipment requirements. These additional responsibilities would require law enforcement staff involvement to ensure compliance with these policies and to contact violators as needed, and would include the authority to revoke ORV use permits. The level of effort related to implementing these new policies would be expected to be greater when they are first implemented, while they would become less time-consuming as Seashore users become accustomed to them. In addition, law enforcement would also continue existing resource protection activities, such as fielding violation calls and responding to violation incidents.

Alternative C would also include seasonally prohibiting night driving from 7:00 p.m. to 7:00 a.m. from May 1 to November 15. This change would be a long term benefit for law enforcement staff since during those dates it would allow the Seashore to focus law enforcement coverage on peak use periods during daylight hours. Additional law enforcement effort under alternative C would be required to enforce carrying capacity within each ranger district when the “peak use limit” is reached, as detailed in table 6 in chapter 2. Law enforcement rangers would also be responsible for identifying and implementing the established standards for safety closures under alternative C, resulting in more staff time when these situations are identified.

The implementation of the ORV permit system would require the establishment of a web-based permit issuing process, as well as local permit issuing stations staffed with sufficient visitor use assistants (VUAs) to provide coverage seven days a week year-round.

In order to accomplish the above activities, which includes enforcing all applicable regulations at the Seashore as well as implementing the ORV permit system, 21.7 FTE would be required and would be

filled primarily by law enforcement rangers and visitor use assistants. Total approximate labor for these positions would equal $1,529,900 a year with an additional $177,000 needed for materials (e.g., vehicles, travel, field supplies, fuel, radio support, and training costs) for these rangers, for a total approximate annual cost to the law enforcement division of $1,706,900. The increase in effort for visitor protection would be primarily related to the implementation and enforcement of new regulations and policies at the Seashore, as well as implementation of an ORV permit system, as described above.

The additional demand on Seashore law enforcement staff would be noticeable and require the re-prioritization of work and the re-allocation of staff time away from other activities. The establishment of year-round visitor use assistant staffing to implement the ORV permit system would be an additional new program to administer under alternative C. The Seashore would use currently available funding and expected revenues from ORV permit fees, which would be based on cost recovery, to provide the 21.7 FTEs needed to address these ORV management responsibilities. With this level of funding and staffing, most field law enforcement staff would spend the majority of their time focused on ORV-management related activities and spend less time patrolling other portions of the park such as roads, campgrounds, and parking areas, resulting in long-term, moderate, adverse impacts to law enforcement operations under alternative C.

Resources Management. Under alternative C, resources management staff would be responsible for all monitoring and establishment of buffers for protected birds, turtles, and seabeach amaranth. Resources management staff would also be responsible for determining monitoring requirements, hiring, training and supervising field staff, and conducting all field surveys. These staff would also provide input into the weekly resources management report updates and access updates that are provided to the public. Resources management under alternative C would have elements related to seasonal closures, which would reduce the need to move resource closures around in response to species behavior and reduce the amount of effort needed by resources management staff when compared to management under alternative B. By seasonally closing some areas of known habitat to ORV use such as Bodie Island spit, Cape Point, Hatteras Inlet spit, and South Point, resources management staff would need to install, modify and remove resource closures much less frequently than under alternatives A or B.

Beyond more predictable resource closures, resources management staff would continue to have monitoring responsibilities. Areas that are designated for the use of ML2 measures under alternative C—such as Bodie Island spit, Cape Point, and South Point—would require daily monitoring when pedestrians are allowed to access these areas, even during the seasonal closure to ORV. Areas subject to ML1 measures—the remaining areas closed to ORV and pedestrian use—would be surveyed at least three times a week. While resources management staff would have fewer demands from moving/adjusting closures under alternative C, efforts related to monitoring, particularly those areas designated for ML2 ~~measures,~~measures would generally increase. NPS resources management staff would also have additional responsibilities related to collecting data to evaluate the action in relation to the adaptive management strategy. Areas that would be studied are detailed in table 4 in chapter 2. Sea turtle and seabeach amaranth management activities under alternative C would be similar to those under the no-action alternatives and would not be expected to change the level of effort spent by resources management staff on these activities.

In addition to regular surveying, monitoring, and establishment of closures, resources management staff would also dedicate time to predator management under alternative C.

In order to accomplish the above activities, the resources management division would require approximately 12.6 FTE, which could include the chief of resources management, a wildlife biologist, seasonal or full-time biological technicians, a GIS specialist, and seasonal administrative assist support. These positions would equal approximately $645,000 in labor costs. In order to support these positions,

overhead costs, computers, uniforms, vehicles, and other equipment (e.g., signs, field gear, ATVs/UTVs) would be needed, resulting in approximately $59,000 in support costs. The total approximate cost of implementing alternative C to the resources management division would be $704,000. When compared to the no-action alternatives, alternative C would require more FTE than alternative A, due to more intensive monitoring requirements, but less FTE than alternative B, primarily due to the decrease in staff time related to adjusting resource closures.

Under alternative C, the Seashore would not have a substantial change in staffing in the resources management division and would be able to accommodate staffing needs using existing or expected funding. With this level of funding and staffing, most resources management field staff would spend the majority of their time focused on ORV-management related species management activities and would have little time to address other field resources management needs, resulting in long-term, negligible to minor, adverse impacts to resources management activities in the Seashore.

Facility Management. The facility management division at the Seashore would be responsible for all maintenance activities under alternative C related to ORV management. Facility management personnel would provide routine maintenance and emergency repairs of beach ramps and parking lots and also be responsible for maintaining the vehicles used by law enforcement, resources management and other staff associated with ORV management related activities.

Under alternative C, parking lots would be added at certain areas to provide additional access for pedestrian use, which would require additional staff time by facilities management to establish and maintain. Additional toilet facilities and trash receptacles in high-use locations would also require frequent maintenance that would add to the responsibilities of facility management staff. Alternative C would establish a system for providing additional maintenance to interdunal roads, as well as specifications for the width and condition of ramps to the beach, which would require more time for the maintenance division to carry out the interdunal road maintenance and ensure all ramps meet the new standard. Likewise, the extension of the South Beach interdunal road called for under alternative C would require additional staff time for the actual extension, as well as the maintenance of this area.

Approximately 3.8 FTE of facility management time would be needed to carry out ORV management related activities, equaling approximately $173,800 of labor. In addition to the labor, approximately $25,000 of supplies would be required that could include ramp fill material, vehicle parts, and vehicle maintenance supplies. Total annual costs for facility management staff related to ORV management would be approximately $198,800. Under alternative C, the increase in maintenance responsibilities, when compared to no-action alternatives, would be primarily related to the expanded maintenance requirements for ramps and interdunal roads.

Under alternative C, the Seashore would generally be able to conduct facility management activities related to ORV management within existing and expected funding sources, but would require re-prioritizing work and re-allocating staff time from other maintenance activities. No other divisions of the Seashore would be significantly impacted by these operations although there would be some noticeable changes to facilities management operations. Impacts to facility management operations at the Seashore would be long-term, minor, and adverse.

Interpretation. Under alternative C, interpretation division staff responsibilities would be the same as those detailed under alternative B. In order to carry out these functions, alternative C would require approximately 3.0 FTE of staff time, equaling approximately $181,500. Printing and other supporting costs would be approximately $12,000, resulting in total approximate annual costs of $193,500 to the interpretive division. Compared to alternative A, specific activities that would require additional staff under alternative C would include assisting in preparing the educational materials that are related to

restrictions on nighttime driving, and providing additional educational materials on species management and any associated user restrictions.

Under alternative C, the Seashore would generally be able to conduct interpretive activities related to ORV use and species protection within existing funding sources and no other divisions of the Seashore would be impacted by these operations. Impacts to interpretive activities at the Seashore would be long-term, negligible, and adverse.

Overall Impacts to Seashore Operations: Overall, there would be an increase in duties related to ORV management for staff in the Park Management/Administration, ~~Natural~~ Resources Management, Facilities Management divisions that could result in some re-prioritization of work, but would not be expected to impact overall duties resulting in long-term minor adverse impacts. In the Visitor Protection division, staff could accomplish their duties with existing budgets, but it would require them to re-prioritize and re-allocate staff, and would not leave staff with adequate time to address other needs at the park outside of ORV management, resulting in long-term moderate adverse impacts. Staff in the Interpretation division would not see a large change in operations would be able to accomplish ORV related tasks within current funding, without shifting priorities or having a noticeable change in operations, resulting in long-term negligible adverse impacts.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative C 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. In

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

Conclusion. Implementation of alternative C would require approximately 45.70 FTE across the park management, administration, visitor protection, resources management, facilities management, and interpretation divisions. Staff costs would equal approximately $2,893,400, with an additional $289,900 in support costs (e.g., signs, vehicles, materials). Total approximate cost to implement alternative C would be $3,183,300. All staff and equipment requirements in all divisions would be accommodated by existing and expected funding sources including ORV permit revenue, and would require that some divisions re-prioritize work and re-allocate staff time to accommodate ORV management activities. Overall, impacts to Seashore operations would be long-term, minor to moderate (but mostly minor) adverse.

Cumulative impacts to Seashore operations and management under alternative C would be long-term, minor to moderate, and adverse.

Impacts of Alternative D: Increased Predictability and Simplified Management

Table 78 provides the total staffing and funding needs under alternative D, Increased Predictability and Simplified Management.

TABLE 78. STAFFING AND FUNDING—ALTERNATIVE D

Division	Assumptions	Annual Costs
Park Management / Administration	4.35 FTE would be required, as well as materials, to account for overhead costs to	Staff = $343,950

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Division	Assumptions	Annual Costs
	provide overall program support.	Supplemental Costs = $16,900 Total Annual Costs = $360,850
Visitor Protection	22.5 FTE for would be required for law enforcement and visitor use assistant staff, as well as support materials for this staff such as vehicles, travel, field supplies, fuel, radio support and training.	Staff = $1,591,500 Supplemental Costs = $177,000 Total Annual Costs = $1,768,500
~~Natural~~ Resources Management	11.0 FTE would be needed, which could include one full-time wildlife biologist, full-time and seasonal biological technicians, and administrative support. Vehicles, signs, and field gear would be required to support these staff~~, as well as signs, field gear, and ATV.~~	Staff = $586,500 Supplemental Costs = $63,000 Total Annual Costs = $649,500
Facility Management	3.60 FTE would be needed, which could include the facility manager, heavy equipment operators, mechanics, and other maintenance workers.	Staff = $158,600 Supplemental Costs = $20,000 Total Annual Costs = $178,600
Interpretation	3.00 FTE would be needed, which could include the division chief, interpretive rangers, and a visual information specialist. Other costs would include printing and distributing informational materials.	Staff = $181,500 Supplemental Costs = $12,000 Total Annual Costs = $193,500
Total Staffing and Annual Costs	44.55 FTEs	Total Staff Costs = $2,862,050 Total Supplemental Costs = $288,900 Total Annual Costs = $3,150,950
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Park Management / Administration. Under alternative D, park management staff would be periodically involved in ORV management activities and all divisions would require administrative support. This support reflects overhead costs, such as payroll, human resource functions, involvement of the superintendent, and other similar costs. Support would also include assisting in distributing weekly updates of ORV access areas during the spring and summer months, as well as assisting in the development and administration of the ORV permit system. Alternative D would not include the consideration of commercial use permits for alternative transportation—such as a beach shuttle—or beach fire permits, and therefore there would be no responsibilities for the administrative division related to these activities.

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Actions under alternative D would require approximate 4.35 FTE, or approximately four and a third full-time administrative staff, to support field operations related to ORV management. Total approximate costs of these staff would be $343,950, with additional $16,900 required for materials. This increase over the no-action alternatives would be related to the various new programs requiring administrative assistance that would be implemented under alterative D. One such program is the ORV permit, which has a fee subject to cost recovery, that would be distributed in-person or on-line. Cost-recovery would be expected to be lower than other alternatives as the permit program would be less involved. Production and distribution of this permit would require administrative staff support. This permit system would be

relatively simple to administer since there would be no testing component, only a requirement that the recipient read the rules and sign a statement that they understand the conditions of the permit.

In addition to these new requirements, park management and administrative staff would continue to assist with the distribution of weekly resources closure and ORV access updates during the summer breeding season. Closure and access would be more consistent since alternative D focuses on simplified management that leaves sensitive resource areas closed to ORV use year-round, rather than on buffers that vary based on bird behavior or seasonal management. Night driving would be restricted from 7:00 p.m. to 7:00 a.m. under alternative D, but would not require a separate permit that would necessitate administrative support, and would not undergo periodic review that would require administrative time of the superintendent.

The year-round designation of ORV areas and non-ORV areas would result in fewer changes to beach access status and simplify the public information function compared to other alternatives, though this would not necessarily affect other administrative functions. The Seashore would use currently available funding and expected revenues from ORV permit fees, which would be based on cost recovery, to provide the 4.35 FTE needed to address these ORV management responsibilities, resulting in long-term, negligible, adverse impacts to park management and administrative operations at the Seashore.

Visitor Protection. Under alternative D, Seashore law enforcement rangers would be responsible for enforcing visitor compliance with ORV regulations and resource closures, many of which would occur year-round in resources management areas known as SMAs. Law enforcement staff would perform routine patrols of beach areas, respond to violations, conduct investigations, and assist in public education through visitor contacts. Alternative D would expand some of the responsibilities of law enforcement staff since a few additional regulations would be implemented; however, the year-round designation of ORV areas and non-ORV areas would simplify and reduce the overall law enforcement workload, as described further below.

Under alternative D, resource protection would be simplified and remain constant, in part, through the year-round designation of SMAs as non-ORV areas. With more consistency, it would be expected that the number of resource violations would decline from current levels since park users would know what to expect, and accidental resource violations related to not being aware of their location would in turn be less. This would reduce the level of effort required by law enforcement staff related to violator contacts under alternative D. Implementation of law enforcement duties would further be simplified by eliminating designations for safety or administrative closures, which law enforcement previously would have had to implement.

Alternative D would implement additional or new regulations such as requiring an ORV use permit, lowering the speed limit, adding restrictions related to pets (but not horses), and implementing vehicle characteristic and equipment requirements. These additional responsibilities would require law enforcement staff involvement in ensuring that these policies are being adhered to and contacting violators when necessary, and would include the authority to revoke ORV use permits. The level of effort related to implementing these new policies would be expected to be greater when they are first implemented, while they would become less time-consuming as Seashore users become accustomed to them. In addition, law enforcement would also continue existing resources management related activities such as fielding violation calls and responding to violation incidents.

Alternative D would also include seasonally prohibiting night driving from 7:00 p.m. to 7:00 a.m. from May 1 to November 15. This change would be a long term benefit for law enforcement staff since during those dates it would allow the Seashore to focus law enforcement coverage on peak use periods during

daylight hours. Additional law enforcement effort under alternative D would also be required to enforce the single row parking limitation when necessary, as detailed in table 6 in chapter 2.

The implementation of the ORV permit system would require the establishment of a web-based permit issuing process, as well as local permit issuing stations staffed with sufficient visitor use assistants (VUAs) to provide coverage seven days a week year-round.

In order to accomplish the above activities, as well as enforce all applicable regulations at the Seashore, 22.5 FTE would be required, which would be filled by law enforcement rangers and visitor use assistants. Total approximate labor for these positions would equal $1,591,500 a year with an additional $177,000 needed for materials (e.g., vehicles, travel, field supplies, fuel, radio support, and training costs) for these rangers, for a total approximate annual cost to the visitor protection division of $1,768,500. The increase in visitor protection effort would be primarily related to the implementation and enforcement of new ORV regulations and policies at the Seashore, as well as implementation of an ORV permit system, as described above.

The year-round designation of ORV areas and non-ORV areas would simplify law enforcement operations and the establishment of year-round visitor use assistant staffing to implement the ORV permit system would be an additional new program to administer under alternative D. The Seashore would use currently available funding and expected revenues from ORV permit fees, which would be based on cost recovery, to provide the 22.5 FTEs needed to address these ORV management responsibilities. With this level of funding and staffing, impacts to visitor protection operations under alternative D would be long-term, negligible, and adverse.

Resources Management. Under alternative D, resources management staff would be responsible for all monitoring and establishment of buffers for protected birds, turtles, and seabeach amaranth. Resources management staff would also be responsible for determining monitoring requirements, hiring, training and supervising field staff, and conducting all field surveys. These staff would also provide input into the weekly resources management report updates and access updates that are provided to the public. Resources management effort under alternative D would be centered on monitoring throughout the Seashore. All, SMAs would be designated as non-ORV areas year-round and would all be managed using the ML1 measures during the breeding season, which would result in less frequent monitoring compared to ML2 measures for some SMAs under alternative C. Survey frequency would be reduced under ML1 measures in the SMAs, because with the year-round non-ORV designation, the potential for impacts to the species from human disturbance would be decreased and the need to survey daily would be decreased. Examples of this reduced level of staffing required can be seen in the observation of unfledged chicks. In areas using ML1 measures, piping plover broods would be observed once a day, whereas in area subject to management under the ML2 measures, they would be observed at least one hour each in the a.m. and p.m. daily. Similarly for American oystercatcher broods, under alternative D they would be observed every other day, rather than once daily for at least a half hour. This reduction in monitoring effort in the SMAs during the breeding season would occur for resources management staff across all species. The year-round designation of all SMAs as year round non-ORV areas would also significantly reduce the number and frequency of resource closures that the resources management staff would need to install, modify, and maintain.

NPS resources management staff would have additional responsibilities related to collecting data to evaluate the action in relation to the adaptive management strategy. Areas that would be studied are detailed in table 4 in chapter 2. Sea turtle and seabeach amaranth management activities under alternative D would be similar to those under the no-action alternatives and would not be expected to change the level of effort spent by resources management staff on these activities.

In addition to regular surveying, monitoring, and establishment of closures, resources management staff would also dedicate time to predator management under alternative D.

In order to accomplish the above activities, the resources management division would require approximately 11.1 FTE, which could include the chief of resources management, a wildlife biologist, seasonal or full-time biological technicians, a GIS specialist, and seasonal administrative assistant support. These positions would equal approximately $586,500 in labor costs. In order to support these positions, overhead costs, computers, uniforms, vehicles, and other equipment (e.g., signs, field gear, ATVs/UTVs) would be needed, resulting in approximately $63,000 in support costs. The total approximate cost of implementing alternative D to the resources management division would be $649,500. When compared to the no-action alternatives, alternative D would require more FTE than alternative A, but less FTE than alternative B, primarily due to the decrease in staff time related to adjusting resource closures.

Under alternative D, the Seashore would not have a noticeable change to staffing in the resources management division and would be able to accommodate staffing needs using existing or expected funding. Because any change to Seashore operations of the resources management division could be accommodated with expected funding and noticeable changes are not expected, impacts to resources management activities at the Seashore would be long-term, negligible, and adverse.

Facility Management. The facility management division at the Seashore would be responsible for all maintenance activities under alternative D related to ORV management. Facility management personnel would provide routine maintenance and emergency repairs of beach ramps and parking lots and would also be responsible for maintaining the vehicles used by law enforcement, resources management and other staff associated with ORV management related activities.

Under alternative D, parking lots would be added at certain areas to provide additional access for pedestrian use, which would require additional staff time by facility management to establish and maintain. Additional toilet facilities and trash receptacles in high-use locations would also require frequent maintenance that would add to the responsibilities of facility management staff. Alternative D would not include a system for providing additional maintenance to interdunal roads but would establish specifications for the width and condition of ramps to the beach, which would require more time for the maintenance division to ensure all ramps meet the new standard. No interdunal roads would be extended under alternative D, and no requirements would be added to the maintenance division.

Approximately 3.6 FTE of facility management time would be needed to carry out ORV management activities, equaling approximately $156,600 of labor. In addition to the labor, approximately $20,000 of supplies would be required that could include ramp fill material, vehicle parts, and vehicle maintenance supplies. Total annual costs for facility management staff related to ORV management would be approximately $176,600. Under alternative D, the increase in maintenance responsibilities, when compared to no-action alternatives, would be primarily related to the expanded maintenance requirements for ramps. Since there would be no program for maintenance of the interdunal road, or establishment of new interdunal roads, there would be a slight reduction on the demand to facility maintenance staff when compared to other alternatives.

Under alternative D, the Seashore would be able to conduct facility management activities related to ORV use within existing funding sources, and no other divisions of the Seashore would be impacted by these operations. Because there would be no change to Seashore operations, impacts to facility management operations at the Seashore would be long-term, negligible, and adverse.

Interpretation. Under alternative D, interpretation division staff responsibilities would be the same as those detailed under alternative B. In order to carry out these functions, alternative D would require approximately 3.0 FTE of staff time, equaling approximately $181,500. Printing and other supporting costs would be approximately $12,000, resulting in total approximate annual costs of $193,500 to the interpretive division. Compared to alternative A, specific activities that would require additional staff under alternative D would include assisting in preparing the educational materials that are related to restrictions on nighttime driving, and providing additional educational materials on species management and any associated user restrictions. Alternative D would also include preparing materials for the simplified permit system, and the natural resources management staff would contribute to the materials provided to ORV users.

Under alternative D, the Seashore would be able to conduct interpretive activities related to ORV use and species protection within existing funding sources, and no other divisions of the Seashore would be impacted by these activities. Impacts to interpretive operations at the Seashore would be long-term, negligible, and adverse.

Overall Impacts to Seashore Operations: Overall, there would long-term negligible adverse impacts to all divisions as each division would be expected to execute their duties from existing, or expected, funding sources, without having to re-prioritize staff. These impacts are due, in part, to the expected cost recovery under the proposed permit program.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative D 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, negligible impacts of alternative D, are expected to have long-term, negligible, adverse cumulative impacts to park operations and maintenance.

Conclusion. Implementation of alternative D would require approximately 44.55 FTE across the administrative, law enforcement, resources management, facilities management, and interpretation divisions. Staff costs would equal approximately $2,862,050, with an additional $288,900 in support costs (e.g., signs, vehicles, materials). Total approximate costs to implement alternative D would be $3,150,950. Staff and equipment requirements in all divisions would be accommodated by existing and expected funding sources and would not require the Seashore to remove any activities or shift resources around to accommodate ORV management activities, resulting in long-term negligible adverse impacts.

Cumulative impacts to Seashore operations and management under alternative D would be long-term, negligible, and adverse.

Impacts of Alternative E: Variable Access and Maximum Management

Table 79 provides the total staffing and funding needs under alternative E, Variable Access and Maximum Management.

TABLE 79. STAFFING AND FUNDING—ALTERNATIVE E

Division	Assumptions	Annual Costs
Park Management / Administration	4.60 FTE would be required, as well as materials, to account for overhead costs to	Staff = $363,200

Division	Assumptions	Annual Costs
	provide overall program support.	Supplemental Costs = $196,900 Total Annual Costs = $3830,100
Visitor Protection	27.4 FTE for would be required for law enforcement and visitor use assistant staff, as well as support materials for this staff such as vehicles, travel, field supplies, fuel, radio support and training.	Staff = $1,970,300 Supplemental Costs = $234,400 Total Annual Costs = $2,204,700
~~Natural~~ Resources Management	16.4 FTE would be needed, which could include one full-time wildlife biologist, full-time and seasonal biological technicians, and administrative support. Vehicles, signs, and field gear would be required to support these staff~~, as well as signs, field gear, and ATV~~.	Staff = $854,200 Supplemental Costs = $70,000 Total Annual Costs = $924,200
Facility Management	3.90 FTE would be needed, which could include the facility manager, heavy equipment operators, mechanics, and other maintenance workers.	Staff = $181,400 Supplemental Costs = $30,000 Total Annual Costs = $211,400
Interpretation	3.00 FTE would be needed, which could include the division chief, interpretive rangers, and a visual information specialist. Other costs would include printing and distributing informational materials.	Staff = $181,500 Supplemental Costs = $12,000 Total Annual Costs = $193,500
Total staffing and Annual Costs	55.3 FTEs	Total Staff Costs = $3,550,600 Total Supplemental Costs = $365,900 Total Annual Costs = $3,916,500
~~Total Annual Cost~~		~~Total Staff Costs = $3,550,600~~ ~~Total Supplemental Costs = $365,900~~ ~~Total Annual Costs = $3,916,500~~

Park Management / Administration. Under alternative E, park management staff would be routinely involved in ORV management activities and all divisions would require administrative support. This support reflects overhead costs, such as payroll, human resource functions, involvement of the superintendent, and other similar costs. Support would also include assisting in distributing weekly updates of ORV access areas during the spring and summer months, as well as assisting in the administration of the ORV permit system and administration of permits for any new proposed alternative transportation, such as a beach shuttle. Actions under alternative E would require approximately 4.60 FTE, or approximately four and a half full-time park management and administrative staff, to support field operations related to ORV management. Total approximate costs of these staff would be $363,200, with additional $196,900 required for materials. This increase over the no-action alternatives would be related to the various new programs requiring park management involvement or administrative assistance that would be implemented under alterative E.

Closures and access may be more consistent than in the no-action alternatives, but would still be variable since pass-through corridors would be located in areas subject to ML2 measures, and these areas would be subject to closure when species are present. Night driving would be restricted from 10:00 p.m. to 6:00 a.m. under alternative E, as currently occurs under alternative B.

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New programs, such as a variety of permits, would increase the complexity of ORV management program and increase the need for public information updates. Permits would include an annual and a weekly ORV permit, which has a fee subject to cost recovery, that would be distributed in-person or on-line. This permit system would also include an educational component requiring the user to pass a basic knowledge test, which would require support from administrative staff. In addition to the ORV permits, this alternative would include permits to park-and-stay overnight at designated locations during the breeding season, permits for off-season self-contained vehicle (SCV) camping, beach fire permits, and the potential for commercial use authorizations, a kind of permit, for alternative transportation such as a water taxi service to designated locations. Development and administration of the various permit systems, as well as providing information and updates to the public would require frequent park management involvement and periodic administrative staff support, which would increase the workloads of the respective staff.

Under alternative E, the above-described park management and administrative functions related to ORV management would be accomplished within the existing Seashore budget, but would require re-prioritizing work and re-allocating staff time from other activities, resulting in long-term, minor to moderate, adverse impacts to park management and administrative operations at the Seashore.

Law Enforcement. Under alternative E, Seashore law enforcement rangers would be responsible for enforcing visitor compliance with ORV regulations and resource closures. Law enforcement staff would perform routine patrols of beach areas, respond to violations, conduct investigations, and assist in public education through visitor contacts. Alternative E would considerably expand the responsibilities of law enforcement staff since new regulations would be implemented, a variety of permits would be issued that require field monitoring and enforcement, pass-through corridors would be utilized during the breeding season at some resource sensitive locations, and the hours of allowable night driving during the breeding season would expand compared to alternatives C and D, as described further below. Under alternative E, certain responsibilities related to law enforcement would be the same as those under alternative C, including new policies requiring beach fire permits, restrictions on horses and pets, implementation of an ORV permit system with a testing requirement and a provision that the permit can be revoked by for a violations of the permit terms and conditions, and implementation of vehicle and equipment requirements for ORV drivers. Alternative E would add additional policy elements that the law enforcement staff would be responsible for implementing, including a prohibition on motorcycle use on the beach.

Alternative E would include seasonally prohibiting night driving from 10:00 p.m. to 6:00 a.m. from May 15 to November 15. Starting November 15, selected ORV routes with low ~~or no~~ density or no turtle nests would reopen to nighttime use. The nighttime restrictions would not result in additional law enforcement efforts when compared to alternative B since the hours of the restriction are the same; however, additional effort could be required to patrol those areas that are, or are not, open to use after November 15.

Under alternative E, resource closures would be implemented on a seasonal basis at high use areas such as Bodie Island spit, Cape Point, Hatteras Inlet spit, and South Point, with ORV use allowed in a corridor in SM2 areas. This ORV corridor would be subject to closures in response to observed species breeding and/or fledging activities. Village beaches that permit ORV use in the winter would require 65.6 feet (20 meters) of beach; with less than 65.6 feet (20 meters), the village beach would not be available for ORV use. While this strategy would provide for maximum flexibility, most areas that are open have conditions that could result in their closure; therefore, this strategy c~~w~~ould result in unpredictability regarding which ORV routes and areas would be open for use at any given time. A lack of consistency would be expected to lead to more visitors entering resource closures accidentally because of lack of knowledge regarding which areas are open and which areas are not. This would be expected to lead to an increased effort by law enforcement staff to inform visitors of what areas are open, and to patrol the areas that are not to

ensure violations are not occurring. In addition, law enforcement would also continue to field violation calls and respond to violation incidents.

Additional law enforcement effort under alternative E would also be required to enforce carrying capacity within each ranger district when the "peak use limit" is reached, as detailed in table 6 in chapter 2. Law enforcement rangers would also be responsible for identifying and implementing the established standards for safety closures under alternative E, resulting in more staff time when these situations are identified.

Alternative E includes new corridors and closures that would be patrolled by law enforcement staff. These areas include the ORV corridor in areas managed using the ML2 measures and the closure of soundside ramps where there is no boat launch access.

Alternative E would also include the establishment of designated overnight park-and-stay areas during the breeding season and SCV use areas during the off-season, each with its own permitting requirements. The patrol of these areas and the enforcement of the related terms and conditions that apply to these two new special use areas would be added to the responsibilities of the law enforcement staff.

Under alternative E, multiple types of permits would be available at the Seashore including annual and weekly ORV permits, beach fire permits, permits to park-and-stay overnight at designated locations during the breeding season, and permits for SCV camping during the off-season. The implementation of the ORV permit system would require the establishment of a web-based permit issuing process, as well as local permit issuing stations staffed with sufficient VUAs to provide coverage seven days a week year-round. The permit stations would also distribute the other kinds of permits called for in alternative E, except for commercial use authorizations.

In order to accomplish the above activities, which includes enforcing all applicable regulations at the Seashore as well as implementing the ORV permit system and distributing the various kinds of permits, 27.4 FTE would be required, which would be filled primarily by law enforcement rangers and visitor use assistants, which would represent 10.9 to 14.4 more positions than under the no-action alternatives. Total approximate labor for these positions would equal $1,970,300 year with an additional $234,400 needed for materials (e.g., vehicles, travel, field supplies, fuel, radio support, and training costs) for these rangers, for a total approximate annual cost to the law enforcement division of $2,204,700. The increase in effort for visitor protection would be primarily related to the implementation and enforcement of new ORV regulations and policies at the Seashore, as well as implementation of an ORV permit system and new closure/corridor areas, as described above.

The additional demand on Seashore visitor protection staff under alternative E would be readily apparent, including the establishment of year-round visitor use assistant staffing to issue ORV and related permits. The Seashore would use currently available funding and expected revenues from ORV permits fees, which would be based on cost recovery, to provide the 27.4 FTE needed to address these ORV management responsibilities, but this alternative would also require re-prioritizing work and re-allocating staff time away from other activities. With this level of funding and staffing, most field law enforcement staff would spend the majority of their time focused on ORV-management related activities and would spend less time patrolling other portions of the park such as roads, campgrounds, and parking areas, resulting in long-term, moderate, adverse impacts to visitor protection operations.

Resources Management. Under alternative E, resources management staff would be responsible for all monitoring and establishment of buffers for protected birds, turtles, and seabeach amaranth. Resources management staff would also be responsible for determining monitoring requirements, hiring, training and supervising field staff, and conducting all field surveys. These staff would also provide input into the weekly resources management report updates and access updates that are provided to the public.

Resources management under alternative E would more complex than under alternatives C or D due, in part, to providing an ORV or pedestrian corridor in areas under ML2 procedures during the breeding season if resource conditions allow it.

Alternative E would require more frequent monitoring and more frequent fencing changes when breeding activity is observed than alternatives C or D. Areas under ML2 procedures under alternative E—such as Bodie Island spit, Cape Point, and South Point—would generally require daily monitoring once shorebird breeding activity is observed. Although this alternative provides the visitor with flexibility, the continual monitoring and implementation of resource closures as needed would require additional resources management staff to implement.

NPS resources management staff would also have additional responsibilities related to collecting data to evaluate the action in relation to the adaptive management strategy. Areas that would be studied are detailed in table 4 in chapter 2. Sea turtle and seabeach amaranth management activities under alternative E would be similar to those under the no-action alternatives and would not be expected to change the level of effort spent by resources management staff on these activities.

In addition to regular surveying, monitoring, and establishment of closures, resources management staff would also dedicate time to predator management under alternative E.

In order to accomplish the above activities, the resources management division would require approximately 16.4 FTE, which could include the chief of resources management, a wildlife biologist, additional seasonal or full-time biological technicians, a GIS specialist, and seasonal administrative assist support. These positions would equal approximately $854,200 in labor costs. In order to support these positions, overhead costs, computers, uniforms, vehicles and other equipment (e.g., signs, field gear, ATVs/UTVs) would be needed, resulting in approximately $70,000 in support costs. The total approximate cost of implementing alternative E to the resources management division would be $924,200. Alternative E would require more FTE to implement than alternatives A, B, C or D due to the increased monitoring and the number of fencing changes required to provide increased flexibility in visitor access.

The additional demand on Seashore resources management staff under alternative E would be readily apparent. The Seashore would use currently available funding and expected revenues from ORV permits fees, which would be based on cost recovery, to provide the 16.4 FTE needed to address these ORV management responsibilities, but this alternative would also require re-prioritizing work and re-allocating staff time away from other activities. With this level of funding and staffing, most field resources management staff would spend the majority of their time focused on ORV-management related activities and would have little time to address other field resources management needs, resulting in long-term, moderate, adverse impacts to resources management operations at the Seashore.

Facility Management. The facility management division at the Seashore would be responsible for all maintenance activities under alternative E. Related to ORV management, facility management personnel would provide routine maintenance and emergency repairs of beach ramps and parking lots and would also be responsible for maintaining the vehicles used by law enforcement, resources management and other staff associated with ORV management activities. As with alternative C, staff would also be responsible for the establishment and maintenance of parking lots in pedestrian areas, additional toilet facilities, and trash receptacles in high-use areas, the expansion of and establishment of interdunal roads, and the implementation of a system to improve the interdunal roads.

Under alternative E, additional facility management time would be required to maintain the SCV areas during the off-season, as well as maintain the soundside parking and access points that would be implemented.

Approximately 3.9 FTE of facility management time would be needed to carry out ORV management activities, equaling approximately $181,400 of labor. In addition to the labor, approximately $30,000 of supplies would be required that could include ramp fill material, vehicle parts, and vehicle maintenance supplies. Total annual costs for facility management staff related to ORV management would be approximately $211,400. Under alternative E, the increase in maintenance responsibilities, when compared to the no action alternatives, would be primarily related to the expanded maintenance requirements for ramps and interdunal roads, parking areas, and other new uses such as the SCV areas.

Under alternative E, the Seashore would generally be able to conduct facility management activities related to ORV management within existing and expected funding sources, but would require re-prioritizing work and re-allocating staff time from other maintenance activities. No other divisions of the Seashore would be significantly impacted by these operations. Although there would be some noticeable changes to the divisions activities, impacts to facility management operations at the Seashore would be long-term, minor, and adverse.

Interpretation. Under alternative E, interpretation division staff responsibilities would be the same as those detailed under alternative B. In order to carry out these functions, alternative E would require approximately 3.0 FTE of staff time, equaling approximately $181,500. Printing and other supporting costs would be approximately $12,000, resulting in total approximate annual costs of $193,500 to the interpretive division. Compared to alternative A, specific activities that would require additional staff under alternative E would include assisting in preparing the educational materials that are related to restrictions on nighttime driving and providing additional educational materials on species management and any associated user restrictions.

Under alternative E, the Seashore would generally be able to conduct interpretive activities related to ORV use and species protection within existing and expected funding sources and no other divisions of the Seashore would be impacted by these operations. Although there would be some changes to division activities, impacts to interpretive operations at the Seashore there would be long-term, negligible, adverse.

Overall Impacts to Seashore Operations: Overall, there would be an increase in duties related to ORV management for staff in the Facilities Management division that could result in some re-prioritization of work, but would not be expected to impact overall duties resulting in long-term minor adverse impacts. In the Park Management/Administration division, the increase in ORV related responsibilities would be similar, but slightly greater with long-term minor to moderate adverse impacts. In the Visitor Protection and ~~Natural~~ Resources Management divisions, staff could accomplish their duties with existing budgets, but it would require them to re-prioritize and re-allocate staff, and would not leave staff with adequate time to address other needs at the park outside of ORV management, resulting in long-term moderate adverse impacts. Staff in the Interpretation division would not see a large change in operations would be able to accomplish ORV related tasks within current funding, without shifting priorities or having a noticeable change in operations, resulting in long-term negligible adverse impacts.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative E 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 negligible to moderate impacts of alternative E, are expected to have long-term, minor to moderate adverse cumulative impacts to park operations and maintenance.

Conclusion. Implementation of alternative E would require approximately 55.3 FTE across the park management, administrative, visitor protection, resources management, facilities management, and interpretation divisions. Staff costs would equal approximately $3,550,600, with an additional $365,900 in support costs (e.g., signs, vehicles, materials). Total approximate cost to implement alternative E would be $3,916,500. Not all staffing and equipment requirements needed to implement alternative E would be accommodated by existing and expected funding sources, and could require re-prioritization in some divisions, with funding needs being partially off-set by ORV permit fee revenues. Overall impacts to Seashore operations would be long-term moderate adverse.

Cumulative impacts to Seashore operations and management under alternative E would be long-term, minor to moderate, and adverse.

Impacts of Alternative F: Management Based on Advisory Committee Input

Table 80 provides the total staffing and funding needs under alternative F, Management Based on Advisory Committee Input.

TABLE 80. STAFFING AND FUNDING—ALTERNATIVE F

Division	Assumptions	Annual Costs
Park Management / Administration	4.60 FTE would be required, as well as materials, to account for overhead costs to provide overall program support.	Staff = $363,200 Supplemental Costs = $19,900 Total Annual Costs = $383,100
Visitor Protection	25.9 FTE for would be required for law enforcement and visitor use assistant staff, as well as support materials for this staff such as vehicles, travel, field supplies, fuel, radio support and training.	Staff = $1,853,300 Supplemental Costs = $225,000 Total Annual Costs = $2,078,300
~~Natural~~ Resource~~s~~ Management	14.70 FTE would be needed, which could include one full-time wildlife biologist, full-time and seasonal biological technicians, and administrative support. Vehicles, signs, and field gear would be required to support these staff, ~~, as well as signs, field gear, and ATV.~~	Staff = $785,700 Supplemental Costs = $65,000 Total Annual Costs = $850,700
Facility Management	3.90 FTE would be needed, which could include the facility manager, heavy equipment operators, mechanics, and other maintenance workers.	Staff = $181,400 Supplemental Costs = $30,000 Total Annual Costs = $211,400
Interpretation	3.00 FTE would be needed, which could include the division chief, interpretive rangers, and a visual information specialist. Other costs would include printing and distributing informational materials.	Staff = $181,500 Supplemental Costs = $12,000 Total Annual Costs = $193,500
Total Staffing and Annual Costs	52.1 FTEs	Total Staff Costs = $3,365,100 Total Supplemental Costs = $351,900 Total Annual Costs = $3,717,000

Division	Assumptions	Annual Costs
~~Total Annual Cost~~		~~Total Staff Costs = $3,365,100~~ ~~Total Supplemental Costs = $351,900~~ ~~Total Annual Costs = $3,717,000~~

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Park Management / Administration. Under alternative F, park management staff would be routinely involved in ORV management activities and all divisions would require administrative support. This support reflects overhead costs, such as payroll, human resource functions, involvement of the superintendent, and other similar costs. Support would also include assisting in distributing weekly updates of ORV access areas during the spring and summer months, as well as assisting in the administration of the ORV permit. Actions under alternative E would require approximately 4.60 FTE, or approximately four and a half -full-time park management and administrative staff, to support field operations related to ORV management. Total approximate costs of these staff would be $363,200, with additional $19,900 required for materials. This increase over the no-action alternatives would be related to the various new programs requiring park management involvement or administrative assistance that would be implemented under alterative F.

Closures and access may be more consistent than in the no-action alternatives, but would still be variable since ORV access corridors would be located two of the three areas under ML2 procedures (with the third area containing a pedestrian corridor), and these areas would be subject to closure when species are present. Night driving would be seasonally restricted from one hour after sunset until turtle patrol has checked the beach in the morning (approximately ½ after sunrise) under alternative F, which would require a higher level of management for all divisions due to the variability of the closure.

New programs, such as a variety of ORV permits, would increase the complexity of the ORV management program and increase the need for public information updates. Permits would include an annual and a weekly ORV permit, which has a fee subject to cost recovery, that would be distributed in-person or on-line. This permit system would also include an educational component requiring the user to pass a basic knowledge test, which would require support from administrative staff. Development and administration of the permit system, as well as providing information and updates to the public would require frequent park management involvement and periodic administrative staff support, which would increase the workloads of the respective staff.

Under alternative F, the above-described park management and administrative functions related to ORV management would be accomplished within the existing Seashore budget, but would require re-prioritizing work and re-allocating staff time from other activities that would likely not be noticeable, resulting in long-term, minor, adverse impacts to park management and administrative operations at the Seashore.

Law Enforcement. Under alternative F, Seashore law enforcement rangers would be responsible for enforcing visitor compliance with ORV regulations and resource closures. Law enforcement staff would perform routine patrols of beach areas, respond to violations, conduct investigations, and assist in public education through visitor contacts. Alternative F would considerably expand the responsibilities of law enforcement staff since new regulations would be implemented, permits would be issued that require field monitoring and enforcement, ORV access corridors utilized during the breeding season at some resource sensitive locations, and the hours of allowable night driving during the breeding season would be variable based on sunset and turtle patrol activities, as described further below. Under alternative F, certain responsibilities related to law enforcement would be the same as those under alternative C, including new policies requiring beach fire permits, restrictions on horses and pets, implementation of an ORV permit

system with a testing requirement and a provision that the permit can be revoked by for a violations of the permit terms and conditions, and implementation of vehicle and equipment requirements for ORV drivers. When compared to alternative E, less resources would be needed since there would be no special provisions for ORV night access during the breeding season~~camping~~ (~~either~~ "park-and-stay") or for off-season ~~or~~ SCV camping~~)~~ under alternative F.

Alternative F would include seasonally prohibiting night driving from one hour after sunset until turtle patrol has checked the beach in the morning (approximately ½ after sunrise) from May 1 to November 15. Starting November 15, selected ORV routes with low or no density turtle nests would reopen to nighttime use. The nighttime restrictions would not result in additional law enforcement efforts when compared to alternative B since the hours of the restriction are the similar; however, additional effort could be required to patrol those areas that are, or are not, open to use after November 15, as described under alternative E.

Under alternative E, resource closures would be implemented on a seasonal basis at high use areas such as Bodie Island spit, Cape Point, and South Point, with ORV use allowed in a corridor under ML2 management at Cape Point and South Point, with a pedestrian access corridor at Bodie Island Spit. The ORV corridor would be subject to closures in response to observed species breeding and/or fledging activities. While alternative F, like alternative E, would provide for maximum flexibility, most areas that are open have conditions that could result in their closure; therefore, this strategy c~~w~~ould result in unpredictability regarding which ORV routes and areas would be open for use at any given time. A lack of consistency would be expected to lead to more visitors entering resource closures accidentally because of lack of knowledge regarding which areas are open and which areas are not. This would be expected to lead to an increased effort by law enforcement staff to inform visitors of what areas are open, and to patrol the areas that are not to ensure violations are not occurring. In addition, law enforcement would also continue to field violation calls and respond to violation incidents.

Additional law enforcement effort under alternative F would also be required to enforce carrying capacity within each ranger district when the "peak use limit" is reached, as detailed in table 6 in chapter 2. Law enforcement rangers would also be responsible for identifying and implementing the established standards for safety closures under alternative F, resulting in more staff time when these situations are identified.

Alternative F includes new access to the soundside would be patrolled by law enforcement staff, including on Ocracoke.

In order to accomplish the above activities, which includes enforcing all applicable regulations at the Seashore as well as implementing the ORV permit system and distributing the various kinds of permits, 25.9 FTE would be required, which would be filled primarily by law enforcement rangers and visitor use assistants, which would represent 12.9 to 9.4 more positions than under the no-action alternatives. Total approximate labor for these positions would equal $1,853,300 year with an additional $225,000 needed for materials (e.g., vehicles, travel, field supplies, fuel, radio support, and training costs) for these rangers, for a total approximate annual cost to the law enforcement division of $2,078,000. The increase in effort for visitor protection would be primarily related to the implementation and enforcement of new ORV regulations and policies at the Seashore, as well as implementation of an ORV permit system and new closure/corridor areas, as described above.

The additional demand on Seashore visitor protection staff under alternative F would be readily apparent, including the establishment of year-round visitor use assistant staffing to issue ORV permits. The Seashore would use currently available funding and expected revenues from ORV permits fees, which would be based on cost recovery, to provide the 25.9 FTE needed to address these ORV management responsibilities, but this alternative would also require re-prioritizing work and re-allocating staff time away from other activities to some degree. With this level of funding and staffing, most field law

enforcement staff would spend the majority of their time focused on ORV-management related activities and would spend less time patrolling other portions of the park such as roads, campgrounds, and parking areas but would be expected to have more time for these activities than under alternative E, resulting in long-term, minor to moderate, adverse impacts to visitor protection operations.

Resources Management. Under alternative F, resources management staff would be responsible for all monitoring and establishment of buffers for protected birds, turtles, and seabeach amaranth. Resources management staff would also be responsible for determining monitoring requirements, hiring, training and supervising field staff, and conducting all field surveys. These staff would also provide input into the weekly resources management report updates and access updates that are provided to the public. Resources management under alternative F would more complex than under alternatives C or D due, in part, to providing an ORV or pedestrian corridor areas under ML2 procedures during the breeding season if resource conditions allow it, but would be slightly less complex than alternative E, which provides more access for visitors.

Alternative F would require more frequent monitoring and more frequent fencing changes when breeding activity is observed than alternatives C or D. Areas that are under ML2 procedures—such as Bodie Island spit, Cape Point, and South Point—would generally require daily monitoring once shorebird breeding activity is observed. Although this alternative provides the visitor with flexibility, the continual monitoring and implementation of resource closures as needed would require additional resources management staff to implement.

NPS resources management staff would also have additional responsibilities related to collecting data to evaluate the action in relation to the adaptive management strategy. Areas that would be studied are detailed in table 4 in chapter 2. Sea turtle and seabeach amaranth management activities under alternative F would be similar to those under the no-action alternatives and would not be expected to change the level of effort spent by resources management staff on these activities.

In addition to regular surveying, monitoring, and establishment of closures, resources management staff would also dedicate time to predator management under alternative F.

In order to accomplish the above activities, the resources management division would require approximately 14.7 FTE, which could include the chief of resources management, a wildlife biologist, additional seasonal or full-time biological technicians, a GIS specialist, and seasonal administrative assist support. These positions would equal approximately $785,700 in labor costs. In order to support these positions, overhead costs, computers, uniforms, vehicles and other equipment (e.g., signs, field gear, ATVs/UTVs) would be needed, resulting in approximately $65,000 in support costs. The total approximate cost of implementing alternative F to the resources management division would be $850,700. Alternative F would require more FTE to implement than alternatives A, B, C or D (but less than E) due to the increased monitoring and the number of fencing changes required to provide increased flexibility in visitor access.

The additional demand on Seashore resources management staff under alternative F would be readily apparent. The Seashore would use currently available funding and expected revenues from ORV permits fees, which would be based on cost recovery, to provide the 14.7 FTE needed to address these ORV management responsibilities, but this alternative would also require re-prioritizing work and re-allocating staff time away from other activities. With this level of funding and staffing, most field resources management staff would spend the majority of their time focused on ORV-management related activities and would have little time to address other field resources management needs, resulting in long-term, moderate, adverse impacts to resources management operations at the Seashore.

Facility Management. The facility management division at the Seashore would be responsible for all maintenance activities under alternative F. Related to ORV management, facility management personnel would provide routine maintenance and emergency repairs of beach ramps and parking lots and would also be responsible for maintaining the vehicles used by law enforcement, resources management and other staff associated with ORV management activities. As with alternative C, staff would also be responsible for the establishment and maintenance of parking lots in pedestrian areas, additional toilet facilities, and trash receptacles in high-use areas, the expansion of and establishment of interdunal roads, and the implementation of a system to improve the interdunal roads. The addition of soundside access under alternative F would also create additional maintenance responsibilities.

Approximately 3.9 FTE of facility management time would be needed to carry out ORV management activities, equaling approximately $181,400 of labor. In addition to the labor, approximately $30,000 of supplies would be required that could include ramp fill material, vehicle parts, and vehicle maintenance supplies. Total annual costs for facility management staff related to ORV management would be approximately $211,400. Under alternative F, the increase in maintenance responsibilities, when compared to the no action alternatives, would be primarily related to the expanded maintenance requirements for ramps and interdunal roads, parking areas, and other new access points.

Under alternative F, the Seashore would generally be able to conduct facility management activities related to ORV management within existing and expected funding sources, but would require re-prioritizing work and re-allocating staff time from other maintenance activities. No other divisions of the Seashore would be significantly impacted by these operations. Although there would be some noticeable changes to the divisions activities, impacts to facility management operations at the Seashore would be long-term, minor, and adverse.

Interpretation. Under alternative F, interpretation division staff responsibilities would be the same as those detailed under alternative B. In order to carry out these functions, alternative F would require approximately 3.0 FTE of staff time, equaling approximately $181,500. Printing and other supporting costs would be approximately $12,000, resulting in total approximate annual costs of $193,500 to the interpretive division. Compared to alternative A, specific activities that would require additional staff under alternative F would include assisting in preparing the educational materials that are related to restrictions on nighttime driving and providing additional educational materials on species management and any associated user restrictions.

Under alternative F, the Seashore would generally be able to conduct interpretive activities related to ORV use and species protection within existing and expected funding sources and no other divisions of the Seashore would be impacted by these operations. Although there would be some changes to division activities, impacts to interpretive operations at the Seashore there would be long-term, negligible, adverse.

Overall Impacts to Seashore Operations: Overall, there would be an increase in duties related to ORV management for staff in the Facilities Management and Park Management/Administration divisions that could result in some re-prioritization of work, but would not be expected to impact overall duties resulting in long-term minor adverse impacts. In the Visitor Protection and ~~Natural~~ Resources Management divisions, staff could accomplish their duties with existing budgets, but it would require them to re-prioritize and re-allocate staff, and would not leave staff with adequate time to address other needs at the park outside of ORV management, resulting in long-term moderate adverse impacts. Staff in the Interpretation division would not see a large change in operations would be able to accomplish ORV related tasks within current funding, without shifting priorities or having a noticeable change in operations, resulting in long-term negligible adverse impacts.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative F 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 negligible to moderate impacts of alternative E, are expected to have long-term, minor to moderate adverse cumulative impacts to park operations and management.

Conclusion. Implementation of alternative F would require approximately 52.10 FTE across the park management, administrative, visitor protection, resources management, facilities management, and interpretation divisions. Staff costs would equal approximately $3,365,100, with an additional $351,900 in support costs (e.g., signs, vehicles, materials). Total approximate cost to implement alternative F would be $3,717,000. Not all staffing and equipment requirements needed to implement alternative F would be accommodated by existing and expected funding sources, and could require re-prioritization in some divisions, with funding needs being partially off-set by ORV permit fee revenues. Overall impacts to Seashore operations would be long-term minor to moderate adverse.

Cumulative impacts to Seashore operations and management under alternative F would be long-term, minor to moderate, and adverse.

TABLE 81. SUMMARY OF IMPACTS TO SEASHORE MANAGEMENT AND OPERATIONS UNDER THE ALTERNATIVES

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Overall, each division could accomplish within current funding, without shifting priorities or having a noticeable change in operations, resulting in long-term negligible adverse impacts to all areas of Seashore operations. Cumulative impacts would be long-term negligible adverse.	Overall, there would be an increase in duties related to ORV management for staff in the Park Management/Administration, Visitor Protection, and ~~Natural~~ Resources Management divisions. Although these staff could accomplish these duties within existing budgets, it would require them to re-prioritize and re-allocate staff, and would not leave staff with adequate time to address other needs at the park outside of ORV management, resulting in long-term moderate adverse impacts. Staff in Facilities Management and Interpretation would not see a large change in operations would be able to accomplish ORV related tasks within current funding, without shifting priorities or having a noticeable change in operations, resulting in long-term negligible adverse impacts to these two divisions. Overall, impacts to Seashore operations would be long-term moderate adverse. Cumulative impacts would be long-term negligible to minor adverse.	Overall, there would be an increase in duties related to ORV management for staff in the Park Management/Administration, ~~Natural~~ Resources Management, Facilities Management divisions that could result in some re-prioritization of work, but would not be expected to impact overall duties resulting in long-term minor adverse impacts. In the Visitor Protection division, staff could accomplish thier duties with existing budgets, but it would require them to re-prioritize and re-allocate staff, and would not leave staff with adequate time to address other needs at the park outside of ORV management, resulting in long-term moderate adverse impacts. Staff in the Interpretation division would not see a large change in operations would be able to accomplish ORV related tasks within current funding, without shifting priorities or having a noticeable change in operations, resulting in long-term negligible adverse impacts Overall, impacts to Seashore operations would be long-term, minor to moderate (but mostly minor) adverse. Cumulative impacts would be long-term minor to moderate adverse.	Overall, there would long-term negligible adverse impacts to all divisions as each division would be expected to execute their duties from existing, or expected, funding sources, without having to re-prioritize staff. These impacts are due, in part, to the expected cost recovery under the proposed permit program. Cumulative impacts would be long-term negligible adverse	Overall, there would be an increase in duties related to ORV management for staff in the Facilities Management division that could result in some re-prioritization of work, but would not be expected to impact overall duties resulting in long-term minor adverse impacts. In the Park Management / Administration division, the increase in ORV related responsibilities would be similar, but slightly greater with long-term minor to moderate adverse impacts. In the Visitor Protection and ~~Natural~~ Resources Management divisions, staff could accomplish their duties with existing budgets, but it would require them to re-prioritize and re-allocate staff, and would not leave staff with adequate time to address other needs at the park outside of ORV management, resulting in long-term moderate adverse impacts. Staff in the Interpretation division would not see a large change in operations would be able to accomplish ORV related tasks within current funding, without shifting priorities or having a noticeable change in operations, resulting in long-term negligible adverse impacts. Overall impacts to Seashore operations would be long-term moderate adverse. Cumulative impacts would be long-term minor to moderate adverse.	Overall, there would be an increase in duties related to ORV management for staff in the Facilities Management and Park Management/Administration divisions that could result in some re-prioritization of work, but would not be expected to impact overall duties resulting in long-term minor adverse impacts. In the Visitor Protection and ~~Natural~~ Resources Management divisions, staff could accomplish their duties with existing budgets, but it would require them to re-prioritize and re-allocate staff, and would not leave staff with adequate time to address other needs at the park outside of ORV management, resulting in long-term moderate adverse impacts. Staff in the Interpretation division would not see a large change in operations would be able to accomplish ORV related tasks within current funding, without shifting priorities or having a noticeable change in operations, resulting in long-term negligible adverse impacts. Overall impacts to Seashore operations would be long-term minor to moderate adverse. Cumulative impacts would be long-term minor to moderate adverse.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

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