

**From:** [Mike Murray](#)  
**To:** [Darrell Echols](#)  
**Cc:** [Thayer Broili](#); [Doug McGee](#)  
**Subject:** please discuss  
**Date:** 10/05/2009 08:01 AM  
**Attachments:** [CAHA CH 2.x04.Species Mgmt Table-092409.doc](#)

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Darrell,

When you discuss the draft Desired Future Conditions for colonial waterbirds (Tim Pinion's draft) with Thayer and RM staff, also please discuss the "Adaptive Management Initiatives" (for birds) on page 8 of Table 5 Species Management Strategies for the ORV DEIS (attached). There are a number of initiatives identified in the plan. All seem worthwhile; however, the way the section is worded, it indicates we **will** do everything listed. My question: Is that a realistic commitment to make over a 10-15 year period? If not, do we need to pare down the list to a smaller number of the most important items, or do we need to qualify the wording (e.g., change "will" to "would" or something similar). On the other hand, the AM initiatives would become meaningless if we were to be too noncommittal and substitute "may" for "will" in every item. It would have the effect of a discretionary conservation measures, which sound good but doesn't mean it would actually get done. I think we need to make a clear commitment to do some AM initiatives over a 10-15 year period; I'm just not sure the number of initiatives listed is realistic, so maybe we need to reduce the number. In contrast to the AM initiatives for birds, the AM initiatives for sea turtles on page 11 seem reasonable and realistic to me, and I can envision getting them done.

In any case, please discuss with Thayer and staff, and submit comments to Louis Berger (and copy me) on any modifications of this section.



CAHA CH 2.x04.Species Mgmt Table-092409.doc

Thanks,

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TABLE 5. SPECIES MANAGEMENT STRATEGIES FOR ACTION ALTERNATIVES

Definitions	
	<p><b>Breeding behavior:</b> Shorebird behavior that includes, but is not limited to, territorial behavior, courtship, mating, scraping, confirmed scrapes, and other breeding or nest-building activities.</p> <p><b>Human disturbance:</b> Any human activity that changes the contemporaneous behavior of one or more individuals of breeding, nesting, foraging, or roosting colonial waterbirds, piping plover, Wilson's plover, or American oystercatcher. Behaviors indicating disturbance include defensive displays; alarm calls; flushing or leaving a nest or feeding area; and diving or mobbing pedestrians, dogs, or vehicles.</p> <p><b>Periodic review:</b> A systematic review of data, habitat conditions, and other information to be conducted by NPS every 5 years, after a major hurricane, or after a significant change in protected species status (e.g., listing or de-listing), in order to evaluate the effectiveness of management actions in making progress toward the accomplishment of stated objectives. Periodic review could result in changes to the management actions in order to improve effectiveness.</p> <p><b>Pre-nesting closure:</b> A kind of resource closure in which an area of suitable habitat is proactively closed to ORVs and pedestrians at the start of the shorebird breeding season to provide undisturbed habitat for bird breeding activities to occur.</p> <p><b>Research area:</b> Area of suitable habitat set aside on a temporary or long-term basis (such as a study site or control plot) as part of a research project authorized by NPS under a research permit.</p> <p><b>Resource closure:</b> Any area posted as closed to all public entry in order to protect wildlife, such as breeding and foraging shorebirds and bird and turtle nests, or vegetation from human disturbance.</p> <p><b>Species Management Area (SMA):</b> Area of suitable habitat that has had concentrated and recurring use by multiple individuals and/or multiple species of protected shorebirds during the breeding season or nonbreeding season, or concentrations of seabeach amaranth specimens, in more than 1 (i.e., 2 or more) of the past 5 years and is managed to reduce or minimize human disturbance. Currently designated SMAs are listed at the end of this table. SMAs will be re-evaluated and re-designated every 5 years, or after major hurricanes, as part of the periodic review process described at the end of this table.</p> <p>- <b>Breeding Shorebird SMA:</b> Area of suitable breeding habitat that has had multiple nests of individuals and/or multiple species of protected shorebirds, or concentrations of seabeach amaranth specimens, in more than 1 (i.e., 2 or more) of the past 5 years and is managed to minimize human disturbance during the breeding season. Focal species for Breeding Shorebird SMAs include piping plover, Wilson's plover, American oystercatcher, least tern, common tern, gull-billed tern, and black skimmer; however, there will be ongoing evaluation of the breeding shorebird species addressed by this plan, as part of the periodic review process described at the end of this table. The following areas have been designated as Breeding Shorebird SMAs:</p> <ul style="list-style-type: none"> <li>o Bodie Island Spit: 0.2 miles south of ramp 4 to inlet</li> <li>o Ramp 27 to ramp 30</li> <li>o New ramp 32.5 to ramp 34</li> <li>o Approximately 1.7 miles south of ramp 38 to north boundary of Buxton</li> <li>o Cape Point: 0.2 miles south of ramp 44 to ramp 45</li> <li>o South Beach: Ramp 45 to new ramp 47</li> <li>o Hatteras Inlet Spit: Ocean shoreline south of Pole Road to soundside of inlet</li> <li>o North Ocracoke Spit: Inlet to 0.25 miles northeast of ramp 59</li> <li>o 0.5 miles southwest of ramp 68 to 1.2 miles north of ramp 70</li> <li>o South Point Ocracoke: 0.5 miles southwest of ramp 72 to inlet</li> </ul> <p>- <b>Nonbreeding Shorebird SMA:</b> Area of suitable nonbreeding habitat that has had concentrated foraging by migrating/wintering shorebirds in</p>

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<p>more than 1 (i.e., 2 or more) of the past 5 years and is managed to reduce human disturbance during the nonbreeding season. This may include portions of breeding SMAs that provide suitable nonbreeding habitat during periods of overlap between the breeding and migrating season and designated non-ORV areas that are set aside to provide pedestrians with the opportunity for a natural beach experience.</p> <p><b>Species Management 1 (SM1):</b> An approach to shorebird protection during the breeding season that will use larger, longer-lasting buffers with less monitoring to reduce the need for more frequent monitoring and fencing changes.</p> <p><b>Species Management 2 (SM2):</b> An approach to shorebird protection during the breeding season that will use smaller buffers and will require more frequent monitoring and fencing changes when an ORV or pedestrian access corridor is open at designated locations during the breeding season.</p>
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Management Activity	Shorebirds		
	Piping Plover	American Oystercatcher and Wilson's Plover	Colonial Waterbirds, including Least Terns, Common Terns, Gull-Billed Terns, and Black Skimmers
<b>Pre-Nesting Surveys</b>	<p>By Mar 1: NPS staff will evaluate all potential breeding habitat and recommend piping plover pre-nesting closures based on that evaluation.</p> <p>Mar 15 to Jul 15: Pre-nesting closures will be surveyed three times per week.</p> <p>Outside of pre-nesting closures, suitable habitat will be surveyed twice per week, increasing to three times per week once birds are present.</p>	<p>Mar 15 to Jul 15: Pre-nesting closures will be surveyed three times per week.</p> <p>Outside of pre-nesting closures, suitable habitat will be surveyed twice per week, increasing to three times per week once breeding pairs are present.</p>	<p>May 1 to Jul 15: Pre-nesting closures will be surveyed three times per week.</p> <p>Outside of pre-nesting closures, suitable habitat will be surveyed twice per week, increasing to three times per week once breeding pairs are present.</p>
<b>Pre-Nesting Closures</b>	<p><b>All species:</b> All designated Breeding Shorebird SMAs will be posted as pre-nesting closures using symbolic fencing by <b>Mar 15</b> at sites involving piping plover, Wilson's plover, and/or American oystercatcher; and by <b>Apr 15</b> at sites involving only colonial waterbirds. NPS will determine the configuration of specific pre-nesting closures based on an annual habitat assessment. Pre-nesting closures will be adjusted to the configuration of the Nonbreeding Shorebird SMAs for the respective sites (as described later in this table) if no breeding activity is seen in the area by <b>Jul 31</b>, or 2 weeks after all chicks have fledged, whichever comes later. Pre-nesting closures will not be modified in cases where the beach erodes into the buffered habitat. ORVs, pedestrians, and pets are prohibited within all resource closures, including pre-nesting closures.</p> <p><b>SM1:</b> SMAs designated as SM1 would not allow ORV or pedestrian access when pre-nesting closures are in effect.</p> <p><b>SM2:</b> The Bodie Island Spit, Cape Point, and South Point Ocracoke SMAs are designated as SM2 in action alternatives C, E, and F. Once pre-nesting closures are implemented at these sites, a narrow ORV access corridor (where ORV use is permitted) or a pedestrian access corridor (where ORV use is not permitted) would be established. Upon the first observation of breeding activity, the standard buffers (please refer to table 6, Shorebird / Waterbird Buffer Summary) will apply, which depending upon the circumstances</p>		

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	<p>may close the access corridor. The Bodie Island Spit access corridor would follow the ocean shoreline to the inlet. The Cape Point access corridor would follow the ocean shoreline from ramp 44 south to the point, then west approximately 0.2 mi along the ocean shoreline. The South Point Ocracoke access corridor would follow the ocean shoreline south from ramp 72 to the inlet. Exact configuration of the corridor would be determined by NPS staff based on the annual habitat assessment. The ORV access corridor at SM2 sites will generally be no more than 50 m wide above the high tide line (alternative E may include a designated pass-through zone where no stopping or recreation would be permitted in order to minimize disturbance). An SM2 pedestrian access corridor would generally be below the high tide line and would in no case be more than 10 m above the high tide line. Pets, as well as kite flying, ball and Frisbee tossing, and similar activities, will be prohibited in the access corridors or pass-through zones (in alternative E only) while the pre-nesting closure is in effect.</p>		
<b>Courtship/Mating Surveys:</b>	<p>Pre-nesting closures will be surveyed three times per week. Outside of pre-nesting closures, suitable habitat will be surveyed three times per week once breeding pairs are present.</p>		
<b>Courtship/Mating Buffers:</b>	<p><b>SM1/SM2:</b> If breeding activity is observed outside of an existing closure, a buffer will be established or expanded to ensure a 75 m buffer for the observed birds.</p> <p>Buffers will be increased in 50 m increments if human disturbance* occurs.</p> <p>Outside of pre-nesting areas, closures will be removed if no breeding activity is observed for a 2-week period, or when associated breeding activity has concluded.</p> <p><i>*Buffers are not expanded for incidental disturbance associated with required NPS protected species monitoring.</i></p>	<p><b>SM1:</b> If breeding activity is observed outside of an existing closure, a buffer will be established or expanded to ensure a 300 m buffer for the observed birds.</p> <p><b>SM2:</b> If breeding activity is observed outside of an existing closure, a buffer will be established or expanded to ensure a 150 m buffer for the observed birds.</p> <p>Buffers will be increased in 50 m increments if human disturbance occurs.</p> <p><b>All:</b> Outside of pre-nesting areas, closures will be removed if no breeding activity is observed for a 2-week period, or when associated breeding activity has concluded.</p>	<p><b>SM1:</b> If scraping is observed outside an existing closure, a buffer will be established or expanded to ensure a 300 m buffer for the observed birds.</p> <p><b>SM2:</b> If scraping is observed outside a resource closure, a 100 m buffer will be established around the scrape location for least terns (if only least terns are present), or a 200 m buffer when other colonial waterbird species are present.</p> <p>Buffers will be increased in 50 m increments if human disturbance occurs.</p> <p><b>All:</b> Buffer establishment will be based on the location of scrape(s) and not location of copulation or "fish flashing."</p> <p>Outside of pre-nesting areas, buffers will be removed if no breeding activity is observed for a 2-week period, or when associated breeding activity has concluded.</p>
<b>Nest Surveys:</b>	<p>A walk-through will be conducted to look for nests every 3 days.</p> <p>Once nests are found, nests will be observed daily from a distance that does not disturb the birds, based on professional judgment.</p> <p>Nests will be approached once per week to observe and record</p>	<p>A walk-through will be conducted to look for nests when observations suggest a nest is present.</p> <p><b>SM1:</b> Nests will be observed at least three times per week from a distance that does not disturb the birds, based on professional judgment. For incubating birds that cannot be observed from a distance, nests will</p>	<p>Colonies will be surveyed on foot during the peak nesting period, which generally is during the last week of May and the first week of June, but could be later, especially for black skimmers.</p> <p><b>SM1:</b> Colonies will be observed at least three times per week from a distance that does not disturb the birds. For incubating birds that cannot be observed from a distance, colonies</p>

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	data.	be checked on a weekly basis (or as staff is available).  <b>SM2:</b> Nests will be observed daily from a distance that does not disturb the birds, based on professional judgment. For incubating birds that cannot be observed from a distance, nests will be checked every 3 days.	will be checked on a weekly basis.  <b>SM2:</b> Nests will be observed daily from a distance that does not disturb the birds, based on professional judgment. For incubating birds that cannot be observed from a distance, colonies will be checked every 3 days.
<b>Nest Buffers:</b>	<b>All species:</b> The park retains the discretion to expand nest buffers under SM1 and SM2 depending on staffing and bird behavior. In unprotected areas, a buffer will be established immediately when a nest with egg(s) is found. Prior to hatching, vehicles may pass by such areas within designated ORV access corridors that have been established along the outside edge of nesting habitat, provided that buffers adequate to prevent human disturbance are maintained. When nests or chicks occur in the immediate vicinity of paved roads, parking lots, campgrounds, buildings, and other facilities, NPS retains the discretion to provide resource protection to the maximum extent possible while still allowing those facilities to remain operational. NPS shall not reduce buffers to accommodate ORV ramp access. Buffers will remain in place for 2 weeks after a nest is lost to determine if pair will re-nest. Outside of pre-nesting areas, buffers will be removed if no breeding activity is seen in the area for 2 weeks, or 2 weeks after all chicks have fledged, whichever comes later.		
	<b>SM1 and SM2:</b> A 75 m buffer/closure will be established around nest(s). Buffers will be increased in 50 m increments if human disturbance occurs.  If a buffer falls within the intertidal zone, a full-beach closure will result.	<b>SM1:</b> A 300 m buffer/closure will be established around nest(s).  <b>SM2:</b> A 150 m buffer/closure will be established around nest(s). Buffers will be increased in 50 m increments if human disturbance occurs.  If a buffer falls within the intertidal zone, a full-beach closure will result.  For nests that occur inside a pre-nesting closure <b>and</b> require a buffer expansion of the pre-nesting area, the buffer expansion may be removed to the original pre-nesting closure after 2 weeks with no breeding activity if the nest is lost to overwash or predation.	<b>SM1:</b> Buffers will be the same as for courtship and mating: 300 m.  <b>SM2:</b> A 100 m buffer/closure will be established around a least tern nest or colony. A 200 m buffer/closure will be established around the nest or colony if any common terns, gull-billed terns, or black skimmers are present. Buffers will be increased in 50 m increments if human disturbance occurs.  If a buffer falls within the intertidal zone, a full-beach closure will result.  For a colony that occurs inside a pre-nesting closure <b>and</b> requires a buffer expansion of the pre-nesting area, the buffer expansion may be removed after 2 weeks with no breeding activity if the nest is lost to overwash or predation.
<b>Adult Foraging Surveys and Buffer:</b>	Suitable breeding habitat will be surveyed three times per week to monitor for adults with an associated scrape or nest territory foraging outside of an existing	No additional buffers/closures.	No additional buffers/closures.

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	closure. If birds are observed foraging outside an existing closure, the site will be surveyed daily. If birds are observed foraging outside of a closure on two consecutive surveys, the buffer will be established or expanded using flexible increments based on observed bird behavior to include the foraging site. These closures are intended to provide foraging opportunities close to breeding sites. The closure will be removed if no foraging is observed for a 2-week period during the breeding season, or when associated breeding activity has concluded.		
<b>Unfledged Chicks Surveys:</b>	<p><b>SM1:</b> Brood will be observed once daily.</p> <p><b>SM2:</b> Brood will be observed at least 1 hour each in a.m. and p.m. daily. Monitor(s) will be present during periods of ORV or pedestrian access.</p> <p><b>All:</b> Observations will end once chicks have fledged. Chicks are considered fledged at 35 days of age or when observed in sustained flight of at least 15 m.</p>	<p><b>SM1:</b> Brood will be observed every other day.</p> <p><b>SM2:</b> Brood will be observed once daily for at least ½ hour.</p> <p><b>All:</b> Observations will end once the chicks have fledged. American oystercatcher chicks are considered fledged if they have been observed to be proficient in flying or observed in sustained flight of at least 30 m. Wilson's plover chicks are considered fledged if they are observed in sustained flight of at least 15 m.</p>	<p><b>SM1:</b> Colony will be observed every other day.</p> <p><b>SM2:</b> Colony will be observed daily.</p> <p><b>All:</b> Colonies will be surveyed on foot during the peak hatching period, which should fall 21 days after initial nest observations.</p> <p>A follow-up survey (perimeter count) should be conducted during the peak fledge, which should fall 20 days after hatch counts.</p> <p>Observations will end after no unfledged chicks have been observed on three consecutive surveys.</p>
<b>Unfledged Chick Buffers:</b>	<p><b>SM1:</b> A minimum 1,000 m buffer will be established on either side of the nest when unfledged chicks are present.</p> <p><b>SM2:</b> A 1,000 m ORV buffer and, where harm and disturbance can be minimized, a 300 m pedestrian buffer will be established on either</p>	<p><b>SM1:</b> A 300 m buffer will be established around the nest when unfledged chicks are present. If chicks move outside of the buffer, it will be adjusted to include an additional 200 m from the chicks' location. Closures will be removed 2 weeks after fledging.</p> <p><b>SM2:</b> A 200 m buffer will be established</p>	<p><b>SM1:</b> A 300 m buffer will be established around nests or colony. If chicks move outside of the buffer, it will be adjusted to provide a standard buffer of 200 m from the chicks' location.</p> <p><b>SM2:</b> A 200 m buffer will be established around the chicks' location. Buffers will be adjusted as needed when chicks are mobile.</p>

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	<p>side of the nest when unfledged chicks are present. Buffers move with chicks.</p> <p><b>All:</b> The buffer should extend 1,000 m for ORVs (or 300 m for pedestrians under SM2) on each side of a line drawn through the nest site and perpendicular to the long axis of the beach. The resulting area (2,000 m wide for ORVs or 600 m wide for pedestrians) of protected habitat for piping plover chicks would extend from the oceanside low water line to the soundside low water line or to the farthest extent of dune habitat if no soundside intertidal habitat exists.</p>	<p>around the unfledged chicks' location. Foraging and roosting habitat will be included from the ocean (low water line) to the dune (or sound shoreline, if accessible). Buffers will be adjusted/ increased as needed when chicks are mobile. Buffers move with chicks.</p> <p>Buffers will remain until Wilson's plover chicks have fledged or 2 weeks after American oystercatcher chicks have fledged (observed flight of 30 meters); a pedestrian corridor may be established prior to the end of the 2-week waiting period for permitting access to the points and spits.</p>	
<p><b>All Species:</b> Vehicles and/or pedestrians may be allowed to pass through portions of the buffers or closures that are considered inaccessible to chicks because of steep topography, dense vegetation, or other naturally occurring obstacles. Access corridors outside of the pre-nesting area will be reopened after chicks fledge (except for American oystercatchers, where the area will remain closed for an additional 2 weeks). Closures can be removed after Jul 31, or 2 weeks after all breeding activity has ceased or chicks have fledged, whichever is later.</p>			
<p><b>Breeding Data Collection/Reporting</b></p>	<p>The following data will be recorded:</p> <ul style="list-style-type: none"> <li>- Date, time, location of breeding pair, courtship behavior, foraging, scrape, nest, or brood observations; identity of observer.</li> <li>- Pair, nest, and brood identification number.</li> <li>- Number, location, and status of territorial pairs, nesting pairs, nests, eggs, and chicks. GPS will be used to document nest location.</li> <li>- Status of eggs/nest and presence/behavior of adults (laying, incubating, lost, abandoned,</li> </ul>	<p>The following data will be recorded:</p> <ul style="list-style-type: none"> <li>- Date, time, and location of breeding pair, scrape, nest, or brood observations; identity of observer.</li> <li>- Pair number; color band (if applicable).</li> <li>- Number, location, and status of pairs, scrapes, nests, eggs, and chicks. Use GPS to document nest location.</li> <li>- Status of eggs/nest and presence/behavior of adults (laying, incubating, lost, abandoned, hatching, hatched).</li> <li>- Status of chicks (age, behavior, fledged status) and presence/behavior of adults.</li> </ul>	<p>The following data will be recorded:</p> <ul style="list-style-type: none"> <li>- Date, time, location, and species of nest/colony observations; identity of observer.</li> <li>- Number and location of birds, nests, chicks, and fledglings. GPS will be used to document colony location.</li> <li>- Status of colony and presence/behavior of adults (laying, incubating, lost, abandoned).</li> <li>- Status of chicks (behavior, fledge status) and presence/behavior of adults.</li> <li>- Indications of potential predators, humans, pets, or ORVs within posted areas.</li> <li>- Indications of cause of nest or chick loss, if</li> </ul>

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	<p>hatching, hatched).</p> <ul style="list-style-type: none"> <li>- Status of chicks (age, behavior, fledge status) and presence/behavior of adults.</li> <li>- Indications of potential predators, humans, pets, or ORVs within posted areas.</li> <li>- Indications of cause of nest or chick loss, if apparent.</li> <li>- Reproductive rate (chicks fledged per breeding pair).</li> </ul>	<ul style="list-style-type: none"> <li>- Indications of potential predators, humans, pets, or ORVs within posted areas.</li> <li>- Indications of cause of nest or chick loss, if apparent.</li> <li>- Reproductive rate (chicks fledged per breeding pair).</li> </ul>	<p>apparent.</p>
<b>Nonbreeding Survey</b>	<p>NPS will monitor presence, abundance, and behavior of migrating and wintering shorebirds from July through May using the SECN protocol. Survey sites will include all Nonbreeding Shorebird SMAs. NPS will obtain data similar to International Shorebird Survey (ISS) data. The following information will be recorded: Date, time, and location of observations; identity of observer; species and number of birds observed; band combination of any banded birds; weather variables and tidal stage; habitat; behavior of the majority of birds in the flock (foraging, resting, disturbed [source will be recorded], other); site management in effect where birds are seen; and number of pedestrians, pets, ORVs and other potential disturbances.</p>		
<b>Nonbreeding Shorebird SMAs</b>	<p><b>All Species:</b> Nonbreeding Shorebird SMAs will be established for migrating/wintering shorebirds at various locations throughout the Seashore. Such closures will be installed no later than when breeding season closures are removed at the same location(s). Pets will be prohibited within Nonbreeding Shorebird SMAs.</p> <p><b>Points and Spits:</b> An annual habitat assessment will be conducted after all birds have fledged from the area. Nonbreeding resource closures will be established at the points and spits based on habitat used by wintering piping plovers in more than 1 (i.e., 2 or more) of the past 5 years, the presence of birds at the beginning of the migratory season, and suitable habitat types based on the results of the annual survey. Actual locations of suitable foraging and roosting habitat may change periodically due to natural processes. Access to the inlet shorelines, where permitted, will be maintained by a corridor to be determined by NPS staff based on the annual habitat assessment.</p> <p><b>Ocean Shoreline Areas:</b> In addition to the nonbreeding resource closures at the points and spits described above, NPS will establish non-ORV areas along the ocean shoreline that will provide relatively less-disturbed foraging, resting, and roosting areas for migrating and wintering shorebirds. These may include wider sections of beach with an upper-beach ORV corridor that has a buffer of at least 50 m above the high tide line, and/or sections of beach that have been designated as non-ORV for other reasons, such as to provide pedestrians with opportunities for a natural beach experience. The following activities are generally compatible with migrating/wintering shorebird use of these areas: pedestrian access for fishing, beach walking, bird-watching, kayaking, kiteboarding, paddleboarding, photography, picnicking, sailing, shelling, stargazing, sunbathing, surfing, swimming, wildlife viewing, and windsurfing. If resource protection staff determines that any single activity or collection of activities is negatively impacting shorebird use of a specific location, NPS may implement additional restrictions on compatible activities. The location(s) of all ocean shoreline Nonbreeding Shorebird SMAs will be subject to periodic review.</p>		



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<p><b>Adaptive Management Initiatives</b></p>	<p>NPS would take an adaptive management approach to the species management program in order to evaluate the effectiveness of and improve the measures identified above. The following adaptive management initiatives related to shorebirds or shorebird habitat have been identified:</p> <ul style="list-style-type: none"> <li>- <b>Piping plover chick fledge rate:</b> An adaptive management study <b>will</b> be developed to evaluate the short-term performance target of 1.0 chick fledged per breeding pair, as well as the 1.5 chicks fledged per pair productivity rate identified in the recovery plan, to determine what productivity rate is realistically attainable and would provide for a growing population at the Seashore over the long term. If the actual productivity rate is not sufficient to achieve the desired future conditions for piping plover, it will be determined what management actions (e.g., frequency of monitoring; size or timing of buffers) need to be changed in order to achieve the desired results.</li> <li>- <b>Piping plover chick buffer distance:</b> As stated in the piping plover recovery plan, where several years of data document that piping plovers on a particular site feed in only certain habitat types, USFWS may provide written concurrence that vehicles pose no danger to plovers in other specified habitats on that site. An adaptive management study <b>will</b> be developed to evaluate whether a reduced ORV or pedestrian buffer distance (i.e., less than that stated in this plan) after a certain time period, such as 2 weeks after chicks have hatched, would be adequate to prevent disturbance of piping plover chicks by ORVs and/or pedestrians using adjacent areas during daylight hours.</li> <li>- <b>Pass-through buffers during the incubation period:</b> An adaptive management study or studies <b>will</b> be developed to evaluate whether a reduced buffer distance is adequate to prevent disturbance caused by ORVs driving past piping plover, American oystercatcher, or colonial waterbird nest sites if all other recreation (e.g., pedestrians, pets) is prohibited within the reduced buffer, and to determine whether a reduced buffer is adequate to prevent disturbance caused by pedestrians walking below the high tide line past piping plover, American oystercatcher, or colonial waterbird nest sites.</li> <li>- <b>Colonial waterbird social attraction:</b> As a pilot project, an adaptive management study <b>will</b> be developed to evaluate the effectiveness of using colonial waterbird decoys and audio-attraction to establish or re-establish colonial waterbird colonies in suitable habitat.</li> <li>- <b>Vegetation management:</b> As a pilot project, an adaptive management study <b>will</b> be developed to evaluate methods for managing vegetation and improving habitat and wildlife access to available habitat in the Cape Point dredge pond area. The applicability and potential effectiveness of such measures at other locations will be determined.</li> <li>- <b>Habitat management:</b> As a pilot project, an adaptive management study <b>will</b> be developed to evaluate methods of improving shorebird nesting and/or foraging habitat at one location in the Seashore by applying dredge material or by moving/manipulating sand or water at the site. The applicability and potential effectiveness of such measures at other locations will be determined.</li> <li>- <b>Enhanced predator management:</b> An adaptive management study <b>will</b> be developed to evaluate whether predator management actions to be implemented under the (proposed) predator control program for protected species management are effective as is, or whether enhanced measures (such as managing avian predators or ghost crabs) would be beneficial and effective, or are necessary to achieve the desired future conditions for species protection.</li> <li>- <b>Change in protected species status:</b> If a significant change were to occur in the status of protected shorebird species (e.g., listing or de-listing), as part of the periodic review process described at the end of this table there would be a systematic re-evaluation of the related species management actions identified in this plan to determine what changes in management, if any, are appropriate.</li> </ul>
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<b>Research</b>	In addition to the species management procedures outlined in this table, through the issuance of a research permit NPS may authorize qualified researchers associated with recognized academic or research institutions to conduct additional scientific research on the respective species that will add to the existing knowledge of shorebird species or improve resource protection within the Seashore. Establishment of research areas may be authorized under such a permit.
<b>Implementation of Adaptive Management and Research Initiatives</b>	Should adaptive management initiatives and other research provide information that NPS believes is an adequate basis for management changes, such changes would be evaluated and considered for implementation as part of the 5-year periodic review process described at the end of this table.
<b>Management Activity</b>	<b>Sea Turtles</b>
<b>Survey Time and Frequency</b>	<p>Sea turtle patrol will begin on May 1, unless leatherback nests have been reported within the state, in which case the Seashore will follow the direction of NCWRC. Patrol will continue until Sep 15, or 2 weeks after the last sea turtle nest or crawl is found, whichever is later.</p> <p>Daily surveys will be conducted by ATV/UTV and possibly ORV for crawls and nests on all beaches, generally in the morning before onset of public ORV use. Daily surveys for nests end Sep 15, or 2 weeks after the last sea turtle nest or crawl is found, whichever is later. Periodic monitoring (e.g., every 2 to 3 days) for unknown nesting and emerging hatchlings will continue, especially in areas of high visitation, from that date until Nov 15.</p> <p>Monitoring will also occur for post-hatchling washbacks during periods when there are large quantities of seaweed washed ashore or following severe storm events. Nest observations will stop when all nests have hatched or excavation indicates that unhatched nests are not viable.</p> <p>Once a light filter fence is installed, nests will be monitored daily for signs of hatchling emergence.</p>
<b>Sea Turtle Data Collection/Reporting</b>	<p>At a minimum, the NCWRC handbook will be followed and the following will be recorded:</p> <ul style="list-style-type: none"> <li>- Date, location, and species of nests and false crawls; identity of observer.</li> <li>- Whether nests need to be relocated and, if so, why and where (new physical description and GPS location), number of eggs relocated, and time of day.</li> <li>- Necessary protective measures for nests and hatchlings.</li> <li>- Information regarding any post-hatching nest excavation and analysis.</li> </ul> <p>All nests will be examined after hatching to determine productivity rates. Nests will be excavated in the evening, a minimum of 72 hours after the hatching event. In cases where hatching events or dates are unknown, nest cavities will be unearthed 80–90 days after the lay date. Any live hatchlings found during excavations will be released at dusk or after dark on the same day as excavation.</p> <p>For strandings, the following will be recorded: species, location (GPS), measurements, indications of human interactions, and disposition of animal/carcass. Samples and photos will be collected when necessary. Necropsies will be conducted when possible.</p>
<b>Nest Closures/</b>	A buffer approximately 10 × 10 m will be established with symbolic fencing and signage around nest. Closure size may be modified

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<b>Buffers</b>	<p>depending on environmental conditions at the nest site.</p> <p>Approximately 50–55 days into incubation, closures will be expanded to the surf line. The width of the closure will be based on the type and level of use in the area of the beach where the nest was laid:</p> <ol style="list-style-type: none"> <li>1. Vehicle-free areas with little or no pedestrian traffic—25 m wide (total).</li> <li>2. Village beaches or other areas with high levels of pedestrian and other non-ORV use—50 m wide (total).</li> <li>3. Areas with ORV traffic—105 m wide (total).</li> </ol> <p>On the landward side of the nest, the closed area will be expanded to 15 m from the nest where possible, but no less than 10 m landward from the nest. If appropriate, traffic detours behind the nest area will be established and clearly marked with signs and reflective arrows.</p> <p>Light-filtering fence will be used in a U-shaped configuration around nests nearing their hatch dates, with the open face of the U oriented toward the water, to block light pollution from the villages and vehicles operating on the beach after dark.</p> <p>Once the buffer expansion is implemented, NPS staff will use rakes or a steel mat attached to an ATV to smooth any vehicle tracks between the nest and the water, so that tracks do not impede hatchlings from reaching the water.</p> <p>If multiple nests are located near each other (within 150 ft), and have similar hatch dates (within 14 days of each other), then closures will encompass all nests in the area and will not be removed until all nests within the closure have hatched.</p>
<b>Nest Watch Program</b>	<p>A cadre of trained volunteers will be established to watch nests that have reached their hatch windows in order to monitor hatchling emergence success and success reaching the water, and to provide for the minimization of negative impacts from artificial lighting, predation, and human disturbance. Depending on the number of nests that may be ready to hatch and the availability of volunteers, it may be necessary for NPS turtle staff to prioritize which nests are watched on any particular night. Priority will be given to watching the nests that are most likely to be negatively impacted by manageable factors.</p>
<b>Nest Relocation</b>	<p>By Apr 15, areas deemed unsuitable for turtle nests (e.g., those with a high erosion rate) will be identified by Seashore staff. Maps and descriptions of these areas will be analyzed by NCWRC prior to nesting season.</p> <p>When a nest is found, designated NPS staff members will assess the need for nest relocation and follow relocation guidance identified in the NCWRC handbook.</p> <p>If it is determined that the nest will not be relocated, it will be immediately protected with symbolic fencing and signs approximately 10 × 10 m in size. Closure size may vary at the discretion of NPS staff depending on the environmental factors at a nest location.</p> <p>If a nest is threatened by an imminent storm event, NPS will consult with NCWRC to determine appropriate action.</p>
<b>Strandings</b>	<p>The Seashore will respond to sea turtle strandings in a timely manner, and will forward or report all information, pictures, and signs of human interaction to NCWRC.</p> <p>Necropsies of stranded turtles will be done when possible.</p>
<b>Light Restrictions</b>	<p>From May 1 through Nov 15:</p> <ul style="list-style-type: none"> <li>- Portable lanterns, auxiliary lights, and powered fixed lights of any kind shining for more than 5 minutes at a time would be prohibited on Seashore ocean beaches.</li> <li>- Beach fires would be allowed/restricted as described in the respective alternatives.</li> </ul>

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<b>Night-Driving Restrictions</b>	From May 1 to Nov 15, all non-essential vehicle use is restricted or prohibited as described in the respective alternatives.
<b>Light Management</b>	<p>By May 1, 2012, turtle-friendly lighting fixtures will be installed on all Seashore structures visible from the ocean beach (except where prevented by other overriding lighting requirements, such as lighthouses, which serve as aids to navigation) and fishing piers operated by NPS concessioners.</p> <p>Educational material will be developed to inform visitors about their impact on the success of sea turtle nests.</p> <p>The Seashore will work with USFWS, NCWRC, and Dare County to encourage development of a turtle-friendly lighting ordinance and/or turtle-friendly lighting education program for villages within the Seashore on Hatteras Island.</p>
<b>Adaptive Management Initiatives</b>	<p>NPS would take an adaptive management approach to the species management program in order evaluate the effectiveness of and improve the measures identified above. The following adaptive management initiatives for sea turtles have been identified:</p> <ul style="list-style-type: none"> <li>- An assessment tool <b>will</b> be developed to measure ambient artificial lighting along the length of the Seashore, which can be used to reassess conditions after any management actions (such as a lighting ordinance) are implemented to reduce artificial lighting. After light management actions are implemented, levels of lighting will be reassessed and impacts on sea turtle nesting success will be monitored and evaluated. If supported by the findings, NPS will work toward an incremental adjustment (i.e., increase) in nighttime ORV access to limited select locations where not in substantial conflict with turtle nesting and hatchling activity.</li> <li>- An adaptive management study <b>will</b> be developed to evaluate the level of human disturbance, if any, that might be caused by designating night-driving routes to select points and spits, and to develop management tools to minimize impacts to an acceptable level. If supported by the findings, NPS will work toward an incremental adjustment (i.e., increase) in nighttime ORV access to limited select locations where not in substantial conflict with turtle nesting and hatchling activity.</li> <li>- An adaptive management study <b>will</b> be developed to determine ways to increase the number of hatchlings that emerge and reach the water.</li> </ul>
<b>Research</b>	In addition to the species management procedures outlined in this table, through the issuance of a research permit, NPS may authorize qualified researchers associated with recognized academic or research institutions to conduct additional scientific research on turtle species that will add to the existing knowledge of sea turtles or improve resource protection within the Seashore. Establishment of research areas could be authorized under such a permit.
<b>Implementation of Adaptive Management and Research Initiatives</b>	Should adaptive management initiatives and other research provide information that NPS believes is an adequate basis for management changes, such changes would be evaluated and considered for implementation as part of the 5-year periodic review process.
<b>Management Activity</b>	<b>Seabeach Amaranth</b>
<b>Survey Time and Frequency</b>	<p>Jul to Sep: Before removing any shorebird closures, surveys will be conducted for seabeach amaranth seedlings/plants.</p> <p>Aug: A Seashore-wide annual survey for seabeach amaranth will be conducted in all potential habitats. Some shorebird closures may not be surveyed until just prior to reopening an area to ORV traffic to minimize disturbance of nesting birds or</p>

**TABLE 5. SPECIES MANAGEMENT STRATEGIES FOR ACTION ALTERNATIVES**

	<p>chicks.</p> <p>Observations will end when all known seabeach amaranth plants have died back.</p>
<b>Data Collection</b>	The location of all individual plants or plant clusters will be recorded using GPS. It will be noted whether the plant is located in an area open or closed to recreational use.
<b>Buffers/Closures</b>	<p>Prior to Jun 1, suitable seabeach amaranth habitat will be identified at points and spits where plants have observed within the last 5 years and delineated with symbolic fencing if such areas are not already protected within existing shorebird resource closures.</p> <p>If a plant/seedling is found outside of an existing closure, symbolic fencing with signage will be erected creating a 10 × 10 m buffer around the plant. If plants are located next to one another, the area will be expanded to create one enclosure protecting several plants.</p> <p>If a seabeach amaranth plant is found during the survey prior to reopening a bird closure to ORV and pedestrian use, the Seashore will protect the plant as described above and reopen the portions of the bird closure where seabeach amaranth plants do not exist.</p> <p>If seabeach amaranth is not present by Sep 1, seabeach amaranth buffers will be removed. If seabeach amaranth is present, buffers will remain until after the plants have senesced, which is typically around Dec 1.</p>
<b>All Species</b>	
<b>Periodic Review</b>	A systematic review of data, annual reports, and other information would be conducted by NPS every 5 years, after a major hurricane, or if necessitated by a significant change in protected species status (e.g., listing or de-listing), in order to evaluate the effectiveness of management actions in making progress toward the accomplishment of stated objectives. Periodic review could result in changes to the management actions in order to improve effectiveness.

**Table 6. Shorebird / Waterbird Buffer\*\* Summary Table**

Species	Breeding Behavior/Nest Buffer		Unfledged Chicks	
	SM1	SM2	SM1	SM2
Piping plover	75 m	75 m	1,000 m	1,000 m; 300m (pedestrian only)
Wilson's plover	300 m	150 m	300 m	200 m
American oystercatcher	300 m	150 m	300 m	200 m

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Least tern	300 m / 100 m	300 m / 200 m
Other colonial waterbird species	300 m / 200 m	300 m / 200 m

\*\* Buffers apply to both ORVs and pedestrians, unless otherwise specified.