

APPENDIX F

NC STATEWIDE PROGRAMMATIC BIOLOGICAL OPINION

**NORTH CAROLINA
STATEWIDE PROGRAMMATIC BIOLOGICAL OPINION
BEACH SAND PLACEMENT
EXECUTIVE SUMMARY
August 28, 2017**

INTRODUCTION

A biological opinion (BO) is the document that states the opinion of the U.S. Fish and Wildlife Service (Service) as to whether a federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat. This BO addresses piping plover (*Charadrius melodus melodus*), red knot (*Calidris canutus rufa*), seabeach amaranth (*Amaranthus pumilus*), and the loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), and Kemp's ridley sea turtles (*Lepidochelys kempii*). Designated critical habitat for wintering piping plovers and terrestrial critical habitat for loggerhead sea turtles is also addressed. The BO evaluates the effects of the Action along with those resulting from interrelated and interdependent actions, and from non-federal actions unrelated to the proposed Action (cumulative effects), relative to the status of the species and the status of the critical habitat to arrive at a Service opinion that the proposed action is or isn't likely to jeopardize species or adversely modify critical habitat. Jeopardize the continued existence of means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR §402.02). Destruction or adverse modification of designated critical habitat means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features (50 CFR §402.02).

DESCRIPTION OF THE PROPOSED ACTION

This is a Statewide Programmatic Biological Opinion (SPBO). The proposed action includes all activities associated with the placement of compatible sediment on the oceanfront beaches of North Carolina, encompassing the entire range of the South Atlantic Wilmington (SAW) Corps Districts. This SPBO includes Corps Regulatory and Civil Works shore protection activities. Corps Regulatory activities may include the involvement of other Federal agencies, such as the Department of Defense (DoD), Bureau of Ocean Energy Management (BOEM), and the Federal Emergency Management Agency (FEMA). The sand placement activities covered in the SPBO encompass the following (when conducted between November 16 and April 30):

1. Sand placement on the sandy beach or dune by any non-federal public or private entity;
2. Sand placement as an associated authorization of sand extraction from the Outer Continental Shelf (OCS) by BOEM; and

3. Sand placement funded or conducted by a Federal agency, such as Coastal Storm Damage Reduction (CSDR) Projects, federal public assistance projects administered by FEMA or other federal agencies, and beach disposal from Operations and Maintenance (O&M) dredging of navigation channels (dredging is not included).

The history of shore protection activities in North Carolina is extensive and consists of a myriad of actions performed by local, State, and Federal entities. Future beach placement actions addressed in this SPBO may include maintenance of these existing projects or beaches that have not experienced a history of beach placement activities.

The Service and National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) share Federal jurisdiction for sea turtles under the Act. The Service has responsibility for sea turtles on the nesting beach. The Service and the NMFS share Federal jurisdiction for sea turtles under the ESA. NMFS has jurisdiction for sea turtles in the marine environment. This SPBO only addresses activities that may impact nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. NMFS will assess and consult with the Corps concerning potential impacts to sea turtles in the marine environment, including updrift and downdrift nearshore areas affected by sand placement projects on the beach.

Action Area

The Service has described the action area to include sandy oceanfront beaches of North Carolina. The Programmatic Biological Assessment (PBA) defines currently managed shorelines in North Carolina as those that include active projects and those that are under study. The length of currently managed shoreline is 112 miles, but is anticipated to eventually grow to 163 miles. Based on the current length of managed shoreline in North Carolina, the BA anticipates that sand placement considered in this opinion will affect up to 25 miles of shoreline annually in North Carolina. However, after major storms, increases in the annual length of sand placement are expected. In years following major storm events, the BA states that a 250% increase in average annual sand placement can reasonably be expected. Therefore, in post-storm years (declared disaster or Congressional Order); a maximum length of annual sand placement is 62.5 miles (25 miles plus an additional 27.5 miles).

Conservation Measures: Corps Commitments as listed in the Final Programmatic Biological Assessment

The following language from the PBA lists the Conservation Measures proposed by the Corps. All sand placement projects would employ each of the following measures to reduce impacts on listed species and critical habitats:

Piping Plover and Red Knot

- 1) All sand placement activities will be completed between 16 November and 30 April; thereby avoiding the majority of the piping plover breeding season, a portion of the piping plover migration period, and the peak red knot migration period in NC.
- 2) As a means of minimizing the extent and/or duration of adverse effects on habitats and benthic prey resources, all material placed on the beach and in associated dune systems will consist of beach compatible sediment. Beach compatible material will consist of sediments that are similar in composition, grain size distribution, and color to the native sediments of the recipient beaches.
- 3) Construction staging areas and pipeline routes will be located to avoid high-value inlet complex habitats for piping plovers and red knots to the maximum extent practicable.
- 4) Temporary storage areas for construction equipment and pipelines will be located off the beach to the maximum extent practicable.

Sea Turtles

- 1) All sand placement activities will be completed between 16 November and 30 April; thereby avoiding the sea turtle nesting and hatching season in NC.
- 2) All material placed on the beach and in associated dune systems will consist of beach compatible sediment that is suitable for sea turtle nesting. Beach compatible material will consist of sediments that are similar in composition, grain size distribution, and color to the native sediments of the recipient beaches.
- 3) Immediately after construction and to the maximum extent practicable prior to 1 May, surveys for escarpments will be conducted within the limits of construction areas. Identified escarpments that may interfere with sea turtle nesting (>18 inches in height and \geq 100 ft in length) will be leveled to the natural beach profile. If it is determined that escarpment leveling is required during the nesting season, leveling activities would be coordinated with the USFWS or NCWRC.
- 4) Immediately after construction and to the maximum extent practicable prior to 1 May, the limits of construction areas will be evaluated for compaction in coordination with the USFWS and NCWRC. If it is determined that tilling is required for sea turtle nesting habitat suitability, the construction areas will be tilled to a depth of 36 inches. All tilling activity shall be completed prior to 1 May to the maximum extent practicable. In the case of projects that run until the 30 April nesting window cutoff, any tilling activities required after 1 May would be coordinated with the USFWS or NCWRC.
- 5) Post-construction monitoring of sea turtle nesting activities will be conducted in sand placement areas to assess effects on nesting. Monitoring will include daily surveys from 1 May until 15 September. Nesting data will be included in annual monitoring reports to be provided to the NCWRC.

Seabeach Amaranth

- 1) All sand placement activities will be completed between 16 November and 30 April; thereby avoiding the majority of the seabeach amaranth growing season in NC.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the ESA, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below in the Reasonable and Prudent Measures and Terms and Conditions are non-discretionary, and must be implemented by the Corps so that they become binding conditions of any funding action or any grant or permit issued to the Applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the Applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Sections 7(b)(4) and 7(o)(2) of the ESA generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the ESA prohibits the removal and reduction to possession of Federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of state law or regulation, or in the course of any violation of a State criminal trespass law.

Amount or Extent of Take

The Service anticipates that no more than 25 miles of highly eroded shoreline along the North Carolina coastline would receive sand placement per year during nonemergency years, with a maximum of 62.5 miles of shoreline receiving sand during or following an emergency event (declared disaster or Congressional Order) as a result of the Statewide Programmatic action. This represents 8% of the entire North Carolina shoreline per year during a nonemergency year, and 19% of the shoreline during an emergency year.

Therefore, directly and indirectly an unspecified number of piping plovers, red knots, and sea turtles along this length of shoreline, all at some point, potentially usable by these species, could be taken in the form of harm, harassment, and/or habitat loss as a result of this proposed action.

Effect of the Take

The Service has determined that the level of anticipated take is not likely to result in jeopardy to the Northern Great Plains, Great Lakes, or Atlantic Coast breeding populations of the piping plover. The Service determined that the proposed activities are not likely to result in adverse modification of wintering critical habitat for the piping plover. The Service has determined that this level of anticipated take is not likely to result in jeopardy to the red knot species, and the potential of the project to damage or destroy seabeach amaranth is not likely to result in jeopardy to the seabeach amaranth species. The Service has determined that this level of anticipated take is not likely to result in jeopardy to the loggerhead sea turtle, green sea turtle, leatherback sea turtle, hawksbill sea turtle, and Kemp's ridley sea turtle species, and the proposed activities are not likely to result in adverse modification of loggerhead terrestrial critical habitat.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize take of piping plovers, red knots, seabeach amaranth, and sea turtles in the Action Area for the following sand placement activities:

- A. Sand placement from beach nourishment activities; and**
- B. Sand placement from navigation channel maintenance.**

If unable to comply with the RPMs and Terms and Conditions, the Corps, as the regulatory authority or construction agent may:

1. Inform the Service why the RPM or Term and Condition is not reasonable and prudent for the specific project or activity and request exception under the SPBO; or

2. Initiate consultation with the Service for the specific project or activity.

The Service may respond by either of the following:

1. Allowing an exception to the Terms and Conditions under the SPBO; or
2. Recommending or accepting initiation of consultation (if initiated by the Corps) for the specific project or activity.

REASONABLE AND PRUDENT MEASURES for:

A. Projects that include sand placement from beach nourishment activities, primarily for shore protection (these projects are usually larger scaled) shall include the following measures:

Post-construction requirements are listed in Reasonable and Prudent Measures A.13, A.16, A.17, A.18, A.19, and A.21. These post-construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Permittee cannot fulfill these Reasonable and Prudent Measures, the Corps must reinitiate consultation.

RPMs – All Species

- A.1. Conservation Measures included in the Corps' Programmatic Biological Assessment (PBA) that address protection of nesting sea turtles, piping plovers, red knots, and seabeach amaranth shall be implemented in the Corps federally authorized project or regulated activity. If a RPM and Term and Condition address the same requirement, the requirements of the RPM and Term and Condition take precedence over the Conservation Measure.
- A.2. The Corps will notify the Service of the commencement of projects that utilize this SPBO for the purposes of tracking incidental take of all species.
- A.3. For the life of the project, all sand placement activities above MHW must be conducted within the winter work window (November 16 to April 30).
- A.4. Prior to sand placement, all derelict material, large amounts of rock, or other debris must be removed from the beach to the maximum extent possible.
- A.5. During construction, trash and food items shall be disposed of properly either in predator-proof receptacles, or in receptacles that are emptied each night to minimize the potential for attracting predators of piping plovers, red knots, and sea turtles.
- A.6. Pipeline placement must be coordinated with NCDCM, the Corps, the Service, and the NCWRC. Pipeline placement coordination may be accomplished through the

permit application or Corps' contract processes utilizing appropriate GIS tools.

- A.7. Access points for construction vehicles should be as close to the project site as possible. Construction vehicle travel down the beach should be limited to the maximum extent possible.
- A.8. A meeting between representatives of the Permittee or Corps, the Service, NCWRC, and NCDCM, must be held prior to the commencement of work on each project.
- A.9. The Corps shall facilitate an annual meeting with the Service to assess the effectiveness of the protection and minimization measures outlined in this SPBO.

RPMs - Piping Plovers and Red Knots

- A.10. All personnel involved in the construction or sand placement process along the beach shall be aware of the potential presence of piping plovers and red knots. Before start of work each morning, a visual survey must be conducted in the area of work for that day, to determine if piping plovers and red knots are present.
- A.11. If project-related activities will potentially adversely affect nesting shorebirds or active nesting habitat, the Corps or Permittee must coordinate with the Service and NCWRC prior to proceeding. If the project is ongoing and shorebirds begin territorial or other nesting behaviors within the project area, then the Corps or Permittee must contact the Service and NCWRC as soon as possible.
- A.12. If project activities will be conducted in Optimal Piping Plover Areas (defined in Terms and Conditions A.13 and A.14), the Corps or the Permittee shall clearly delineate work areas within the Optimal Piping Plover Area such as pipeline corridors, travel corridors, and access points. Disturbance outside those delineated work areas must be limited to the maximum extent possible, thereby minimizing effects to sandy unvegetated habitat within the project footprint.
- A.13. If project activities will be conducted in Optimal Piping Plover Areas (defined in Term and Conditions A.13 and A.14), the Corps, the Permittee, or the local sponsor shall provide the mechanisms necessary to monitor impacts to the piping plovers from the project for two years post-construction.

RPMs – Loggerhead, Green, Leatherback, Hawksbill, and Kemp's Ridley Sea Turtles

- A.14. Only beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence (defined in Term and Condition A.18) shall be used for sand placement.
- A.15. During dredging operations, material placed on the beach shall be qualitatively inspected daily to ensure compatibility. If the inspection process finds that a significant amount of non-beach compatible material is on or has been placed on the beach, all work shall stop immediately and the NCDWM and the Corps will be notified by the Permittee or Corps to determine the appropriate plan of action.
- A.16. Sea turtle nesting surveys must be conducted within the project area between May 1 and November 15 of each year, for at least two consecutive nesting seasons after completion, if the sand remains on the beach. Acquisition of readily available sea turtle nesting data from qualified sources (volunteer organizations, other agencies, etc.) is acceptable.
- A.17. Visual surveys for escarpments along the Action Area must be made immediately after completion of sand placement, and within 30 days prior to May 1, for two subsequent years after any construction or sand placement event.
- A.18. Sand compaction must be qualitatively evaluated at least twice after each sand placement event. Sand compaction must be inspected in the project area immediately after completion of any sand placement event and one time after project completion between October 1 and May 1.
- A.19. A report describing the fate of observed sea turtle nests and hatchlings and any actions taken, must be submitted to the Service following completion of work for each year when a sand placement activity has occurred.
- A.20. If a dune system is part of the project design, the placement and design of the dune must be coordinated with the Service.

RPMs – Seabeach Amaranth

- A.21. The Corps Civil Works Program shall continue its annual seabeach amaranth monitoring program.

TERMS AND CONDITIONS FOR:

A. Sand placement from beach nourishment activities

All conservation measures described in the Corps' Programmatic Biological Assessment are hereby incorporated by reference as Terms and Conditions within this document pursuant to 50 CFR §402.14(I) with the addition of the following Terms and Conditions. In order to be exempt from the prohibitions of section 9 of the Act, the Corps shall comply with the following Terms and Conditions, which implement the Reasonable and Prudent Measures, described above and outline reporting/monitoring requirements. These terms and conditions are non-discretionary.

Post-construction requirements are listed in Terms and Conditions A.13, A.14, A.17, A.18, A.19, A.20, A.22, A.23, A.24, A.25, and A.26. These post-construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Permittee cannot fulfill these Terms and Conditions, the Corps must reinitiate consultation.

Terms and Conditions – All Species

- A.1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles, piping plover, red knot, and seabeach amaranth listed on pages 10-11 of the SPBO shall be implemented in the Corps federally authorized project or regulated activity.
- A.2. The Corps or the Permittee must provide the following information to the Service at least 10 business days prior to the commencement of work:
 - a) Project location (include latitude and longitude coordinates, as well as mile markers, cross streets, or street addresses if available);
 - b) Project description (including linear feet of beach, actual fill template, access points, and borrow areas); and
 - c) Anticipated date of commencement and anticipated duration of construction.
- A.3. For the life of the permit/project, all sand placement activities above MHW must be conducted within the winter work window (November 16 to April 30), unless a variance is approved after additional consultation with the Service.
- A.4. Prior to sand placement, all derelict material, large amounts of rock, or other debris must be removed from the beach to the maximum extent possible. If debris removal activities take place during shorebird breeding season (April 1– August 31), the work shall be conducted during daylight hours only.
- A.5. During construction, trash and food items shall be disposed of properly either in predator-proof receptacles, or in receptacles that are emptied each night to minimize the potential for attracting predators of piping plovers, red knots, and sea turtles.

- A.6. Pipeline placement must be coordinated with NCDCM, the Corps, the Service, and the NCWRC. This may be accomplished through the permit application or Corps' contract processes utilizing appropriate GIS tools.
- A.7. Access points for construction vehicles should be as close to the project site as possible. Construction vehicle travel down the beach should be limited to the maximum extent possible.
- A.8. A meeting between representatives of the contractor(s), the Corps, the Service, the NCWRC, and NCDCM, must be held prior to the commencement of work. Advance notice (of at least 5 business days) must be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the Conservation Measures and Terms and Conditions, and will include the following:
- a) Staging locations, and storing of equipment, including fuel stations;
 - b) Coordination with the surveyors on required species surveys;
 - c) Pipeline placement;
 - d) Minimization of driving within and around the Action Area;
 - e) Follow up coordination during construction and post construction;
 - f) Direction of the work including progression of sand placement along the beach;
 - g) Plans for compaction monitoring;
 - h) Plans for escarpment surveys and
 - i) Names and qualifications of personnel involved in any required species surveys.
- A.9. Following the preconstruction meeting, the Corps shall provide the Service with specific anticipated shoreline lengths and anticipated duration of the project, using the form on the following web link:
<<https://www.fws.gov/northflorida/SeaTurtles/Docs/Corp%20of%20Engineers%20Sea%20Turtle%20Permit%20Information.pdf>>. Only the following information should be filled out: Corps permit number, FWS Log Number, Project Location, Construction Activity, Duration of Project, and Actual Take (linear feet of beach). This form shall be emailed to the Service at <seaturtle@fws.gov>. The form should be filled out using information from the permit application or authorization. This form is in addition to the annual report, listed below.
- A.10. The Corps shall meet with the Service, NCDCM, and NCWRC (and cooperating agencies such as BOEM, as appropriate) annually to discuss the effectiveness of the avoidance measures and additional measures to include for future projects. The agencies will also review the projects utilizing this SPBO the previous year to ensure that the reporting requirements for calculating the extent of take are adequate. This meeting will also explore:

- a) The possibility of using dredged materials to enhance potential or existing piping plover habitat within and adjacent to the project area;
- b) Methods for funding beneficial use opportunities for dredged materials that are not least-cost disposal to benefit piping plovers and their habitat;
- c) The development of shore protection design guidelines that can be utilized during future project planning to protect and/or enhance piping plover habitat; and
- d) Incorporating artificial lagoons or ephemeral pools into project designs adjacent to inlets where sand placement is proposed.

Terms and Conditions – Piping Plovers and Red Knots

- A.11. All personnel involved in the construction or sand placement process along the beach shall be aware of the potential presence of piping plovers and red knots. Before start of work each morning, a visual survey must be conducted in the area of work for that day, to determine if piping plovers and red knots are present. If shorebirds are present in the work area, careful movement of equipment in the early morning hours should allow those individuals to move out of the area. Construction operations shall be carried out at all times in a manner as to avoid negatively impacting shorebirds and allowing them to exit the area.
- A.12. If project-related activities will potentially adversely affect nesting shorebirds or active nesting habitat, the Corps or Permittee must coordinate with the Service and NCWRC prior to proceeding. If the project is ongoing and shorebirds begin territorial or other nesting behaviors within the project area, then the Corps or Permittee must contact the Service and NCWRC as soon as possible.
- A.13. If project activities will be conducted in Optimal Piping Plover Areas, piping plover habitat (sandy unvegetated habitat) within the Optimal Piping Plover Area shall be avoided to the maximum extent practicable when staging equipment, establishing travel corridors, and aligning pipeline. The Corps or the Permittee, to the maximum extent practicable, shall clearly delineate work areas within the Optimal Piping Plover Area such as pipeline corridors, travel corridors, and access points. Disturbance outside those delineated work areas must be limited, thereby minimizing effects to sandy unvegetated habitat. Driving on the beach for construction shall be limited to the minimum necessary within the designated travel corridor. The delineation of work corridors and work areas in authorized project plans will be sufficient to meet this term and condition.
- Optimal Piping Plover Areas are defined as having documented use by piping plovers, and they include coastal habitat features that function mostly unimpeded. Optimal Piping Plover Areas include:
- a) Designated piping plover Critical Habitat Units (see **Appendix B**);

- b) All Federal, State, and County publicly owned land where coastal processes are allowed to function, mostly unimpeded*, that have any of the following features in the Action Area:
 - i. Located within 1 mile of an inlet;
 - ii. Emergent nearshore sand bars;
 - iii. Washover fans;
 - iv. Emergent soundside and Ocean shoals and sand bars;
 - v. Soundside mudflats, sand flats, and algal flats; or
 - vi. Soundside shorelines.

[*Publicly owned land where coastal processes are allowed to function, mostly unimpeded, generally does not include public lands that are solely state-owned water bottoms, street ends, parking lots, piers, beach accesses, heavily-developed or highly-manipulated parks, or shoreline developed for commercial or residential purposes. It generally does include public lands consisting of undeveloped parks, preserves, and other natural undeveloped shoreline and dunes.]

A.14. If project related activities will be conducted in Optimal Piping Plover Areas, then the piping plover and red knot survey protocol in **Appendix D** must be followed. Two full years of post-construction monitoring is required. Optimal Piping Plover Areas include:

- a) Designated piping plover Critical Habitat Units (see **Appendix B**);
- b) All Federal, State, and County publicly owned land where coastal processes are allowed to function, mostly unimpeded*, that have any of the following features in the Action Area:
 - i. Located within 1 mile of an inlet;
 - ii. Emergent nearshore sand bars;
 - iii. Washover fans;
 - iv. Emergent soundside and Ocean shoals and sand bars;
 - v. Soundside mudflats, sand flats, and algal flats; or
 - vi. Soundside shorelines.

[*Publicly owned land where coastal processes are allowed to function, mostly unimpeded, generally does not include public lands that are solely state-owned water bottoms, street ends, parking lots, piers, beach accesses, heavily-developed or highly-manipulated parks, or shoreline developed for commercial or residential purposes. It generally does include public lands consisting of undeveloped parks, preserves, and other natural undeveloped shoreline and dunes.]

Terms and Conditions – Sea Turtles

A.15. Only beach compatible fill shall be placed on the beach or in any associated dune

system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. Beach compatible fill must be sand comprised solely of natural sediment and shell material, containing no construction debris, toxic material, large amounts of rock, or other foreign matter. The beach compatible fill must be similar in both color and grain size distribution (sand grain frequency, mean and median grain size and sorting coefficient) to the native material in the Action Area. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. In general, fill material that meets the requirements of the most recent version of the North Carolina Technical Standards for Beach Fill (15A NCAC 07H .0312) is considered compatible.

- A.16. During dredging operations, material placed on the beach shall be qualitatively inspected daily to ensure compatibility. If the inspection process finds that a significant amount of non-beach compatible material is on or has been placed on the beach, all work shall stop immediately, and the NCDCM, Corps, and BOEM (as appropriate) will be notified by the permittee and/or its contractors to determine the appropriate plan of action. Required actions may include immediate removal of material and/or long-term remediation activities.
- A.17. Daily sea turtle nesting surveys must be conducted within the project area between May 1 and November 15 of each year, for at least two consecutive nesting seasons after completion of sand placement (2 years post-construction monitoring). Acquisition of readily available sea turtle nesting data from qualified sources (volunteer organizations, other agencies, etc.) is acceptable. However, in the event that data from other sources cannot be acquired, the Corps or permittee will be responsible to collect the data. Data collected for each nest should include, at a minimum, the information in the table, below. This information will be provided to the Service in the annual report, and will be used to periodically assess the cumulative effects of these projects on sea turtle nesting and hatchling production and monitor suitability of post construction beaches for nesting. Please see REPORTING REQUIREMENTS, below.

Parameter	Measurement	Variable
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Number of False Crawls	Visual Assessment of all false crawls	Number/location of false crawls in nourished areas; any interaction of turtles with obstructions, such as sand bags or scarps, should be noted.
False Crawl Type	Categorization of the stage at which nesting was abandoned	Number in each of the following categories: a) Emergence - no digging; b) Preliminary body pit; c) Abandoned egg chamber.
Nests	Number	The number of sea turtle nests in nourished areas should be noted. If possible, the location of all sea turtle nests should be marked on a project map, and approximate distance to scarps or sandbags measured in meters. Any abnormal cavity morphologies should be reported as well as whether turtle touched sandbags or scarps during nest excavation.
Nests	Lost Nests	The number of nests lost to inundation or erosion or the number with lost markers.
Nests	Relocated nests	The number of nests relocated and a map of the relocation area(s). The number of successfully hatched eggs per relocated nest.
Lighting Impacts	Disoriented sea turtles	The number of disoriented hatchlings and adults.

A.18. Visual surveys for escarpments along the Action Area must be made immediately after completion of sand placement, and within 30 days prior to May 1, for two subsequent years after any construction or sand placement event. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet must be leveled and the beach profile must be reconfigured to minimize scarp formation by the dates listed above. Any escarpment removal must be reported by location. The Service must be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service or NCWRC will provide a brief written authorization within 30 days that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken must be submitted to the Service.

A.19. Sand compaction must be qualitatively evaluated at least twice after each sand

placement event, once in the project area immediately after completion of any sand placement event and once after project completion between October 1 and May 1. Compaction monitoring and remediation are not required if the placed material no longer remains on the beach. Within 14 days of completion of sand placement and prior to any tilling (if needed), a field meeting shall be held with the Service, NCWRC, and the Corps to inspect the project area for compaction and determine whether tilling is needed.

- a) If tilling is needed for sand suitability, the area must be tilled to a depth of 36 inches. All tilling activities shall be completed prior to May 1 of any year.
- b) Tilling must occur landward of the wrack line and avoid all vegetated areas that are 3 square feet or greater, with a 3-foot buffer around all vegetation.
- c) If tilling occurs during the shorebird nesting season or seabeach amaranth growing season (after April 1), shorebird surveys and/or seabeach amaranth surveys are required prior to tilling.
- d) A summary of the compaction assessments and the actions taken shall be included in the annual report to NCDCM, the Corps, and the Service.
- e) These conditions will be evaluated and may be modified if necessary to address and identify sand compaction problems.

A.20. A report describing the fate of observed sea turtle nests and hatchlings and any actions taken, must be submitted to the Service following completion of the proposed work for each year when a sand placement activity has occurred. Please see REPORTING REQUIREMENTS, below.

A.21. If a dune system is part of the project design, the placement and design of the dune must be coordinated with the Service.

Terms and Conditions – Seabeach Amaranth

A.22. The Corps Civil Works Program shall continue its annual seabeach amaranth monitoring program in accordance with April 19, 1993 Biological Opinion for various U.S. Army Corps of Engineers' projects and Terms and Conditions A.23 to A.26, below..

A.23. The Corps should survey beach sand placement areas for at least five years following each placement event, to determine the status of the seabeach amaranth populations in the project areas and the effects that beach disposal has on this species. Surveys should be conducted in August or September so that the number of plants reaching reproductive age can be determined.

A.24. Suitable habitat along shoreline reaches that have received sand within the previous five years should be surveyed for the occurrence of seabeach amaranth. Documentation for each seabeach amaranth plant should include location (using a

handheld GPS unit), unique features, abnormalities, or other relevant information. If multiple plants are observed in an area, a single representative GPS point may be logged with accompanying notes describing total plants associated with that point.

- A.25. A Corps report describing the seabeach amaranth survey and results should be submitted to Service, the North Carolina Natural Heritage Program, and the North Carolina Plant Conservation Program, by December 31 of each year. The report should include a map showing locations of seabeach amaranth populations and the numbers of plants, with separate figures for those in flower or fruit, found in the sand placement areas.
- A.26. If tilling of the beach is required due to high compaction levels resulting from beach disposal, surveys should be conducted in advance of the tilling for seabeach amaranth (see sea turtle section - Reasonable and Prudent Measures). No tilling should be conducted in the immediate areas where seabeach amaranth plants are growing.

REASONABLE AND PRUDENT MEASURES for:

B. Projects that are navigation maintenance dredging with beach placement shall include the following measures:

Historically, sand placement events associated with navigation maintenance dredging projects have no local sponsor, are smaller-scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time.

Post-construction requirements are listed in Reasonable and Prudent Measures B.11, B.12, B.13, B.15, and B.16. These post-construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Permittee cannot fulfill these Terms and Conditions, the Corps must reinitiate consultation.

- B.1. Conservation Measures included in the Corps' PBA that address protection of piping plovers, red knots, nesting sea turtles, and seabeach amaranth shall be implemented in the Corps' federally authorized project or regulated activity.
- B.2. The Corps will notify the Service of the commencement of projects that utilize this SPBO for the purposes of tracking incidental take of all species.
- B.3. For the life of the project, all sand placement activities above MHW must be conducted within the winter work window (November 16 to April 30).
- B.4. Prior to sand placement, all derelict material, large amounts of rock, or other debris must be removed from the beach to the maximum extent possible.

- B.5. During construction, trash and food items shall be disposed of properly either in predator-proof receptacles, or in receptacles that are emptied each night to minimize the potential for attracting predators of piping plovers, red knots, and sea turtles.
- B.6. Pipeline placement must be coordinated with NCDCM, the Corps, the Service, and the NCWRC.
- B.7. Access points for construction vehicles should be as close to the project site as possible. Construction vehicle travel down the beach should be limited to the maximum extent possible.
- B.8. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence shall be used for sand placement.
- B.9. A meeting between representatives of the Corps, Service, NCWRC, and NCDCM shall be held prior to the commencement of work on this project.
- B.10. During dredging operations, material placed on the beach shall be inspected daily to ensure compatibility. If the inspection process finds that non-beach compatible material, including large amounts of shell or rock, is or has been placed on the beach, all work shall stop immediately and the NCDCM and the Corps will be notified by the permittee and/or its contractors to determine the appropriate plan of action.
- B.11. For navigation projects with placement of at least 200,000 cubic yards of sand on the beach, sea turtle nesting surveys must be conducted within the project area between May 1 and November 15 of each year, for at least two consecutive nesting seasons after completion, if the sand remains on the beach. Acquisition of readily available sea turtle nesting data from qualified sources (volunteer organization, other agencies, etc.) is acceptable.
- B.12. Sand compaction shall be monitored and tilling shall be conducted if needed to reduce the likelihood of impacting sea turtle nesting and hatching activities.
- B.13. Escarpment formation shall be monitored and leveling shall be conducted if needed to reduce the likelihood of impacting nesting and hatchling sea turtles.
- B.14. Construction equipment and materials shall be stored in a manner that will minimize impacts to piping plovers, red knots, and nesting shorebirds.
- B.15. A report describing the actions taken shall be submitted to the Service work for each year when the activity has occurred.

- B.16. The Corps Civil Works Program shall continue its annual seabeach amaranth monitoring program.

TERMS AND CONDITIONS for:

B. Projects that are navigation maintenance dredging with beach placement, or Corps civil works project shall include the following measures:

Historically, sand placement events associated with navigation maintenance dredging projects have no local sponsor, are smaller-scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time.

All conservation measures described in the Corps' Programmatic Biological Assessment are hereby incorporated by reference as Terms and Conditions within this document pursuant to 50 CFR §402.14(I) with the addition of the following Terms and Conditions. In order to be exempt from the prohibitions of section 9 of the Act, the Corps shall comply with the following Terms and Conditions, which implement the Reasonable and Prudent Measures, described above and outline reporting/monitoring requirements. These terms and conditions are non-discretionary.

Post-construction requirements are listed in Terms and Conditions B.11, B.12, B.13, B.15, B.16, B.17, B.18, and B.19. These post-construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Permittee cannot fulfill these Terms and Conditions, the Corps must reinitiate consultation.

- B.1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles, piping plover, red knot, and seabeach amaranth listed on pages 10-11 of the SPBO shall be implemented in the Corps federally authorized project or regulated activity.
- B.2. The Corps or the Permittee must provide the following information to the Service at least 10 business days prior to the commencement of work:
- a) Project location (include latitude and longitude coordinates, as well as mile markers, cross streets, or street addresses if available);
 - b) Project description (including linear feet of beach, actual fill template, access points, and borrow areas);
 - c) Anticipated date of commencement and anticipated duration of construction
- B.3. For the life of the permit/project, all sand placement activities above MHW must be conducted within the winter work window (November 16 to April 30), unless allowed after additional consultation with the Service.

- B.4. Prior to sand placement, all derelict material, large amounts of rock, or other debris must be removed from the beach to the maximum extent possible. If debris removal activities take place during shorebird breeding season (April 1– August 31), the work shall be conducted during daylight hours only.
- B.5. During construction, trash and food items shall be disposed of properly either in predator-proof receptacles, or in receptacles that are emptied each night to minimize the potential for attracting predators of piping plovers, red knots, and sea turtles.
- B.6. Pipeline placement must be coordinated with NCDCM, the Corps, the Service, and the NCWRC.
- B.7. Access points for construction vehicles should be as close to the project site as possible. Construction vehicle travel down the beach should be limited to the maximum extent possible.
- B.8. Only beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. Beach compatible fill must be sand comprised solely of natural sediment and shell material, containing no construction debris, toxic material, large amounts of rock, or other foreign matter. The beach compatible fill must be similar in both color and grain size distribution (sand grain frequency, mean and median grain size and sorting coefficient) to the native material in the Action Area. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. In general, fill material that meets the requirements of the most recent version of the North Carolina Technical Standards for Beach Fill (15A NCAC 07H .0312) is considered compatible.
- B.9. The Service must be invited to any pre-construction meetings held prior to the commencement of work. Advance notice (of at least 5 business days) must be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the Conservation Measures and Terms and Conditions, and will include the following:
 - a) Staging locations, storing equipment including fuel stations;
 - b) Coordination with the surveyors on required species surveys;
 - c) Pipeline placement (between 5 to 10 feet from dune);
 - d) Minimizing driving;
 - e) Follow up coordination during construction and post construction;
 - f) Direction of the project including progression of sand placement along the beach;
 - g) Plans for compaction monitoring;

- h) Plans for escarpment surveys; and
- i) Names and qualifications of personnel involved in any required surveys.

B.10. During dredging operations, material placed on the beach shall be inspected daily to ensure compatibility. If the inspection process finds that non-beach compatible material, including large amounts of shell or rock exceeding the state sediment criteria (15A NCAC 07H .0312), is or has been placed on the beach, all work shall stop immediately, and the NCDCM and the Corps will be notified by the permittee and/or its contractors to determine the appropriate plan of action.

B.11. For navigation projects with placement of at least 200,000 cubic yards of sand on the beach, sea turtle nesting surveys must be conducted within the project area between May 1 and November 15 of each year, for at least two consecutive nesting seasons after completion of sand placement (2 years post-construction monitoring). Acquisition of readily available sea turtle nesting data from qualified sources (volunteer organizations, other agencies, etc.) is acceptable. Data collected for each nest should include, at a minimum, the information in the table, below. This information will be provided to the Raleigh Field Office in the annual report, and will be used to periodically assess the cumulative effects of these projects on sea turtle nesting and hatchling production and monitor suitability of post construction beaches for nesting. Please see REPORTING REQUIREMENTS, below.

Parameter	Measurement	Variable
Number of False Crawls	Visual Assessment of all false crawls	Number/location of false crawls in nourished areas; any interaction of turtles with obstructions, such as sand bags or scarps, should be noted.
False Crawl Type	Categorization of the stage at which nesting was abandoned	Number in each of the following categories: a) Emergence - no digging; b) Preliminary body pit; c) Abandoned egg chamber.
Nests	Number	The number of sea turtle nests in nourished areas should be noted. If possible, the location of all sea turtle nests should be marked on a project map, and approximate distance to scarps or sandbags measured in meters. Any abnormal cavity morphologies should be reported as well as whether turtle touched sandbags or scarps during nest excavation.
Nests	Lost Nests	The number of nests lost to inundation or erosion or the number with lost markers.

Nests	Relocated nests	The number of nests relocated and a map of the relocation area(s). The number of successfully hatched eggs per relocated nest.
Lighting Impacts	Disoriented sea turtles	The number of disoriented hatchlings and adults.

B.12. Sand compaction must be qualitatively evaluated at least twice after each sand placement event, once in the project area immediately after completion of any sand placement event and once after project completion between October 1 and May 1. Compaction monitoring and remediation are not required if the placed material no longer remains on the beach. Within 14 days of completion of sand placement and prior to any tilling (if needed), a field meeting shall be held with the Service, NCWRC, and the Corps to inspect the project area for compaction and determine whether tilling is needed.

- a) If tilling is needed for sand suitability, the area must be tilled to a depth of 36 inches. All tilling activities shall be completed prior to May 1 of any year.
- b) Tilling must occur landward of the wrack line and avoid all vegetated areas that are 3 square feet or greater, with a 3-foot buffer around all vegetation.
- c) If tilling occurs during the shorebird nesting season or seabeach amaranth growing season (after April 1), shorebird surveys and/or seabeach amaranth surveys are required prior to tilling.
- d) A summary of the compaction assessments and the actions taken shall be included in the annual report to NCDWM, the Corps, and the Service.
- e) These conditions will be evaluated and may be modified if necessary to address and identify sand compaction problems.

B.13. Visual surveys for escarpments along the Action Area must be made immediately after completion of sand placement, and within 30 days prior to May 1, for two subsequent years after any construction or sand placement event. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet must be leveled and the beach profile must be reconfigured to minimize scarp formation by the dates listed above. Any escarpment removal must be reported by location. The Service must be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service or NCWRC will provide a brief written authorization within 30 days that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken must be submitted to the Service.

- B.14. Piping plover habitat (sandy unvegetated habitat along inlet shoulders) shall be avoided to the maximum extent practicable when staging equipment, establishing travel corridors, and aligning pipeline.
- B.15. A report describing the fate of observed sea turtle nests and hatchlings and any actions taken, must be submitted to the Service following completion of the proposed work for each year when a sand placement activity has occurred. Please see REPORTING REQUIREMENTS, below.
- B.16. The Corps' annual seabeach amaranth monitoring program shall continue in accordance with April 19, 1993 Biological Opinion for various U.S. Army Corps of Engineers' projects.
- B.17. The Corps should survey beach sand placement areas for at least five years following each placement event, to determine the status of the seabeach amaranth populations in the project areas and the effects that beach disposal has on this species. Surveys should be conducted in August or September so that the number of plants reaching reproductive age can be determined.
- B.18. Suitable habitat along shoreline reaches that have received sand within the previous five years should be surveyed for the occurrence of seabeach amaranth. Documentation for each seabeach amaranth plant should include location (using a handheld GPS unit), unique features, abnormalities, or other relevant information. If multiple plants are observed in an area, a single representative GPS point may be logged with accompanying notes describing total plants associated with that point.
- B.19. A Corps report describing the seabeach amaranth survey and results should be submitted to Service, the North Carolina Natural Heritage Program, and the North Carolina Plant Conservation Program, by December 31 of each year. The report should include a map showing locations of seabeach amaranth populations and the numbers of plants, with separate figures for those in flower or fruit, found in the sand placement areas.

REPORTING REQUIREMENTS

An annual report detailing the monitoring and survey data collected during the preceding year (required in the above Terms and Conditions) and summarizing all piping plover, red knot, shorebird, and sea turtle data must be provided to the Service's Raleigh Field Office by January 31 of each year for review and comment. In addition, any information or data related to a conservation measure or recommendation that is implemented should be included in the annual report. As in the past, the Corps should submit a separate annual monitoring report detailing seabeach amaranth monitoring and survey data for the preceding year. The contact for these reporting requirements is:

Pete Benjamin, Supervisor
Raleigh Field Office
U.S. Fish and Wildlife Service
Post Office Box 33726
Raleigh, North Carolina 27636-3726
(919) 856-4520

Upon locating a dead, injured, or sick individual of an endangered or threatened species, initial notification must be made to the Service's Law Enforcement Office below. Additional notification must be made to the Raleigh Ecological Services Field Office identified above and to the NCWRC at (252) 241-7367. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury.

Jason Keith
U.S. Fish and Wildlife Service
551-F Pylon Drive
Raleigh, NC 27606
(919) 856-4786, extension 34

COORDINATION OF INCIDENTAL TAKE STATEMENT WITH OTHER

The Service will not refer the incidental take of any migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 USC S 703-712), if such take is in compliance with the terms and conditions specified herein. Take resulting from activities that are not in conformance with the Corps permit or this biological opinion (e.g. deliberate harassment of wildlife, etc.) are not considered part of the proposed action and are not covered by this incidental take statement and may be subject to enforcement action against the individual responsible for the act.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service recommends the following Conservation Actions:

1. Construction activities for these projects and similar future projects should be planned to take place outside the shorebird nesting season (Prior to March 30).
2. The Permittee or the Corps should maintain suitable piping plover migrating and wintering habitat. Natural accretion at inlets should be allowed to remain. Accreting sand spits on barrier islands provide excellent foraging habitat for migrating and wintering plovers.
3. The Service encourages the Corps to work with local sponsors and/or applicants and permittees to develop local beach management plans that include protections for sea turtles, seabeach amaranth, piping plovers, red knots, and other shorebirds.
4. A conservation/education display sign at beach access points would be helpful in educating local beach users about the coastal beach ecosystem and associated rare species, including sea turtles, seabeach amaranth, piping plover, and red knot. The sign could highlight each species life history and basic biology and ways recreationists can assist in species protection efforts (e.g., keeping pets on a leash, removing trash to sealed refuse containers, etc.). The Service would be willing to assist the Corps or the Permittee in the development of such a sign, in cooperation with NCWRC.
5. The Service encourages continued investigation into opportunities for increasing monitoring for Civil Works operations and maintenance projects, including the potential development of a piping plover and red knot survey fund to assist in the management and monitoring of shorebirds in Optimal Piping Plover Areas.
6. If public driving is allowed on the project beach, and if the Corps has the authority, we recommend it exercise its discretionary authority to require the local sponsor or Permittee to have authorization from the Service for incidental take of piping plover, red knot, sea turtles, including nests and hatchlings (as appropriate), due to such driving or provide written documentation from the Service that no incidental take authorization is required. If required, the incidental take authorization for driving on the beach should be obtained prior to any subsequent sand placement events.
7. If the project area is within a local municipality that has not adopted a lighting ordinance, and lighting is shown to be an issue on a nourished beach, and if the Corps has the authority, we recommend it exercise its discretionary authority to require an ordinance be adopted prior to any subsequent sand placement event.
8. If the Corps has the authority, we recommend it exercise its discretionary authority to require that leash-laws and predator control programs (including education of pet owners and cat colony supporters) be implemented.

9. The Corps should work with local municipalities to identify and eradicate beach vitex, an invasive species. Beach vitex populations have been known to impact nesting sea turtles and shorebirds.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE – CLOSING STATEMENT

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the Corps' action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion or the project has not been completed within five years of the issuance of this biological opinion; (3) the Corps' action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

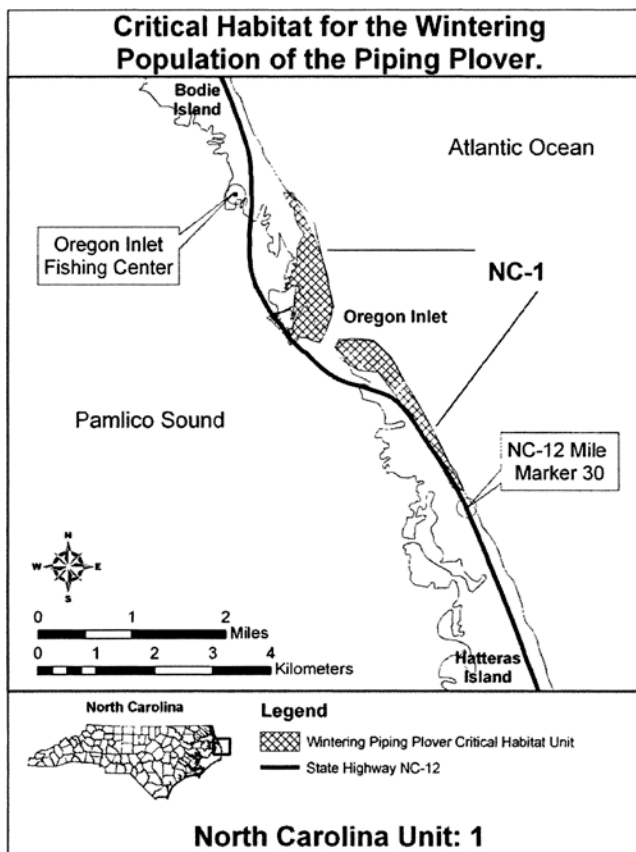
APPENDIX B

North Carolina Critical Habitat Units

Piping Plover Wintering Critical Habitat

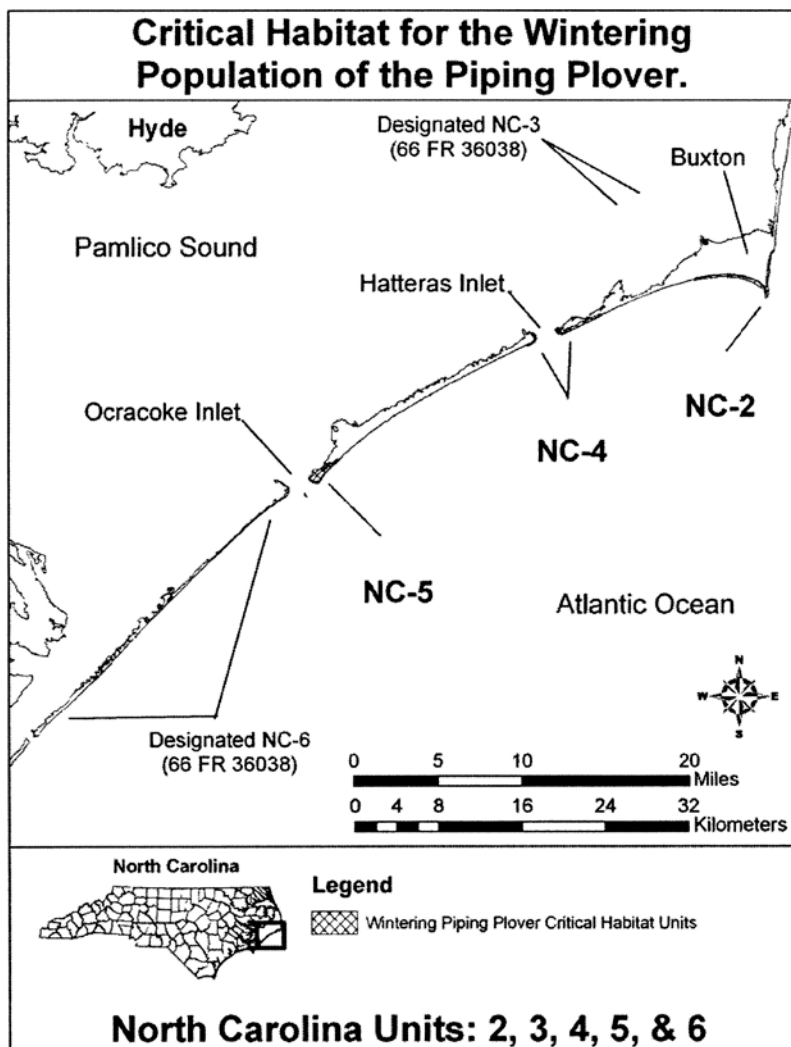
Critical habitat may be viewed at the following web site. An online map is available for viewing, as well as downloadable GIS shapefiles and metadata:

<https://ecos.fws.gov/ecp/report/table/critical-habitat.html>



Unit NC-1 (Oregon Inlet): This unit extends from the southern portion of Bodie Island through Oregon Inlet to the northern portion of Pea Island. It begins at Ramp 4 near the Oregon Inlet Fishing Center on Bodie Island and extends approximately 4.7 mi (7.6 km) south to the intersection of NC Highway 12 and Salt Flats Wildlife Trail (near Mile Marker 30, NC Highway 12), approximately 2.9 mi (4.8 km) from the groin, on Pea Island. The unit is bounded by the Atlantic Ocean on the east and Pamlico Sound on the west and includes lands from the MLLW (mean lower low water) on the Atlantic Ocean shoreline to the line of stable, densely vegetated dune habitat (which is not used by piping plovers and where PCEs do not occur) and from the MLLW on the Pamlico Sound side to the line of stable, densely

vegetated habitat, or (where a line of stable, densely vegetated dune habitat does not exist) lands from MLLW on the Atlantic Ocean shoreline to the MLLW on the Pamlico Sound side. Any emergent sandbars south and west of Oregon Inlet, including Green Island and lands owned by the State of North Carolina, such as island DR-005-05 and DR-005-06, are included (not shown on map). This unit does not include the Oregon Inlet Fishing Center, NC Highway 12 and the Bonner Bridge or its associated structures, the terminal groin, or the historic Pea Island Life-Saving Station, or any of their ancillary facilities (e.g., parking lots, out buildings).



Unit NC-2 (Cape Hatteras Point): This unit is entirely within Cape Hatteras National Seashore and encompasses the point of Cape Hatteras (Cape Point). The unit extends south approximately 4.5 km (2.8 miles) from the ocean groin near the old location of the Cape

Hatteras Lighthouse to the point of Cape Hatteras, and then extends west 7.6 km (4.7 miles) (straight-line distances) along Hatteras Cove shoreline(South Beach) to the edge of Ramp 49 near the Frisco Campground. The unit includes lands from the MLLW on the Atlantic Ocean to the line of stable, densely vegetated dune habitat (which is not used by the piping plover and where PCEs do not occur). This unit does not include the ocean groin.

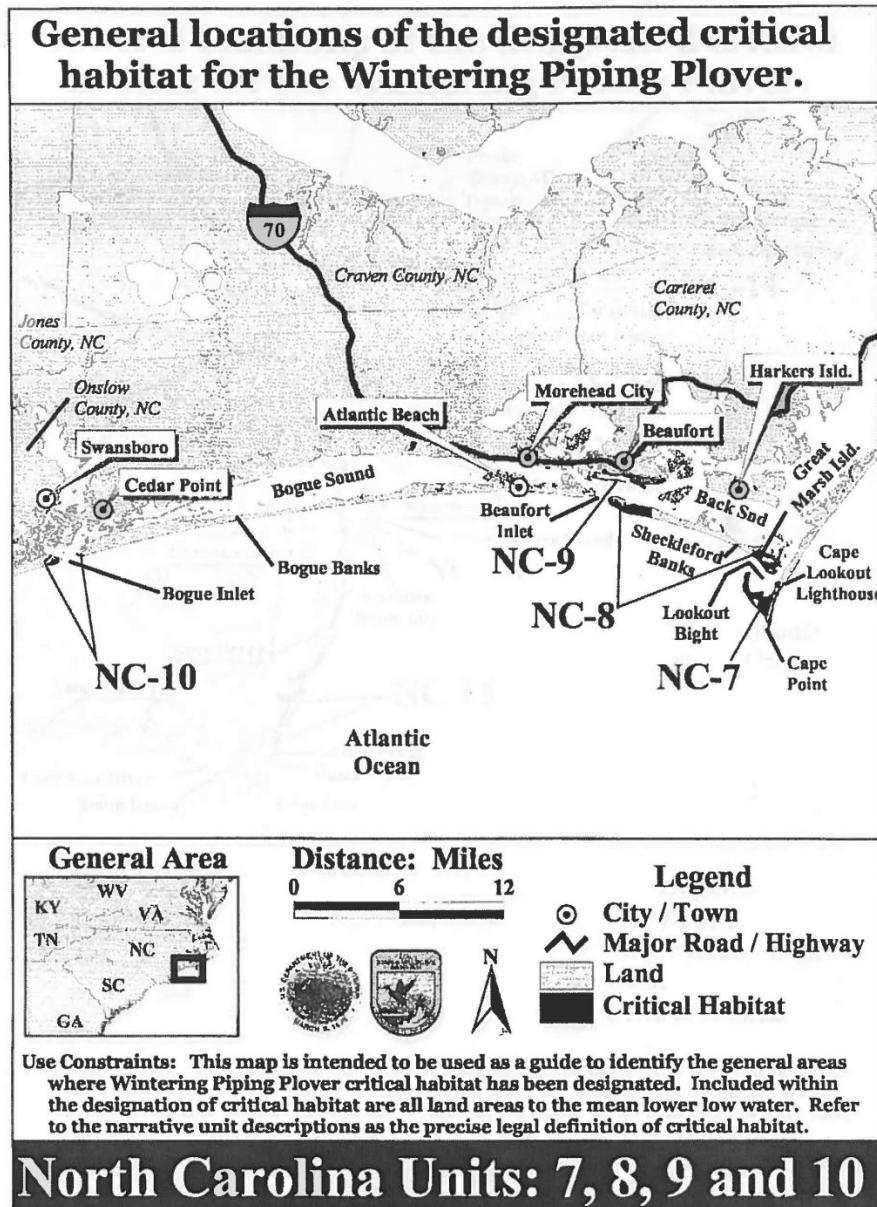
Unit NC-3 (Clam Shoals): The entire unit is owned by the State. This unit includes several islands in Pamlico Sounds known as Bird Islands. This unit includes lands on all islands to the MLLW.

Unit NC-4 (Hatteras Inlet): This unit extends from the western end of Hatteras Island to the eastern end of Ocracoke Island. The unit extends approximately 7.6 km (4.7 mi) southwest from the first beach access point at the edge of Ramp 55 at the end of NC Highway 12 near the Graveyard of the Atlantic Museum on the western end of Hatteras Island to the edge of the beach access at the ocean-side parking lot (approximately 0.1 mi south of Ramp 59) on NC Highway 12, approximately 1.25 km (0.78 mi) southwest (straightline distance) of the ferry terminal on the northeastern end of Ocracoke Island. The unit includes lands from the MLLW on the Atlantic Ocean shoreline to the line of stable, densely vegetated dune habitat (which is not used by the piping plover and where PCEs do not occur) and from the MLLW on the Pamlico Sound side to the line of stable, densely vegetated habitat, or (where a line of stable, densely vegetated dune habitat does not exist) lands from MLLW on the Atlantic Ocean shoreline to the MLLW on the Pamlico Sound side. All emergent sandbars within Hatteras Inlet between Hatteras Island and Ocracoke Island, including lands owned by the State of North Carolina such as Island DR-009-03/04 (not shown on map), are included. The unit is adjacent to but does not include the Graveyard of the Atlantic Museum, the ferry terminal, the groin on Ocracoke Island, NC Highway 12, or their ancillary facilities (e.g., parking lots, out buildings).

Unit NC-5 (Ocracoke Island): This unit is entirely within Cape Hatteras National Seashore and includes the western portion of Ocracoke Island beginning at the beach access point at the edge of Ramp 72 (South Point Road), extending west approximately 3.4 km (2.1 mi) to Ocracoke Inlet, and then back east on the Pamlico Sound side to a point where stable, densely-vegetated dune habitat meets the water. This unit includes lands from the MLLW on the Atlantic Ocean shoreline to the line of stable, densely-vegetated dune habitat (which is not used by the piping plover and where PCEs do not occur) and from the MLLW on the Pamlico Sound side to the line of stable, densely vegetated habitat, or (where a line of stable, densely vegetated dune habitat does not exist) lands from MLLW on the Atlantic Ocean shoreline to the MLLW on the Pamlico Sound side. All emergent sandbars within Ocracoke Inlet are also included. This unit does not include any portion of the maintained South Point Road, NC Highway 12, or any of their ancillary facilities.

Unit NC-6 (Portsmouth Island – Cape Lookout): The entire unit is within Cape Lookout National Seashore. This unit includes all land to MLLW on Atlantic Ocean to MLLW on Pamlico Sound, from Ocracoke Inlet extending west to the western end of the Pilontary Islands. This unit includes the islands of Casey, Sheep, Evergreen, Portsmouth, Whalebone, Kathryne Jane, and Merkle Hammock. This unit also extends west from the eastern side of Old Drum Inlet to 1.6 km (1.0 mi) west of the New Drum Inlet and includes all lands from

MLLW on Atlantic Ocean to MLLW on Core Sound.

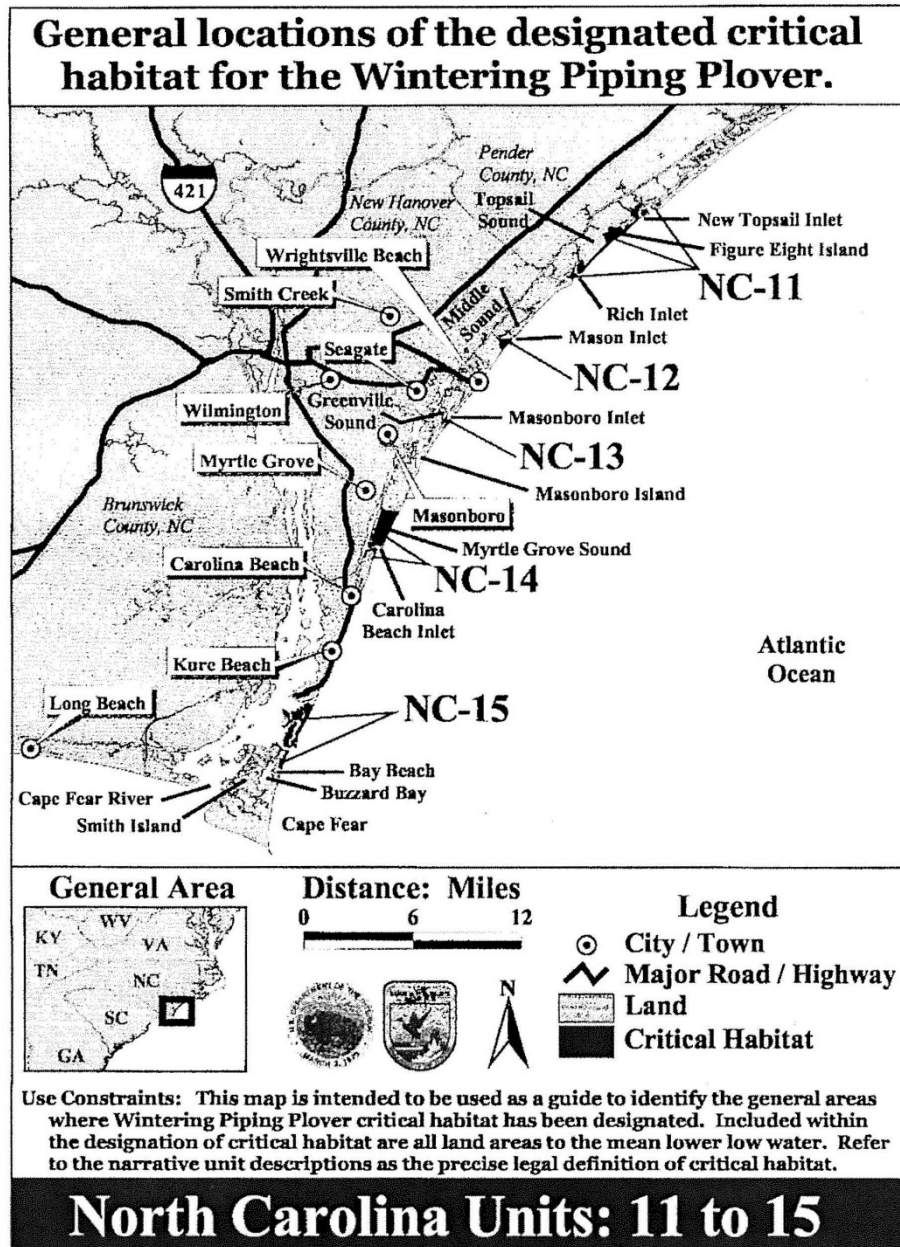


Unit NC-7 (South Core Banks): The entire unit is within Cape Lookout National Seashore. This unit extends south from Cape Lookout Lighthouse, along Cape Lookout, to Cape Point and northwest to the northwestern peninsula. All lands from MLLW on the Atlantic Ocean, Onslow Bay, and Lookout Bight up to where densely vegetated habitat, not used by the piping plover, begins and the constituent elements no longer occur are included.

Unit NC-8 (Shackleford Banks): The entire unit is within Cape Lookout National Seashore. This unit is in two parts: (1) The eastern end of Shackleford Banks from MLLW of Barden Inlet extending west 2.4 km (1.5 mi), including Diamond City Hills, Great Marsh Island, and Blinds Hammock; and, (2) The western end of Shackleford Banks from MLLW extending east 3.2 km (2.0 mi) from Beaufort Inlet. The unit includes all land from MLLW to where densely vegetated habitat, not used by the piping plover, begins and where the constituent elements no longer occur and any emergent sandbars within Beaufort Inlet. This unit is bordered by Onslow Bay, Shackleford Slue, and Back Sound.

Unit NC-9 (Rachel Carson): The entire unit is within the Rachel Carson National Estuarine Research Reserve. This unit includes islands south of Beaufort including Horse Island, Carrot Island, and Lennox Point. This unit includes entire islands to MLLW.

Unit NC-10 (Bogue Inlet): The majority of the unit is privately owned, with the remainder falling within Hammocks Beach State Park. This unit includes contiguous land south, west, and north of Bogue Court to MLLW line of Bogue Inlet on the western end of Bogue Banks. It includes the sandy shoals north and adjacent to Bogue Banks and the land on Atlantic Ocean side to MLLW. This unit also extends 1.3 km (0.8 mi) west from MLLW of Bogue Inlet on the eastern portion of Bear Island.



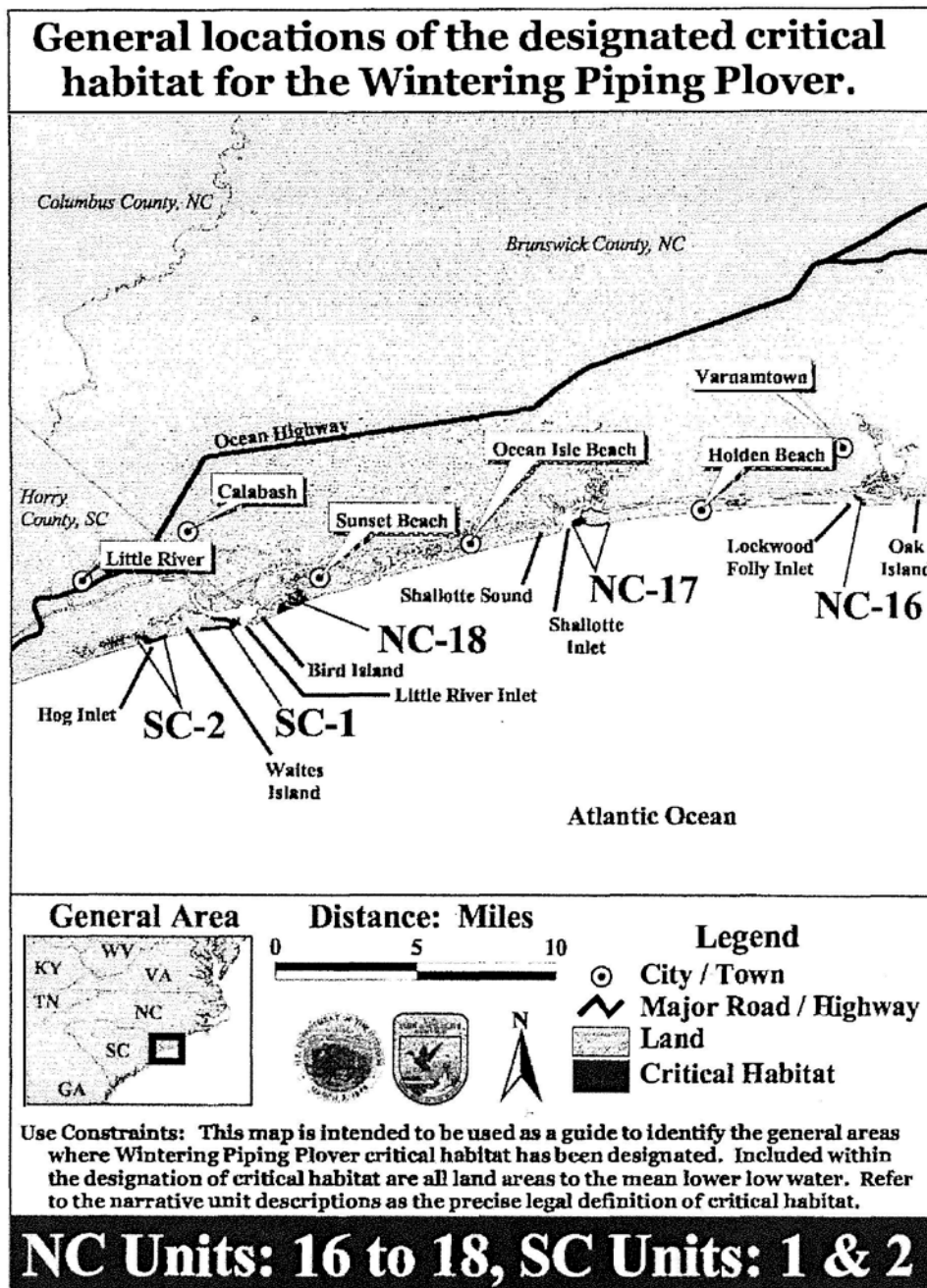
Unit NC-11 (Topsail): The entire area is privately owned. This unit extends southwest from 1.0 km (0.65 mi) northeast of MLLW of New Topsail Inlet on Topsail Island to 0.53 km (0.33 mi) southwest of MLLW of Rich Inlet on Figure Eight Island. It includes both Rich Inlet and New Topsail Inlet and the former Old Topsail Inlet. All land, including emergent sandbars, from MLLW on Atlantic Ocean and sound side to where densely vegetated habitat, not used by the piping plover, begins and where the constituent elements no longer occur. In

Topsail Sound, the unit stops as the entrance to tidal creeks become narrow and channelized. **Unit NC-12 (Figure Eight Island):** The majority of the unit is privately owned. This unit extends south from the western end of Beach Road on Figure Eight Island to the northern end of Highway 74 on Wrightsville Beach. The unit includes Mason Inlet and the sand and mudflats northwest of the inlet from MLLW on Atlantic Ocean to where densely vegetated habitat, not used by the piping plover, begins and where the constituent elements no longer occur.

Unit NC-13 (Masonboro): The entire unit is within the North Carolina National Estuarine Research Reserve. This unit extends 1.1 km (0.70 mi) south from the MLLW of Masonboro Inlet on Masonboro Island. This unit includes all lands along the Atlantic Ocean, Masonboro Inlet, and Masonboro Sound from MLLW to where densely vegetated habitat, not used by the piping plover, begins and where the constituent elements no longer occur.

Unit NC-14 (Carolina Beach Inlet): The majority of the unit is within Myrtle Grove Sound on Masonboro Island and is owned by the North Carolina National Estuarine Research Reserve. This unit extends south from 3.2 km (2.0 mi) north of MLLW at Carolina Beach Inlet on Masonboro Island to 1.1 km (0.70 mi) south of MLLW at Carolina Beach Inlet on Carolina Beach. It includes land from MLLW on Atlantic Ocean across and including lands to MLLW on the western side of Masonboro Island, excluding existing dredge spoil piles. Emergent sand bars within Carolina Beach Inlet are also included.

Unit NC-15 (Ft. Fisher): This unit is within Ft. Fisher State Recreation Area and Zeke's Island Estuarine Reserve. This unit extends south from Ft. Fisher Islands (from the rocks), south of the ferry terminal, to approximately 0.8 km (0.5 mi) south of MLLW at Corn Cake Inlet on Smith Island. It includes all land (including Zeke's Island) from MLLW on Atlantic Ocean across to MLLW on the eastern side of the Cape Fear River.



Unit NC-16 (Lockwood Folly Inlet): The entire unit is on Oak Island (formerly known as the Town of Long Beach) and is privately owned. This unit extends from the end of West Beach Drive, west to MLLW at Lockwood Folly Inlet, including emergent sandbars south and adjacent to the island. This unit includes land from MLLW on Atlantic Ocean across to MLLW adjacent to the Eastern Channel and the Intracoastal Waterway.

Unit NC-17 (Shallotte Inlet): The entire unit is privately owned. This unit begins just west of Skimmer Court on the western end of Holden Beach. It includes land south of SR 1116, to where densely vegetated habitat, not used by the piping plover, begins and where the constituent elements no longer occur to the MLLW along the Atlantic Ocean. It includes the contiguous shoreline from MLLW to where densely vegetated habitat, not used by the piping plover, begins and where the constituent elements no longer occur along the Atlantic Ocean, Shallotte Inlet, and Intracoastal Waterway stopping north of Skimmer Court Road. The unnamed island and emergent sandbars to MLLW within Shallotte Inlet are also included.

Unit NC-18 (Mad Inlet): The entire unit is privately owned. This unit extends west 1.2 km (0.75 mi) from the end of Main Street (SR 1177) on western Sunset Beach to the eastern portion of Bird Island and includes the marsh areas north of western Sunset Beach shoreline. The shoreline area begins at MLLW on the Atlantic Ocean and continues landward to where densely vegetated habitat, not used by the piping plover, begins and where the constituent elements no longer occur.

APPENDIX D: USFWS Raleigh North Carolina Field Office Piping Plover and Red Knot Survey Minimum Survey Requirements To Document Site Abundance and Distribution

Required skills, training, and equipment for conducting surveys

1. Piping plover monitors must be capable of detecting and recording locations of roosting and foraging plovers, accurately reading and recording bands, and documenting observations in legible, complete field notes. Aptitude for monitoring includes keen powers of observation, familiarity with avian biology and behavior, experience observing birds or other wildlife for sustained periods, tolerance for adverse weather, experience in data collection and management, and patience. Monitors must also be able to captain a boat (if applicable) and walk long distances carrying field gear.
2. Binoculars, a GPS unit (set to record in decimal degrees in the WGS datum), a 10-60x spotting scope with a tripod, boat access (if applicable), and the RFO's datasheet must be used to conduct the surveys.

Piping plover survey methodology

3. Nonbreeding piping plover abundance and distribution must be determined through 6 surveys per season (2 during fall migration scheduled ≤ 3 days apart, 2 during winter scheduled ≤ 3 days apart, and 2 during spring migration scheduled ≤ 3 days apart). Suitable habitat must be surveyed by walking the survey area (weather and tide permitting, no surveys should be conducted if sustained winds exceed 20 mph) during the survey window (July 15 – May 15).
4. Surveys should be scheduled around the peak of migration (September in Fall and March in Spring) based on input from the RFO. Winter surveys must be conducted between December 1 and January 31. Surveys should be conducted around mid-tide when birds will still be foraging, making legs easier to see for re-sighting bands, but more concentrated.
5. All unbanded and banded piping plovers must be recorded on the RFO datasheet. Weather data must be collected at the beginning of each survey. The presence/absence of bands, GPS coordinate, plumage, behavior, and habitat type must be recorded for each piping plover.
6. Band resightings must be read and documented during each survey.
7. GPS coordinates must be collected in decimal degrees during each survey for each bird as close to the location of the bird as possible without causing a change in

behavior (if the bird is spending most of its time watching the monitor instead of continuing the behavior it was exhibiting when it was first spotted).

8. Recreation and disturbance must be documented during the surveys. The number of people, dogs (on and off leash), bicycles, vehicles, etc. must be recorded during the surveys. Additionally, any activity causing a disturbance (change in behavior, particularly if the disturbance flushes the birds) to roosting or foraging birds must be noted on the datasheet.
9. Survey data must be recorded in the field on the RFO datasheet and transcribed into the Microsoft Access database (provided by the RFO). Electronic hard copies of the datasheets and the database must be provided annually by June 15 to the RFO.

Red Knot

10. Red knots must be recorded during the piping plover surveys when both species are present. Additional surveys for red knots during their peak season must follow the same protocol outlined above. Band combinations, flag color and alphanumeric codes, and geolocators must be noted on the datasheet if applicable. All resightings must be reported on www.bandedbirds.org.

Be careful not to disturb the bird. A slow, quiet approach avoids harassment and allows the observer to carefully scan the band combination. Using a spotting scope facilitates accurate observations from a distance.

Please record:

1. Location where the bird was seen (GPS coordinates are helpful).
2. Date when the bird was seen.
3. Any observations of the bird's behavior (e.g., roosting, foraging).
4. Band combination:
 - a. Band combinations should be recorded in the following sequence: upper left (UL; above the "knee"), lower left (LL; below the "knee"), upper right (UR), lower right (LR). "Right" and "left" are from the bird's perspective, not the observer's (just like a person's right and left legs). (please refer to http://www.fws.gov/charleston/pdf/PIPL/20141205_usfws_pipl_survey_datasheet.pdf)
 - b. Band types include flags (band with tab sticking out), metal, and color bands.
 - c. Some bands may have alpha-numeric codes printed on the band or the flag (e.g., A1). The code, in addition to the color and location of the band or flag should be documented. Both the color of the band and the code (e.g., white writing on a green band) should be noted.
 - d. Some bands are split (a single band with two colors; e.g., orange/blue) or triple split (a single band with three colors; e.g., blue/orange/blue).
 - e. Sometimes two bands of the same color are placed over each other, appearing like one very tall band.
 - f. Some piping plovers are banded on the upper legs only, and bands can be stacked (one above the other) on the upper leg.
 - g. Record leg positions where bands are absent.
 - h. Note if the color or type of any of the bands is uncertain or if some parts of a leg were not seen clearly.
 - i. Recognize that band colors can fade over time.

For banded piping plovers seen in North Carolina, please send this information along with the observer's contact information to melissa_chaplain@fws.gov. For more information about band resighting, please consult http://www.fws.gov/charleston/pdf/PIPL_Band_Identification_Training.pdf



Left Figure: This band combination would be recorded as: metal (UL), dark blue (LL), black flag (UR), red over black (LR). The band combination would be recorded as: X,B:Lf,RL. **Middle Figure:** Examples of alpha-numeric gray, black, and white flags. **Right Figure:** Example in yellow circle shows use of an alpha-numeric code on a color band.

Datasheet Habitat Descriptor Definitions

Back beach – dry sand, beach landward of the mean high water (MHW) line and seaward of the dune line.

Dune – A mound, hill, or ridge of wind-blown sand, either bare or covered with vegetation located landward of the back beach.

Ephemeral pool – a temporary water feature located on the beach.

Mudflat – intertidal area typically located behind sand spits adjacent to inlets. They appear darker in color than sand, and are soft and slick to walk on. The closest vegetation is typically *Spartina* sp.

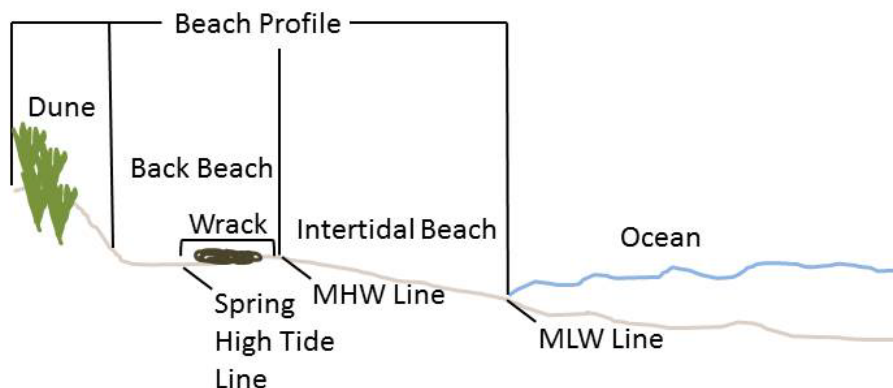
Intertidal beach – wet, smooth sand; beach seaward of the MHW line and landward of the mean low water (MLW) line.

Sandflat – flat, rippled intertidal area along sound shorelines or around the mouth of an inlet. They are firm to walk on.

Dense vegetation – vegetation located on the back beach or dunes that provides >75% cover.

Washover – beach sand that has been transported landward of the beach/dune system by storm waves, areas where sand and shells become the top layer of once vegetated areas following a storm event.

Wrack – organic plant material deposited between MHW line and the spring high tide line.



Nonbreeding PIPL/REKN Survey Data Sheet

Page__ of__

Date: _____ **Location:** _____ **Observer(s):** _____

Survey #: _____ **Survey Coverage:** (circle one): ALL NE SW **Survey Type:** (circle one): Population Foraging Roosting S/R

Start Time:_____ **End Time:**_____ **General weather** (circle one): Sunny Partly cloudy Cloudy Rain Fog Other (describe)

Temp: _____ °F **Wind Direction** (circle one): N NE E SE S SW W NW **Wind Speed** (circle one): 0-5 6-10 11-15 16-20 >21 MPH

Tidal stage at start of survey (circle one): Low Mid High (Rising/Falling)

Disturbance (#): Pedestrian(s) Boat(s) Bicycle(s) ATV(s) ORV(s) Dog(s) On Dog(s) Off

[illegible]

Abbreviation Key							
Band Color		Plumage		Behavior		Habitat	
A	Gray	B	Basic (nonbreeding)	D	Disturbed	M	Mudflats
B	Dark blue	A	Alternate (breeding)	FR	Foraging	S	Sandflats
b	Light blue	P	Partial (some breeding)	R	Roosting	B	Beach
f	Flag			L	Loafing	D	Dunes
G	Dark green			T	Territorial	WR	Wrack
g	Light green			O	Other	IT	Ocean intertidal
L	Black					WA	Washover
N	No band seen (leg position not visible)					VS	Vegetation sparse (<75%)
O	Orange					VT	Vegetation thick (>75%)
P	Pink					EP	Ephemeral pool
R	Red					O	Other
U	Purple						
W	White						
X	Metal						
Y	Yellow						
-	No band (no band on that leg position)						
/	Split band (color/color on one band)						
//	Triple split band (color/color/color on one band)						



August 28, 2017
NC SPBO
Executive Summary