

September 23, 1998

Mr. H. Farrell McMillan, Chief
Engineering/Planning Division
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Mr. McMillan:

This is the Service's Biological Opinion, 98-005 (F) pursuant to Section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531, et seq.). This Opinion addresses the Falkner Island, Long Island Sound, Guilford Connecticut - Shoreline Protection Project and its effects on the endangered roseate tern (*Sterna dougallii*). Critical habitat pursuant to Section 4(a)(3) of the Endangered Species Act has not been designated for the North Atlantic population of the roseate tern.

The occurrence of any other federally-threatened or endangered species at Falkner Island, with the exception of transient (non-breeding) bald eagles (*Haliaeetus leucocephalus*), piping plovers (*Charadrius melodus*), and peregrine falcons (*Falco peregrinus*), is unlikely. A survey for the endangered American burying beetle (*Nicrophorus americanus*), which occurs on nearby Block Island, Rhode Island, and historically occurred on Long Island, New York, was conducted at Falkner Island in 1991, and recorded only the common, non-endangered congener *N. orbicollis* (Faulkner's Light Brigade Proposal for Erosion Control, 1993). The threatened northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*) also historically occurred on nearby Block Island, Rhode Island, and at several beaches on eastern Long Island, NY. However, this species requires open, sandy beaches and since this habitat is not well represented at Falkner Island, the northeastern beach tiger beetle has not been recorded there.

As pointed out in the ACOE's Environmental Assessment, Falkner Island is within the Service's Stewart B. McKinney National Wildlife Refuge and is administered by the Service's Refuges Division from a field office in Westbrook, Connecticut. This Biological Opinion does not obviate the need for the ACOE to obtain a Special Use Permit and to further coordinate with Refuge Manager, Mr. William Kolodnicki in Westbrook, prior to initiation of construction.

The Service has reviewed all available materials provided by the ACOE for the subject project, including the final environmental assessment, biological assessment and design drawings and specifications, dated May 1998.

Consultation History:

Information on the proposed shoreline protection project at Falkner Island and the potential effect on endangered roseate terns was exchanged during numerous informal consultations between our agencies and other interested parties, and is summarized as follows:

August 24, 1994 - meeting between the Faulkner Light Brigade, ACOE, U.S. Fish and Wildlife Service (staff from Stewart B. McKinney and Ninigret National Wildlife Refuges, Engineering and Patuxent Wildlife Research Center) to discuss biological and engineering aspects of project.

November 1996 - site visit to Falkner Island by ACOE and Stewart B. McKinney staff.

May 8, 1997 - meeting between the ACOE and the USFWS (New England Field Office and Stewart B. McKinney National Wildlife Refuge) and the Little Harbor Lab, at the Service's Hadley, Massachusetts, Regional Office.

June 17, 1997 - letter to Michael Bartlett, Supervisor, NEFO, from Richard Reardon, Chief, Engineering/Planning Division, ACOE, requesting comments under the Fish and Wildlife Coordination Act and the Endangered Species Act for the Falkner Island project.

July 21, 1997 - letter to Richard Reardon, ACOE from Acting Supervisor, Michael Amaral, NEFO, transmitting Service comments pursuant to the Fish and Wildlife Coordination Act and the Endangered Species Act.

February 9, 1998 - draft environmental assessment and biological assessment from Cathy Demos, ACOE, received by Michael Amaral, NEFO.

February 20, 1998 - letter to Cathy Demos, ACOE, from Michael Amaral, NEFO, transmitting Service's comments on the ACOE's draft environmental assessment and biological assessment.

March 23, 1998 - meeting between the ACOE, the Connecticut Department of Environmental Protection (DEP), Office of Long Island Sound Programs, and the Service's NEFO and Stewart B. McKinney NWR staff at CT DEP's Hartford office.

June 2, 1998 - final ACOE project drawings and specification, and construction solicitation and specifications (dated May 2, 1998) received by NEFO.

June 4, 1998 - letter to Michael Bartlett, NEFO, from H. Farrell McMillan, Chief, Engineering/Planning Division, ACOE, transmitting final environmental assessment and biological assessment and requesting initiation of formal consultation under Section 7 of the ESA.

June 18, 1998 - telephone call to Cathy Demos, ACOE, from Michael Amaral, NEFO, requesting clarification and additional information on materials submitted by the ACOE to NEFO on June 4, 1998.

June 18, 1998 - fax transmittal to Michael Amaral, NEFO from Cathy Demos, ACOE, providing partial consultation history and additional technical data regarding surface area of proposed revetment.

June 18, 1998 - letter to H. Farrell McMillan, ACOE, from acting Supervisor, Kenneth Carr, NEFO, acknowledging receipt of the request for formal Section 7 consultation and confirming that sufficient information was provided by the Corps to initiate consultation.

A complete administrative record for this project is available at the Service's New England Field Office at 22 Bridge Street, Concord, New Hampshire, 03301.

Biological Opinion:

In the Western Hemisphere, the roseate tern is geographically separated into two populations. One population is listed as threatened and breeds on islands around the Caribbean Sea from the Florida Keys to the Lesser Antilles. The other population is listed as endangered, and breeds on islands along the northeastern Atlantic coast from New York to Maine and in adjacent maritime Canada (Federal Register 52:42064-42071, November 2, 1987).

In developing biological opinions pursuant to Section 7 of the ESA, Service policy provides for the evaluation of jeopardy to a species such as the roseate tern, within its specific distinct population segment, rather than across the species' entire range. Thus, endangered roseate terns in the northeastern Atlantic population (only) are the subject of this consultation.

It is the Service's biological opinion that construction and placement of shoreline protection revetment on Falkner Island is not likely to jeopardize the continued existence of the northeastern Atlantic population of the roseate tern. This project will not jeopardize the roseate tern because anticipated adverse effects to the species from the alteration of nesting habitat are likely to be offset by the creation of "new" nesting habitat and the long-term protection of Falkner Island from further erosion. As critical habitat has not been formally designated for the roseate tern under Section 4 of the ESA, none will be destroyed or adversely modified by the proposed action.

Falkner Island:

Falkner Island is a small, crescent shaped island 3 miles south of Guilford, Connecticut in Long Island Sound (Figure 1). The Island is about 250 feet wide and 1,200 feet long and is composed of unconsolidated glacial sediments (Faulkner Island Light Brigade, 1993). Among the Island's most notable features is an historic, operating light station that was commissioned by Thomas Jefferson in 1801 and constructed in 1802. The most notable wildlife resource is the large colony of nesting terns, including 3,000 to 4,000 pairs of common terns (*Sterna hirundo*) and 120-150 pairs of endangered roseate terns. Falkner Island is presently one of the five largest roseate tern colonies within the breeding range for this species in the North Atlantic. Along with Bird and Ram Islands in Buzzards Bay, Massachusetts; Great Gull Island, New York; and Eastern Egg Rock in Maine, the roseate terns at Falkner Island are essential to the survival and recovery of this endangered species. In recognition of the importance of Falkner Island as a breeding site for marine birds and other wildlife, the Island, with the exception of the lighthouse and other improved structures, was added to the Service's National Wildlife Refuge system in 1984.

In addition to nesting terns, the Light Brigade Proposal (1993) and annual reports by Dr. Jeff Spendelow of the Patuxent Wildlife Research Center refer to the occurrence on the Island of over 130 species of birds, and a few species of terrestrial mammals.

Roseate Tern Biology¹

The roseate tern is a medium-sized sea tern about 15 inches long (including tail streamers up to 8 inches) and weighs about 4 ounces. Its plumage superficially resembles that of the common tern, among which it invariably nests in the Northeast.

The known breeding and winter distribution of roseate terns in the Western Hemisphere is as follows: Birds of the northeastern population breed from Long Island, New York, east and north to Nova Scotia and Quebec (Iles Madeleines). Historically, the breeding range extended south to Virginia and North Carolina. In recent decades, the breeding range has contracted and the population has become concentrated in the Massachusetts-Connecticut-New York area.

¹The following description of roseate tern breeding biology and habitat requirements is excerpted from the Roseate Tern Northeastern Population Recovery Plan, First Update, September 1998.

Insert Figure 1

The basic breeding biology of the roseate tern is as follows: Adults return to nesting colony sites in April, and begin egg laying in mid-to-late May, typically 2 eggs are laid and the incubation period lasts 23 days. Young tern chicks are fed small fish by both adults and grow rapidly. Renesting is common if the first clutch of eggs is lost. By mid-August, most terns have completed nesting and leave the colony sites for pre-migratory staging areas. After feeding for a matter of weeks, roseate terns migrate south through the West Indies to winter off the northern and eastern coasts of South America. The winter quarters are still not well defined. Recent findings have located wintering birds along the Brazilian coast as far as 18 degrees south (Hays *et al.* 1997; Hays *et al.* in press; Hays *et al.* in prep.).

The roseate tern is exclusively marine, usually breeding on small islands, but occasionally on sand dunes at the ends of barrier beaches. All recorded nestings in the Northeast have been in colonies of common terns. Within these mixed colonies, roseate terns usually select the more densely vegetated parts of the nesting area (Burger and Gochfeld 1988) or other areas that provide dense cover. Unlike most other temperate zone terns, roseate terns usually nest under or adjacent to objects that provide cover or shelter (Nisbet 1981). These objects include clumps of vegetation, rocks, driftwood, or other man-made objects. Plants utilized for cover include beach grass (*Ammophila breviligulata*), seaside goldenrod (*Solidago sempervirens*), lambs quarter (*Chenopodium alba*), beach pea (*Lathyrus japonica*) and mustard (*Brassica* sp.). At some colony sites, vegetation grows to a height of 1-2 meters over the nesting sites during the breeding season, providing concealment for the eggs and chicks, but sometimes impeding access by the adults. At other colony sites, roseate terns nest under rocks, sometimes deep within crevices of rock riprap placed to protect island slopes from erosion. They readily adopt artificial sites such as nest boxes or partly-buried automobile tires (Spendelov 1982, 1994). Nests typically are 60 to 180 centimeters apart and density is sometimes as high as two or three nests per square meter within patches of suitable cover (Nisbet 1981; Burger and Gochfeld 1988b).

Foraging Habitat During the Breeding Season

During the breeding season, roseate terns forage over shallow coastal waters around the breeding colonies. They tend to concentrate in places where prey fish are brought close to the surface, either by predatory fish chasing them from below or by vertical movement of the water. Hence, they usually forage over shallow bays, tidal inlets and channels, tide-rips and sandbars over which tidal currents run rapidly (Nisbet 1981; Duffy 1986; Safina 1990a; Heinemann 1992; Casey, Kilpatrick and Lima unpubl. data). Roseate terns usually feed in clearer and deeper water than those favored by common terns from the same colony sites and rarely feed close to shore.

Description of the Proposed Action:²

The proposed action is the construction of 1,400 linear feet of revetment along the east shore, and encircling the north and south shores to tie in the structure. The northern point of the Island would be rounded back 35 feet to accommodate placement and anchoring of the revetment. The toe of the structure would extend below mean high water in some areas, but would not extend below mean low water. A 300-foot-long, five-foot-wide berm would be constructed along the top of the bluff in front of the lighthouse to direct rainfall runoff away from the slope and to provide anchorage for an erosion control blanket. Access points, staging areas, ramps and other aspects of the project are described in the ACOE's final EA and Biological Assessment.

The purpose and need for the project as described in the ACOE's final EA is to stabilize the eroding shoreline adjacent to the Falkner Island Lighthouse. In addition, the ACOE Biological Assessment states that a collateral purpose of the project is to "identify and evaluate which alternative would reduce or eliminate erosion on the east side of the island, without jeopardizing the continued existence of the federally-endangered Roseate Tern."

Erosion of the Island is caused by rain and surface runoff washing unconsolidated glacial till from the exposed slopes down to the beach. During storm events, waves carry away the material that accumulates at the base of the slope. The ACOE estimates that, historically, the Island has been eroding at the rate of 6 inches per year. If the forces eroding the Island remain unchecked, not only will the foundation of the historic lighthouse be undermined, but the area of the Island will continue to diminish, thereby eventually reducing the amount of nesting habitat available to roseate terns.

Species Account/Environmental Baseline:

At the time of its addition to the endangered species list in 1987, the primary threats to the species included low population size (about 3,000 nesting pairs); loss of prime offshore nesting habitat to encroachment by gulls; and vulnerability to breeding failure and predation, as most nesting pairs (about 90%) were concentrated at just a few, relatively large near-shore colonies.

In the decade since listing, the Northeastern roseate tern population has increased to about 4,000 pairs (Brad Blodget, pers. comm., August 1998) and a number of islands that were former tern colony sites have been restored through removal of competing gull species and re-occupied by nesting roseate terns. These include Eastern Egg Rock, Petit Manan and Stratton Islands, Maine; Ram Island and a portion of Monomoy Island, Massachusetts; and Gardiner's Point Island, New York.

² The description of the proposed action is paraphrased from the ACOE's, final Environmental Assessment and Biological Assessment, dated May 1998.

Current threats to the survival and recovery of the roseate tern include the continued reduced population size and concentration of most of the northeastern breeding population at just a few major colony sites. At these near-shore sites, roseates are vulnerable to predation from species such as great horned owls, black-crowned night-herons and (potentially) foxes, that are usually absent from off-shore sites. In addition, erosion and overwashing of nesting habitat is identified as a significant threat to several important breeding sites, including Bird and Ram Islands (MA), Warner Island (NY), and Falkner Island (USFWS 1998).

Ecology of Falkner Island Roseate Terns: Systematic banding of common and roseate terns at Falkner Island began in 1978 with the initiation of the Falkner Island tern project. A comprehensive study on the roseate tern was initiated in 1987 as a region-wide study of the population dynamics and ecology of the birds breeding in the MA-CT-NY area. This study is coordinated by Dr. Jeffrey A. Spendelow of the Patuxent Wildlife Research Center (Patuxent) of the U.S. Geological Survey's Biological Resources Division and has resulted in a wealth of information on the roseate tern population nesting at Falkner Island (see references in USFWS 1998).

Since the listing of this species as endangered in 1987, the roseate tern (total season) nesting population at Falkner has declined from a high of about 190 pairs in 1988 to a low of 105 pairs in 1998 (J. Spendelow, *in litt.*, September 1998). From 1992-1997, the population at this site was relatively stable at 130-160 pairs. In 1998, about 30 fewer pairs nested at Falkner than in the previous two years (see below).

Estimated "peak period" numbers³ of nesting pairs of roseate terns at Falkner Island and four other large colonies sites in the northeastern U.S. 1988-1998 (excerpted from Roseate Tern Northeastern Population Recovery Plan, First Update 1998, and pers. comm. B. Blodget, L. Welch, and J. Spendelow).

YEAR	<u>1988</u>	<u>89</u>	<u>90</u>	<u>91</u>	<u>92</u>	<u>93</u>	<u>94</u>	<u>95</u>	<u>96</u>	<u>97</u>	<u>98</u>
Falkner I.	147	96	150	149	107	130	123	125	135	136	115
E. Egg Rock	5	17	38	50	51	59	63	86	126	138	144
Ram I. MA	0	0	0	0	0	0	76	197	719	253	543
Bird I. MA	1572	1473	1547	1728	1375	1319	1238	1250	996	1179	1113
Great Gull, NY	1004	960	1026	1204	964	1040	1138	1056	1064	1455	1690

³Peak period estimates are based on the number of nests found containing eggs at the time of hatching of the first chick and are believed to reflect the initial nesting attempts by older, more experienced breeders.

In 1997, an estimated 3,382 (peak period) pairs of roseate terns nested in the northeastern United States, of which 136 pairs, or 4%, nested at Falkner Island. In 1998, the total nesting population increased to about 4,000 pairs, while a slight decrease to 115 pairs (or 3% of total) was recorded for Falkner Island. Although up to 10 roseate pairs nested at Duck and Tuxis Islands, Connecticut in 1989, few roseate terns appear to have used these sites in the 1990's, making Falkner Island the only significant nesting colony statewide. Moreover, the importance of the Falkner Island population to the recovery of the species rangewide is greater than a numerical description of population size. Due to the Patuxent Wildlife Research Center's long-term study at Falkner Island, many of the roseate terns there are known-age and known-origin birds that are individually marked. Information obtained from this study is contributing to our understanding of roseate tern breeding ecology, dispersal, survival rates and other aspects of life history.

Falkner Island supports the largest common tern colony in Connecticut. In general, roseate terns are thought to benefit from an association with common terns, a closely-related species with which they share nesting colony sites. However, where the ratio of commons to roseates is highly skewed (e.g., 3-4,000 pairs of common terns to . 125 pairs of roseate terns at Falkner), competition with common terns for food may be an important factor lowering roseate tern productivity and possibly retarding or preventing local population growth. This topic warrants further study (USFWS 1998).

At Falkner Island, roseate terns readily nest in half-buried tires and in nest boxes around the base of the Island, i.e., the high beach area above mean high water (Spendelow 1994, 1996). Terns using such shelters usually have higher success than those that do not. Other types of artificial structures may work as well. Overhead screens of some type may provide young terns with protection from gulls, night-herons, and raptors in areas with sparse vegetation. In contrast to the roseates, the common terns on Falkner Island nest not only on the high beach but also on the slopes and on the top of the Island, which is vegetated.

Erosion and Ecology of Roseate Terns at Other Breeding Sites:

Researchers and the Roseate Tern Recovery Team recognize the importance of erosion as a threat to the long-term viability of roseate tern nesting colonies. The following paragraphs pertaining to erosion are excerpted or paraphrased from the Roseate Tern Recovery Plan.

Between 1920 and 1979, at least 30 major roseate tern colony sites (those with >200 nesting pairs) were abandoned or were subject to drastic reductions in numbers (Nisbet 1980). Erosion is cited as a contributing factor leading to colony abandonment in about 20% of these cases (see Table 1A of USFWS 1998; Nisbet 1973, 1980, and 1989; Kirkham and Nettleship 1987).

Islands used by roseate terns from Maine to Long Island, New York vary greatly in physical characteristics. However, many are low areas exposed to some erosion and tidal overwash. This reduces the amount of nesting area available and sometimes results in major losses of eggs and young to flooding.

The breakdown of containment structures, many years of erosion, recent severe storms, and rising sea levels are together, or in various combinations, threatening many sites. For example, Bird and Ram Islands, Massachusetts, and Warner Island, New York, all have substantial areas which are subject to flooding at high tides. Continued unchecked, erosion will increasingly compromise capacity and productivity at these sites and slow the recovery effort. Dredged material from approved projects (such as the Cape Cod Canal maintenance dredging) should be used to enhance these Islands. Any such addition of material should be limited to the non-nesting portion of the year. Riprap material along the periphery of these Islands would help to protect them from continued erosion. Permits issued for such projects should include specific conditions regarding fill material, grading, vegetation plantings, and a firm completion date. Accordingly, the Roseate Tern Recovery Team identified the following as foremost among six recovery strategies:

Maintain suitable conditions for nesting roseate terns at existing breeding sites in the Northeast, to enhance them where possible and to protect and manage these sites to support continued population growth. Specific activities include wardening, posting, control of human visitation and surveillance for predation or other adverse factors. At some sites activities also may include erosion control, restoration of eroded areas, vegetation management, provision of artificial nest sites [emphasis added], control of encroaching gulls and control of other predators. Existing and potential breeding sites should be visited and censused each year to monitor changes in numbers and distribution.

At Great Gull Island, New York, most roseate terns nest in rock crevices created when the Island was riprapped for storm damage protection. These nesting sites offer the benefit of protection from most predators. Use of riprap to create additional nesting substrate incidental to erosion control projects should be evaluated. Such an evaluation should include careful description of the actual riprap design utilized by nesting roseate terns at Great Gull Island, New York. If colony sites are to be protected from erosion with riprap, project design should take into consideration the appropriateness and advantages of use of revetment like that at Great Gull Island, New York. [End of recovery plan excerpt]

Direct and Indirect Effects of the Action

Direct disturbance to nesting roseate terns by construction crews and equipment will be avoided entirely by scheduling construction during the non-breeding season (September 1 to March 31). Furthermore, construction during this period is conditional upon the Refuge Manager's approval, due to the possible continued presence of terns into September. It is also anticipated that the Refuge Manager will condition the ACOE's and contractor's Special Use Permit in several additional ways, including the following: location of access points where materials and equipment will be off-loaded and stockpiled; location of temporary, cross-island access roads; the selection of native species used in revegetating exposed areas; and possibly other measures (W. Kolodnicki, pers. comm., September 1998).

The proposed project will partially replace the natural substrate, high beach habitat (composed of boulders and assorted loose soil and gravel) around the eastern and northern- and southern-most reaches of the Island, with an armored stone revetment. The nesting habitat utilized by virtually all of the roseate terns on Falkner will be affected by the proposed project, with perhaps the exception of terns nesting in plots 16-19 (Figure 2). The nesting habitat of roseate terns in plots 25-27 will be directly altered in phase 1 of construction, and tern nesting plots 46, 49, 50, 52, 53, and 55-58 will be directly altered in phase 2.

It is anticipated that roseates at Falkner Island will utilize spaces between the armor stone to nest as they do on Great Gull Island. Horizontal access to these spaces between the armor stone by adult birds is necessary. The concern that deep vertical crevices within the two layers of stone making up the revetment may trap young tern chicks and result in their mortality is partially addressed by the ACOE's final design plans that call for filling the interstitial spaces in the first layer of armor stone with smaller, crushed stone. However, the longevity of this material within these spaces will depend on the severity and frequency of storms, and the overall settling and shifting of the structure over time.

A history and discussion of roseate tern nesting activity on Great Gull Island, as it pertains to revetment and tern nest site occupancy, is found in the ACOE's Biological Assessment. The Service believes that the roseates at Falkner will adapt to the presence of the new structure and will either nest within rock crevices, as they do on Great Gull Island, or possibly on the top, horizontal surface of the revetment. The Service notes that if roseates will nest on top of the structure, or within nest boxes or other shelters placed there, the project will result in the creation of "new" nesting habitat that will be well above normal storm surges that could affect beach nesting birds. A total of approximately 39,000 square feet of elevated, horizontal surface area will be created on top of the structure (C. Demos, ACOE, *in litt.*, June 1998).

As the project is scheduled to occur in phases over at least two construction seasons, it is anticipated that roseates unaccustomed to the presence of the revetment after phase 1 will nest on the unaffected portion of the Island rather than abandoning this Island for an alternate colony site. (Approximately two-thirds of roseate tern nesting habitat on the Island would be unaffected by phase 1.) Recent past and future predation by black-crowned night-herons, however, is anticipated to result in movements of some roseate terns to other sites (J. Spendelow, *in litt.*, September 1998). Long-term monitoring of marked individuals could determine the relative effect and possible interactive effects of these factors.

Figure 2

The habitat that will be selected for nesting by roseate terns returning to Falkner Island after phase 2 when the project is completed is unknown; therefore, this large-scale habitat alteration offers a unique research opportunity.

Neither the construction of the revetment or its subsequent presence on the Island is likely to have any effect on the abundance or availability of marine food resources (primarily small schooling fish) utilized by roseate terns, as most foraging for prey fish is done away from the immediate vicinity of the Island. Therefore, decreased productivity of roseate terns due to construction-related effects on prey is not expected. However, food availability probably is the most important factor affecting productivity of roseate terns nesting on Falkner Island (J. Spendelow, pers. comm.).

It is possible that some tern chicks may die if entrapped in deep cracks that could form between the layers of armor stone. Other chicks may have higher survival rates due to the protection the structure offers them from avian predators such as black-crowned night-herons. If roseate chicks secret themselves deep within cracks and crevices between the armor stone, researchers may have difficulty accessing them. Filling the spaces between the first layer of stone with small rock/gravel, coarse sand or other material will minimize this concern, but cannot eliminate it. Dr. Spendelow and cooperators in the Metapopulation Project have contributed more than 45 scientific papers on research findings to date, and have many individually-marked birds whose fate they intend to follow in future years. In view of the fact that continued access and observability of both chicks and adults are essential to this on-going study, it is uncertain to what degree the revetment will affect research efforts.

Although roseate terns elsewhere have demonstrated "acceptance" of revetment as nesting habitat, it is unknown whether some period of adjustment will be necessary before experienced breeders at Falkner Island will adapt to the new structure and nest within (or on) the revetment, as they do at nearby Great Gull Island. Falkner Island roseates are known to have moved to Great Gull Island, where many of the terns nest in and around the revetment there. Construction of the revetment over two seasons will allow observations of roseate response to the first phase of the structure but will nonetheless offer limited opportunity to significantly change the basic project design, if the two seasons are sequential (e.g., fall winter 1998/1999 to 1999/2000).

The source of material maintaining the north spit of Falkner Island is likely to be soil and gravel eroding off the bluffs and carried north by the prevailing long-shore drift. If so, this shallow spit habitat may eventually erode after the project eliminates the supply of this material. However, the outer spit is not used by roseates for nesting, nor is it used extensively by roseates for resting, bathing, preening, or other activities (J. Spendelow, pers. comm.). Gulls (*Larus* sp.), however, are reported to use the spit for loafing.

Construction of the revetment will also affect the common terns that nest on the high beach. Approximately 77% of Falkner Island's common terns nest there and most of this nesting habitat will be directly affected by the project (ACOE Biological Assessment 1998). To what degree the common tern population will shift

following the construction from the beach to nesting on the top or the newly-created gentler slopes of the Island is uncertain. Great Gull Island, despite the revetment there, supports a robust common tern population estimated at >10,000 nesting pairs.

Cumulative Effects:

Cumulative effects include the effects of future state, local or private actions that are reasonably certain to occur in the action area considered in this Biological Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate review pursuant to Section 7 of the ESA. No cumulative effects are identified for this project because all future actions on Falkner Island will be subject to review under the Service's authority to manage the Stewart B. McKinney NWR and under authority to implement the Endangered Species Act and the Migratory Bird Treaty Act.

Conclusion:

After reviewing the current status of the roseate tern--northeastern population, the environmental baseline for Falkner Island, the direct and indirect effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Falkner Island erosion control project is not likely to jeopardize the continued existence of the roseate tern. No critical habitat has been designated for this species, therefore, none will be affected.

Incidental Take Statement:

Sections 9 of the ESA and the federal regulations pursuant to Section 4(d) of the Act prohibit the take of listed species of fish or wildlife without a 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 behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as 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 any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by a federal agency or an applicant. 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 a prohibited taking, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Take

Direct Take of Roseate Terns

Although there is the potential for roseate tern chicks to become entrapped within deep vertical crevices in the revetment and die, this potential mortality factor will be influenced by many variables. Among these are the number of roseate pairs that nest within or near the structure, the adequacy and longevity of the stone/sand material placed in the crevices to fill the cracks, and the degree of human disturbance or predator disturbance at the colony during the nestling period. Therefore, while incidental take of roseate chicks (due to entrapment in deep vertical crevices) is a possible result of the project, we do not believe that it will be a significant mortality factor. This view is supported by the Great Gull Island experience. As discussed earlier, it is believed that the revetment will offer tern chicks added protection from avian predators, as has been noted at Great Gull Island (H. Hays, American Museum of Natural History, pers. comm.) and may thereby increase the survival of some chicks that otherwise would be subject to predators.

Take or Alteration of Roseate Habitat

This project will alter 75-90% of the roseate tern nesting habitat on Falkner Island. However, the Service recognizes that the revetment will provide new nesting structure for roseate terns and will offer the Island long-term protection from storm events that are currently adversely affecting the stability of the Island's shoreline and bluff.

Effect of the Take

The Service finds that the anticipated level of incidental take is not likely to jeopardize the continued existence of the roseate tern in the northeastern Atlantic population.

Reasonable and Prudent Measure

The measures described below are non-discretionary, and must be undertaken by the ACOE so that they become binding conditions of any grant, permit or contract issued, as appropriate, for the exemption in Section 7(o)(2) to apply. The ACOE has a continuing duty to regulate the activity covered by this incidental take statement. If the ACOE (1) fails to assume and implement the terms and conditions or (2) fails to require the contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the contract or project specifications, the protective coverage of Section 7(o)(2) may lapse. The Fish and Wildlife Service will not refer the incidental take of any migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions specified herein.

1. The ACOE will make every reasonable and feasible effort to reduce the likelihood that roseate tern chicks will become entrapped within vertical crevices in the structure.
2. The ACOE will make every reasonable and feasible effort to maximize the compatibility of the erosion control project with the nesting habitat requirements of the roseate tern.

Terms and Conditions:

Incidental take statements exempt federal agencies and their permittees from the ESA's Section 9 prohibitions if the action is conducted in compliance with the terms and conditions that implement the reasonable and prudent measure described above. Terms and conditions also outline reporting/monitoring requirements.

1. In addition to constructing the project in two phases over two separate winter construction seasons, provide a one-year moratorium between year (phase) one and year (phase) two to allow researchers and managers time to assess the project's effects on nesting terns. For example, construction of phase 1 begins fall 1998/winter 1999, no construction during fall 1999/winter 2000, construction (phase 2) restarted and completed fall 2000/winter 2001.

A possible exception to the above moratorium may be negotiated if, as a result of the annual meeting described in condition 2 below, it is the consensus of the McKinney Refuge Manager and NEFO Supervisor that nesting roseate terns were not adversely affected by construction of phase 1. Even in this case, no construction would be allowed in the fall but could be initiated after January 1 of the new year.

2. Coordinate an annual meeting with USFWS, the State of Connecticut (DEP) and USGS/BRD each fall after phase one of construction. At the discretion of the McKinney Refuge Manager, implement recommendations consistent with project purpose and funding that result from the assessment study (see 3 below) before initiation of phase 2 of construction.
3. Contribute to the funding of a biological monitor to assess the short-term response of roseate terns to the revetment structure before construction and between phases 1 and 2. Anticipated funding required is 5K/year for three years; 20K/year for three years would fully support a graduate student. Monitoring is essential to evaluate tern response to changes in island physiognomy.
4. Provide a stock pile of small stone or gravel (or other material) at Falkner Island for use in enhancement of tern nesting substrate and establishment of artificial nesting structures (quantity and specific locations to be specified by the McKinney Refuge Manager).

5. The proposed location(s) of construction equipment access points, material stockpiles, cross-island roads that may be needed to move construction equipment and materials, plant species utilized in revegetating disturbed areas, and other activities with the potential for affecting the Island's environment must be reviewed and approved by the McKinney Refuge Manager.

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 does not have any conservation measures to propose.

Reinitiation:

This concludes formal consultation on the actions outlined in the description of the proposed action section of this Biological Opinion. 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 agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency 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.

Please keep this office informed as to the ACOE's plans to proceed with this project. Questions regarding this Biological Opinion can be referred to me or Michael Amaral, Endangered Species Specialist, at 603/225-1411.

Sincerely yours,

Michael J. Bartlett
Supervisor
New England Field Office

Attachment

CC: J.Victoria, CT DEP
W. Kolodnicki, SBM NWR
B. Blodget, MA DFW, RT Rec. Team
Charles Evans, CT DEP LI Sound Programs
Joel Helander, Faulkner I. Light Brigade
Reading File
ES: MAmaral:9-23-98:603-225-1411

LITERATURE CITED:

- Burger, J., and M. Gochfeld. 1988a. Defensive aggression in terns: effect of species, density, and isolation. *Aggressive Behaviour* 14:169-178.
- Burger, J., and M. Gochfeld. 1988b. Nest site selection and temporal patterns in habitat use of roseate and common terns. *Auk* 105:433-438.
- Duffy, D. C. 1986. Foraging at patches - interactions between common and roseate terns. *Ornis Scandinavica* 17:47-52.
- Faulkner Island Light Brigade. 1993. A proposal for erosion control on Faulkner's Island, Long Island Sound, Connecticut. Unpubl. report to USFWS and US Coast Guard. 64pp.
- Hays, H., J. DiCostanzo, G. Cormons, P. de Tarso Zuquim Antas, J.L.X. do Nascimento, I. de Lima Serrano do Nascimento and R.E. Bremer. 1997. Recoveries of roseate and common terns in South America. *Journal of Field Ornithology* 68(1):79-90
- Hays, H. and P. Lima. 1997. Distribution of roseate terns along the coast of Brazil. *In* L.R. Monteiro (ed.) *Proc. of the Seventh Roseate Tern Workshop*. 46pp.
- Hays, H., P. Lima, L. Monteiro, J. DiCostanzo, G. Cormons, I.C.T. Nisbet, J. Saliva, J. Spendelow, J. Burger, J. Pierce and M. Gochfeld. 1998. Wintering concentration of roseate and common terns in Bahia, Brazil. *Journal of Field Ornithology*. *In press*.
- Heinemann, D. 1992. Foraging ecology of roseate terns breeding on Bird Island, Buzzards Bay, Massachusetts. Unpubl. report, U.S. Fish and Wildlife Service, Newton Corner, MA. 54 pp.
- Kirkham, I. R., and D. N. Nettleship. 1987. Status of the roseate tern in Canada. *Journal of Field Ornithology* 58:505-515.
- Nisbet, I. C. T. 1980. Status and trends of the roseate tern *Sterna dougallii* in North America and the Caribbean. Unpubl. report, U.S. Fish and Wildlife Service, Newton Corner, MA. x and 131 pp.
- Nisbet, I. C. T. 1981. Biological characteristics of the roseate tern, *Sterna dougallii*. Unpubl. report, U.S. Fish and Wildlife Service, Newton Corner, MA. viii and 112 pp.
- Nisbet, I. C. T. 1989. Status and biology of the northeastern population of the roseate tern *Sterna dougallii*: a literature survey and update: 1981-1989. Unpubl. report, U.S. Fish and Wildlife Service, Newton Corner, MA. iv and 74 pp.
- Nisbet, I. C. T. 1973. Terns in Massachusetts: present numbers and historical changes. *Bird-Banding*