APPENDIX R

MEMORANDA OF UNDERSTANDINGS, BIOLOGICAL OPINIONS, AGREEMENTS, AND INSTRUCTIONS

MEMORANDUM OF UNDERSTANDING
BETWEEN
U.S. FISH AND WILDLIFE SERVICE
AND
THE U.S. NAVY
CONCERNING CONSERVATION OF
THE ENDANGERED CALIFORNIA LEAST TERN
IN SAN DIEGO BAY, CALIFORNIA

This Memorandum of Understanding (MOU) is entered into by the Department of the Interior, U.S. Fish and Wildlife Service, hereinafter referred to as the Service, and the U.S. Navy represented by Commander, Navy Region Southwest, hereinafter referred to as the Navy, pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. 1533, 1534, 1536). This MOU continues efforts in endangered species conservation between the Service and the Navy in Southern California started in October 1987 and renewed in 1993. The Navy has requested extensions of the MOU for 1999 and 2000, which have been agreed to by the Service.

BACKGROUND

The purpose and objective of the MOU is to establish standards and conditions for Navy in-water construction activities conducted in San Diego Bay to prevent adverse effects to the State of California and federally listed endangered California least tern *(Sterna antillarum browni)* [tern], while optimizing the Navy's ability to proceed with in-water construction as needed and in full compliance with the applicable portions of the federal Endangered Species Act and its regulations. Maintenance, construction, and demolition of Navy facilities routinely require in-water construction activities in San Diego Bay including pier and quay wall construction and repair, pile driving, placement of sheet pile, riprap, dredging, and removal of existing dolphins, piers and piles.

This MOU defines geographical areas and physical conditions under which in-water Naval construction activities may occur in San Diego Bay without the need to conduct formal consultation pursuant to section 7 of the Endangered Species Act. Attachment A of the MOU provides a list of conservation measures to be implemented by the Navy to improve nesting and foraging success of the tern population dependent upon San Diego Bay (Bay) and the near shore marine waters of the Pacific Ocean (Ocean). Land-based Naval construction activities that may affect the tern are not covered under this MOU and will be addressed on a case-by-case basis through consultation with the Service pursuant to the Endangered Species Act.

DESCRIPTION AND BIOLOGY

The occurrence in and use of Bay by the tern typically occurs between April 1 and September 15 of each year. During this period the tern migrates north from wintering areas in Central and South America to southern California coastal areas to nest and raise its young. There are six recognized tern nesting colonies adjacent to the Bay. These nesting colony locations include Naval Air Station (NAS) North Island; Naval Amphibious Base (NAB) Coronado; Lindbergh Field (San Diego International Airport); "D" Street Fill, a parcel of land jointly administered by Sweetwater Marsh National Wildlife Refuge and the Port of San Diego; Chula Vista Wildlife Reserve; and the levees at South San Diego Bay National Wildlife Refuge (Figure 1). The first two of the above listed locations are located on Navy property. NAS North Island includes the main nesting colony, known as the "Mat" site and four alternate nesting colony sites, Runway 1-1, Ammo Dump, Runway 1-8 and the base of Zuniga Point. These alternate nesting colony sites are shown in Figure 2. NAB Coronado has three main tern nesting sites including North and South Delta Beaches, which are adjacent to the Bay, and the Ocean Beach site, which is adjacent to the Pacific Ocean (Figure 3).

During the nesting season, adult terns and their young feed almost exclusively on small marine fish captured in the surface waters (top two feet) within the Bay, in river mouths in the Bay such as the Sweetwater Channel, and in near shore ocean waters adjacent to the Silver Strand. Figures 2-5 depict tern nesting sites and foraging areas on or adjacent to Navy lands in the Bay.

Major reasons for the failure of tern breeding colonies adjacent to the Bay, including those found on Navy properties, are believed to have been avian and mammal predation, loss of nesting and foraging habitat, and human disturbance. Additional adverse impacts to the terns can occur if in-water construction activities inhibit or prevent foraging opportunities for the tern or disrupt nesting pairs on the colony. Poor foraging may affect the survival of chicks by requiring adult terns to forage farther from their nesting colony or for a longer period of time, thus leaving tern chicks at the nesting colony unprotected from predators. It has also been shown that chick survival can be reduced during El Niño events when size and availability of food resources are typically altered.

STATUS OF CONSERVATION EFFORTS

In accordance with the 1987 MOU, the Navy established a permanent, full-time natural resource position at the Naval Facilities Engineering Command office in San Diego in 1988 to manage a tern conservation program and coordinate with the Service on Navy projects that may affect the tern. The natural resource position developed and managed the overall strategy for the tern colonies on Navy lands in four major areas: predator management, tern monitoring, site preparation of tern nesting colonies, and biological information gathering. Through establishment of this position these management objectives have been successfully met.

Predator management has been carried out under a Cooperative Agreement with the U.S. Department of Agriculture, Wildlife Services (WS), formerly known as Animal Damage Control,

since March 1988, when initial efforts to control both avian and mammalian predators began. Predator management activities have been conducted at NAS North Island, Naval Training Center (NTC) San Diego, and NAB Coronado since the 1989 breeding season. Predator management and biological monitoring of the NTC colony site was suspended after the 1998 tern nesting season by the Navy as a result of the cessation of base operations under the 1993 Base Closure and Realignment Act. The Service acquired the NTC tern colony and a 15-acre buffer area from the Navy when this installation permanently closed. The NTC property was exchanged for Western Salt property owned by H.G. Fenton Company and lands administered by the State Lands Commission. These lands totaled approximately 1,400 acres. This action was described in an internal section 7 consultation (1-6-98-FW-49) dated October 13, 1998 and released the Navy from any future tern management responsibilities for NTC.

The Navy's predator management program has resulted in significant reductions in the numbers of both avian and mammalian predators found at the tern nesting sites, thereby enhancing the species' productivity. From 1984 to 1987 the tern fledglings per pair averaged .38; between 1988 and 1991 the number of tern fledglings averaged .50 per pair, a 32% increase in fledgling production. Between 1992 and 1999, tern fledglings per pair averaged .66, an increase of over 74% from the 1984-1987 period. Undoubtedly, a significant portion of the increased productivity can be attributed to the predator management program.

The implementation of an objective, scientific, long-term monitoring program for tern nesting colonies has provided critical information essential in developing a prudent management strategy in San Diego Bay. The retention of a tern expert since 1988 to oversee monitoring of individual nesting sites and prepare annual reports on breeding success of the tern colonies occurring on Naval property has been a key element in this successful monitoring program. This expert is exceptionally familiar with tern populations in San Diego County and specifically in San Diego Bay, and has provided the Navy with sound, basic information on the breeding biology of the terns at the Navy sites, and has been instrumental in advising the Navy in the development of its overall tern conservation strategy.

The Navy also funded basic research in assessing the effects of in-water pile driving activities on fish behavior, as well as research in identifying foraging areas important to the terns. Key foraging areas for the tern adjacent to Navy lands (See shaded areas in Figures 2-5) were identified as part of this research along with long-term observations of the tern.

Major improvements have been completed by the Navy adjacent to their tern nesting colonies. A 10-acre tern nesting site was first prepared in 1988 at South Delta Beach, NAB Coronado. This site has been prepared and monitored every year since then and supported its first successful tern nest in 1992. In 1996 the South Delta Beach site was further enhanced by expanding the 10-acre nesting site to 15 acres, adding a four-foot sand berm along the tidal flats to protect tern nests from high tide events, and placing a two-foot layer of clean sand (without a soil component) in the center portion of the original 10-acre site to enhance nesting substrate for the tern and reduce the likelihood for the establishment of predatory ant colonies that have been documented to

adversely affect tern eggs and chicks. These improvements have contributed significantly to tern use of South Delta Beach, increasing the number of active nests from one in 1992 to 80 in 1999.

The North Delta Beach nesting area has also been enhanced to protect nesting terns. In 1992, large, low profile signs were placed facing the Bay warning pleasure boaters of the sites' protected status. In 1996, a sand berm was also placed along the northern and a portion of the eastern shoreline to protect tern nests in areas prone to flood at high tides. These improvements have helped the North Delta Beach site to grow from 46 nests in 1989 to 344 nests in 1999. Ten acres of eelgrass was planted in the spring of 1990 immediately east of North Delta Beach as compensation for Naval construction projects. Eelgrass provides important habitat for a number of species of marine fish, including tern forage species, and may provide an enhanced foraging area for terns that nest on the North and South Delta Beach sites. Beginning in November 2000, the Navy constructed an enhancement island approximately .5 km north of North Delta Beach using dredge materials to provide approximately 20 acres (9 acres of inter-tidal and 11 acres of sub-tidal) of potential foraging area for terns and other marine birds.

Fences have been built or replaced at NAS North Island (1992) and the south edge of the South Delta Beach (1994) tern colonies. Permanent grids have been established at North and South Delta Beach and NAS North Island tern colony sites. These grids serve to mark nest sites so that they can be definitively located and monitored from year to year for the purposes of measuring changes.

In 1997, the Navy, San Diego Gas and Electric Company, and the City of Coronado jointly combined efforts to underground power lines along Highway 75 that parallel Delta Beach. This effort resulted in reduced perching opportunities for avian predators of the tern, and eliminated the possibility for tern mortality due to impact with the overhead wires.

SPECIFIC OBLIGATIONS OF THE PARTIES

The Navy and the Service mutually agree that the goal of this MOU is to promote the survival and the recovery of the tern population in San Diego Bay. To help achieve this goal, the protection and enhancement of the nesting colonies and preservation of sufficient foraging opportunities immediately adjacent to tern nesting colonies shall be pursued on both Navy and Service owned lands.

The Navy and the Service will hold two meetings each calendar year to discuss the obligations and provisions of the MOU. The meetings will be held in April and October at a time and location to be mutually agreed to by Service and Navy representatives. The purpose of the April meeting will be to identify and review the future Navy construction projects, to the extent feasible. This meeting will focus on the known projects that could affect biological resources of San Diego Bay or the near shore marine waters of the Pacific Ocean utilized by the tern.

During the October meeting the following will be jointly reviewed by the Navy and the Service to evaluate whether identified objectives should be modified or reprioritized or new objectives

should be added: a) tern recovery objectives, b) the priority of tern compensation projects to be initiated during the current fiscal year, c) funding needed to implement the objectives, 4) recommendations for improving tern management, and 5) opportunities to cooperatively partner to achieve meeting the identified conservation objectives.

MOU objectives in subsequent years will be mutually determined through these meetings when the previous year's results are reviewed and the next year's objectives are proposed. All in-water construction projects are subject to this MOU regardless of whether they were foreseen prior to and briefed at the April or October meeting. In addition to Service and Navy representatives, the appropriate contractor and other government personnel who have worked at the Navy tern colony sites shall attend the October meeting. Attachment A will be revised annually, as necessary, to reflect these decisions. The mutually agreed to objectives will be described in a letter to the Service prepared by the Navy.

The Parties may forego the April and/or the October meeting in any year, because in some years the purposes of the meetings may be accomplished through other communications between the parties.

At any time during this MOU should the Navy require emergency in-water repairs to any of its piers, wharfs, pilings or quay walls during the tern breeding season, the Navy shall present the Service with all available information on the emergency need, including but not limited to, a brief page of description of the work needed to be done, the method(s) to be used to effect the repairs, an estimate of the number of days needed to complete in-water repairs as well as for the total repair, a detailed map showing the portion(s) of the structure(s) requiring the repair, and any measures the Navy will incorporate into the project to avoid and/or minimize effects to the terns. The Service then agrees to review the Navy submittal and provide a brief written response within 5 working days unless otherwise mutually agreed upon.

Each of the meetings described above, as well as actions for emergency in-water repairs, will constitute informal consultation between the Service and the Navy pursuant to section 7 of the Endangered Species Act, where mutually agreed upon conservation measures can be incorporated into the project description so as not likely to adversely effect the tern.

NAVY OBLIGATIONS

In order to support Naval activities in San Diego Bay, various types of in-water construction activities are conducted in the waters of San Diego Bay. The Navy believes that to accomplish this construction in a timely manner, to reduce costs, and to ensure required fleet support, it is necessary to be able to initiate construction throughout the year, including during the tern nesting season (April 1-September 15).

In concert with the goal of this MOU, subject to limitations discussed in the Miscellaneous Provisions section of this MOU, the Navy will: (1) to the maximum extent practicable eliminate impacts from in-water construction occurring within tern nesting and foraging areas by

scheduling construction activities outside the tern nesting season (September 16 to March 31) or incorporate specific measures within individual projects to minimize potential affects to terns (i.e. employment of silt curtains during dredging operations, use of vibratory hammer instead of use of a conventional piston driven pile driver etc.) and/or (2) offset effects of in-water construction to terns by implementing the obligations identified in this MOU. The Navy will provide a management program that will continue a predator management effort at its current level for tern colonies existing on Navy properties in and adjacent to San Diego Bay, and provide additional or improved nesting and foraging habitat wherever possible. The Navy agrees to accomplish items one through six below and complete the specific obligations outlined in Attachment A by providing an annual funding source of at least $250,000 for the purpose of implementing this tern management program. Current obligations are listed in order of priority. If the stipulated tern recovery obligations can be accomplished for less than the amount of annual funds identified above, then the amount committed for that year by the Navy can be decreased accordingly. It is recognized by the Navy that a proactive program for enhancing tern survival continues to be included within these funds.

In addition to the implementation of compensation measures identified in Attachment A of this MOU, and subject to the availability of appropriated funds, the Navy agrees to: (a) as necessary, continue to study and evaluate through research projects the effects of in-water construction activities on the foraging behavior of marine birds, especially terns, in San Diego Bay, (b) maintain a permanent position to oversee the Navy's in-water construction MOU conservation program obligations to the tern in San Diego Bay, and (c) place a high priority in using clean dredged material from Navy projects to enhance the substrate of tern nesting colony sites and foraging areas within San Diego Bay. These obligations are further described below:

1. Reserve funding and designate a Navy biologist to oversee, coordinate and implement the Navy's obligations identified in this MOU, including executing contracts to provide annual tern monitors and predator management personnel at Navy tern nesting colony sites. In addition, a program to control predatory ants at tern colony sites is required so long as this predator continues to be identified as a threat to tern eggs or chicks at individual tern nesting sites.

2. Meet with Service personnel in April of each year to discuss planned Navy in-water projects in San Diego Bay and near shore marine waters of the Pacific Ocean utilized by the tern, and other projects adjacent to tern colonies that may affect the tern and its nesting and foraging habitat, and seek mutually agreed upon conservation measures to avoid or minimize effects to this species. During these meetings the Navy will provide the Service with an updated table or list that summarizes individual in-water construction projects and the amount of San Diego Bay waters that have been covered by wharves, piers, and/or floating structures.

3. In October of each year, meet with the Service to discuss tern recovery objectives, the priority of tern compensation projects to be initiated during the current fiscal year, funding needed to implement the objectives, and recommendations for improving tern management on Navy

lands. Any changes to these mutually agreed upon tern recovery objectives will be identified in a letter prepared by the Navy within 45 days from the October meeting.

4. Give a high priority to using non-contaminated, beach quality dredged material of appropriate sediment grain size from future Navy dredging projects as a source of material to enhance: (a) the substrate of existing tern nesting colony sites on San Diego Bay Naval bases or (b) foraging habitat for the tern in San Diego Bay. This latter enhancement option involves the shallowing of San Diego Bay waters that are greater than -10 feet Mean Lower Low Water (MLLW) or deeper.

5. When the parties mutually identify specific issues concerning the tern that may be the result of the Navy's in-water construction activities conducted in San Diego Bay, and when the parties determine a study is necessary, a study plan will be developed by the Navy in consultation with the Service to investigate and attempt to resolve the issue. Issues may need to be prioritized, and if so, will be prioritized jointly by the Navy and the Service. Issues may require a focused study to resolve the issue and could include, but are not limited to, impacts to nesting terns, tern foraging behavior or foraging areas. The specific study design will be developed in consultation with the Service. Such studies may require that contractors obtain a Section 10(a) permit from the Service.

6. The Navy will provide the Service copies of its annual tern monitoring reports that summarize numbers of nests, eggs, chicks, fledglings, and adults that occurred at each Navy tern nesting colony, as well as copies of any tern research reports prepared for the Navy.

SERVICE OBLIGATIONS

Through informal consultation conducted in the development of this MOU, the Service hereby agrees that:

1. The Service recognizes that the proactive management program as implemented by the Navy has resulted in direct benefits (i.e., increases in fledgling production) to terns that would not have been achievable with rescheduling in-water construction during the non-breeding season of the tern or compensation obtained on a project-by-project basis and will include such recognition during its analysis of whether a Navy activity triggers formal, informal, or any consultation at all.

2. Navy in-water construction activities may be conducted in the Bay or the Ocean during any time of the year without the requirement of conducting a formal section 7 consultation because they are not likely to adversely affect the tern, provided that the projects are located outside the shaded (nesting) areas shown in Figures 2–5, and provided that:

    a. Surface turbidity resulting from dredging projects must not be allowed to intrude into those areas that are within a one-kilometer (i.e., 3,280.6 feet or 0.6 mile) radius from all active tern nesting colonies located in Bay. Surface turbidity is defined as an obvious

discoloration of the top three meters (9.8 feet) of the water column visible to the human eye. Surface turbidity from any dredging project conducted between April 1 and September 15 shall not exceed 1 hectare (2.47 acres) in length or width, persist longer than one (1) hour, and be in or adjacent to a foraging area of high to very high value to foraging terns as identified in Figures 2-5 by the shaded areas.

b. Noise from pile driving, sheet pile driving, or other heavy construction activity within 500 meters of an active tern nesting area is not to exceed ambient decibel levels as measured at the perimeter of individual tern nesting areas. Vibrations from these activities shall not be allowed to disrupt nesting or loafing terns, particularly in areas of the Bay that have been previously filled.

3. Proposed Naval projects located in the shaded areas (Figures 2–5) would require initial review by the Service through informal consultation if in-water construction activity during the nesting season (April 1 to September 15) is desired. The Navy will avoid formal consultation if it can be demonstrate to the Service that its proposed project is not likely to adversely affect the tern. If the Navy gives the Service a letter or other written communication showing the Service that the conditions listed below will be met, the Service will concur with the Navy's assessment. The Service will review these projects on a case-by-case basis or as a group of projects with similar objectives, and will respond in writing whether they concur with the Navy's assessment. If the Service does not concur, it shall specify which of the conditions listed below have not been properly shown, and the reasons that it believes that they have not.

a. The Navy's written communication to the Service must contain detailed discussion of dredging methodology and means to control turbidity from project construction activities, including dredged material disposal. This information will be provided to show that the project is not likely to adversely affect tern nesting or foraging activities.

b. Noise levels from pile driving, sheet pile driving, or other heavy construction activity shall be as described in 2.b. above. Vibrations from these activities shall not be allowed to disrupt nesting or loafing terns.

4. The Service will review and evaluate all studies that are conducted in conjunction with this MOU on a continuous basis with the intention of modifying the restrictions placed on Navy in-water construction activities, as warranted.

5. The Service shall attend a minimum of two meetings each year with the Navy (i.e. April and October) to determine the priority of tern compensation projects to be initiated during the next fiscal year and review the Navy's current list and description of proposed construction projects to be conducted in the Bay and near shore marine waters of the Ocean. The mutually agreed upon tern compensation projects will be identified in a letter prepared by the Navy within 45 days from the October meeting.

6. The Service agrees to monitor and conduct predator management at each Service tern nesting colony and to provide the Navy with copies of its annual tern monitoring reports that summarize numbers of nests, eggs, chicks, fledglings, and adults that occurred at each Service tern nesting colony, as well as copies of any tern research reports prepared for the Service.

7. Prior to completion and approval of the Comprehensive Conservation Plan (CCP), the Service will continue to provide for: (1) predator management, (2) annual monitoring of the tern and WSPL, (3) preseason site preparation at the Tijuana Slough NWR, Sweetwater Marsh NWR, and South San Diego Bay Unit, and (4) enhancement of tern and Western snowy plover nesting substrate at the South San Diego Bay Unit. The Service, in developing the CCP, agrees to assist in promoting the long-term viability of tern and Western snowy plover populations by preserving the continuity of the above initiatives to the greatest extent possible. This will facilitate a balanced dispersal of nesting opportunities among federal and state agencies and municipalities within San Diego Bay. After completion and approval of the CCP, the Service will incorporate all applicable habitat and species management projects into the Refuge Operations Needs System to request funding.

8. The Service shall work to ensure that other non-Department of the Navy entities that administer areas used by terns, shall manage these areas so that they are sufficiently attractive to terns and provided with a level of management that will result in a level of productivity comparable to that accomplished at Navy sites. This will provide for a more balanced and biologically sound distribution of tern breeding populations in the Bay and surrounding areas. The Service shall provide information on the progress of this effort annually at the October meeting. Other relevant entities include but are not limited to the Service's own Refuges Division, the State of California, County of San Diego, San Diego Unified Port District, and the City of San Diego, as well as all other surrounding municipalities.

9. The Service shall make all reasonable efforts to finalize the tern recovery plan currently under revision, and provide a public review draft within six months of the signature of this document. If the Service forms a tern recovery team, the Service shall include a Navy representative as a full team member.

MISCELLANEOUS PROVISIONS

This MOU is effective when signed by both parties and shall extend for a period of 2 years from that date. The MOU can be updated at any time as an improved database is developed from studies conducted in San Diego Bay and elsewhere. Any amendment to this MOU must be in writing signed by all parties. Nothing in this MOU is intended to abrogate the responsibility of the Navy or the Service to comply with any provision(s) of the Endangered Species Act, Migratory Bird Treaty Act, Clean Water Act, or River and Harbor Act or other applicable federal laws.

While the parties agree that their annual budget submissions will be sufficient to cover the tasks and goals described herein, pursuant to the Anti-Deficiency Act, 31 U.S.C. §1341, *et seq.*, any

requirement for the payment or obligation of funds, including funding for staffing resources, pursuant to this MOU (including any attachment), shall be subject to the availability of funds appropriated by Congress, and no provision herein shall be interpreted to require obligation or payment of funds in advance of an appropriation. Nor shall this MOU be construed to require the violation of any other applicable federal law. In cases where payment or obligation of funds would constitute a violation of the Anti-Deficiency Act, the dates established for targeted tasks under this MOU shall be appropriately adjusted. Nothing in this MOU shall be construed as implying that Congress will, at a later time, appropriate funds sufficient to meet deficiencies. Immediate action, in the form of a written letter, is warranted should either party determine that the payment of obligation of funds pursuant to this MOU could not be fulfilled in a given fiscal year. That party should provide an anticipated schedule when such funds would be available to fulfill the terms of this MOU.

This MOU may be modified only by written agreement of the parties. Modification includes extension of its term. This MOU may be terminated by either party by a procedure that begins with written notification to the other party that such measure is being considered. Within 30 days of such notification the parties will meet to informally address all concerns raised. If resolution of the concerns cannot be negotiated, The MOU may be dissolved upon written notice by the party wanting to terminate the MOU. Said final termination notice must be within 60 days following the meeting and state the reasons for dissolution of the MOU.

Paul Henson
for Mr. Steve Thompson
California/Nevada Operations Manager
U.S. Fish and Wildlife Service

5/19/04
Date

C. Schanze
C. SCHANZE
Captain, CEC, U.S. Navy
By direction of the
Commander, Navy Region Southwest

04 DEC 03
Date

A. Gonzales
A. GONZALES
Captain, U.S. Navy
By direction of the
Commander, Navy Region Southwest

6/14/04
Date

D.R. Landon
D. LANDON
Captain, U.S. Navy
Commanding Officer
Naval Base Coronado

12 Nov 03
Date

ATTACHMENT A

MEMORANDUM OF UNDERSTANDING BETWEEN U.S. FISH AND WILDLIFE SERVICE AND THE U.S. NAVY CONCERNING CONSERVATION OF THE ENDANGERED CALIFORNIA LEAST TERN IN SAN DIEGO BAY, CALIFORNIA

Navy conservation measures ranked in the order that they should be implemented:

1. Prepare tern nesting colony sites on NAS North Island identified as the "MAT" site and NAB Coronado identified as North and South Delta Beaches and Ocean Beach by March 1 of each year. Preparation of the Alternate Site "Ammo Dump" (2B) will not be done until issues of site contamination have been resolved. Site preparation includes grading or mowing or use of Service-approved herbicides to remove annual plant growth, inspection/replacement or reinstallation of the chick barrier around the perimeter of the tern colony, inspection/ repair/replacement of nest site grid poles and placement of chick shelters throughout the nesting colony. Chick shelters, usually consisting of ceramic roofing tiles, should be placed at approximately 15 meter intervals throughout the entire nesting sites.

2. Provide funding for and conduct monitoring at all tern nesting colonies on Navy property adjacent to San Diego Bay including, NAS North Island and NAB Coronado, to determine the breeding status of the colony. A minimum tern monitoring effort of four (4) days a week per individual nesting colony site should occur from May 1 through July 31, and three (3) days a week from April 15-30 August 1-31 or until the terns have departed each nesting colony site. At a minimum, the following information shall be recorded for each nesting site: the number of adult nesting pairs, number and location of nests, number of eggs laid, number of chicks, fledglings produced, level of depredation, and the known causes of depredation. Monitors must be experienced with the identification of the different age classes of terns, vocalizations of terns and other shorebirds that occur in San Diego Bay, and have specific knowledge concerning the breeding and foraging behavior of terns.

3. Provide funding for predator management at all least tern colonies on Navy property in San Diego Bay including, NAS North Island and NAB Coronado. Only professional predator management personnel shall be used. A predator management program shall be developed specifically for feral cats, other mammalian predators (i.e., foxes, skunks, rats, cats and dogs), and avian predators (i.e., ravens, gulls, loggerhead shrikes, herons, owls and American kestrels). A minimum predator management effort of five (5) days a week for an eight (8) month period from January 1 through August 31of each year is required. It may be necessary

to use drugs or poisoned bait to deal with some avian and mammalian species. In these cases, personnel licensed to use such drugs shall be required. The Navy and the Service will develop strategy in advance for the management of known sensitive, but not federally listed, predators such as the Western gull-billed tern (*Sterna nilotica vanrossemi*) and peregrine falcon (*Falco peregrinus*).

4. Maintain annually and replace, as needed, all fences around active tern nesting sites on Navy lands in San Diego Bay. This includes maintaining and replacing Nixalite (an anti-perching material) on the top of the fence, any visual barriers on or attached to the fence, chick movement barriers along the bottom of the fence and the repair or replacement of tern conservation signs. The fence design shall preclude cats and dogs (both feral and domestic) from entering the nesting colony.

5. Develop, implement and maintain an ant control program at all the nesting sites on Navy lands in San Diego Bay as long as ants continue to be documented as a cause of tern egg and chick mortalities.

6. Place tern decoys in appropriate numbers and locations on all active tern nesting sites on Navy lands in San Diego Bay, and at as many alternate nesting sites as decoys will allow, to encourage tern use of a suitable habitat for nesting. The use of decoys shall not discourage nesting efforts of the federally listed Western snowy plover (*Charadrius alexandrinus nivosus).*

7. Initiate appropriate pet control regulations, conduct an installation-wide pet licensing program for dogs and cats, and encourage the spay-neutering of pets on NAS North Island and NAB Coronado to reduce feral dog and cat populations. Information should be provided to all owners of dogs and cats concerning the potential problems their pets can cause to indigenous wildlife, especially to federally listed and sensitive species nesting on Navy land. The pet control regulations shall also reflect the intent of Executive Order 13112, Invasive Species, and Department of the Navy Policy Letter Preventing Feral Cat and Dog Populations on Navy Property dated 10 January 2002, in the prohibition of establishing/maintaining feral cat colonies on Navy land.

8. Provide additional foraging opportunities for terns through one or more of the following: creation/rehabilitation of eelgrass beds and creation/rehabilitation of inter-tidal/sub-tidal bay habitat.

9. Continue to investigate the feasibility of creating a new tern nesting site at the Naval Radio Receiving Facility, Imperial Beach, as compatible with operational and training requirements.

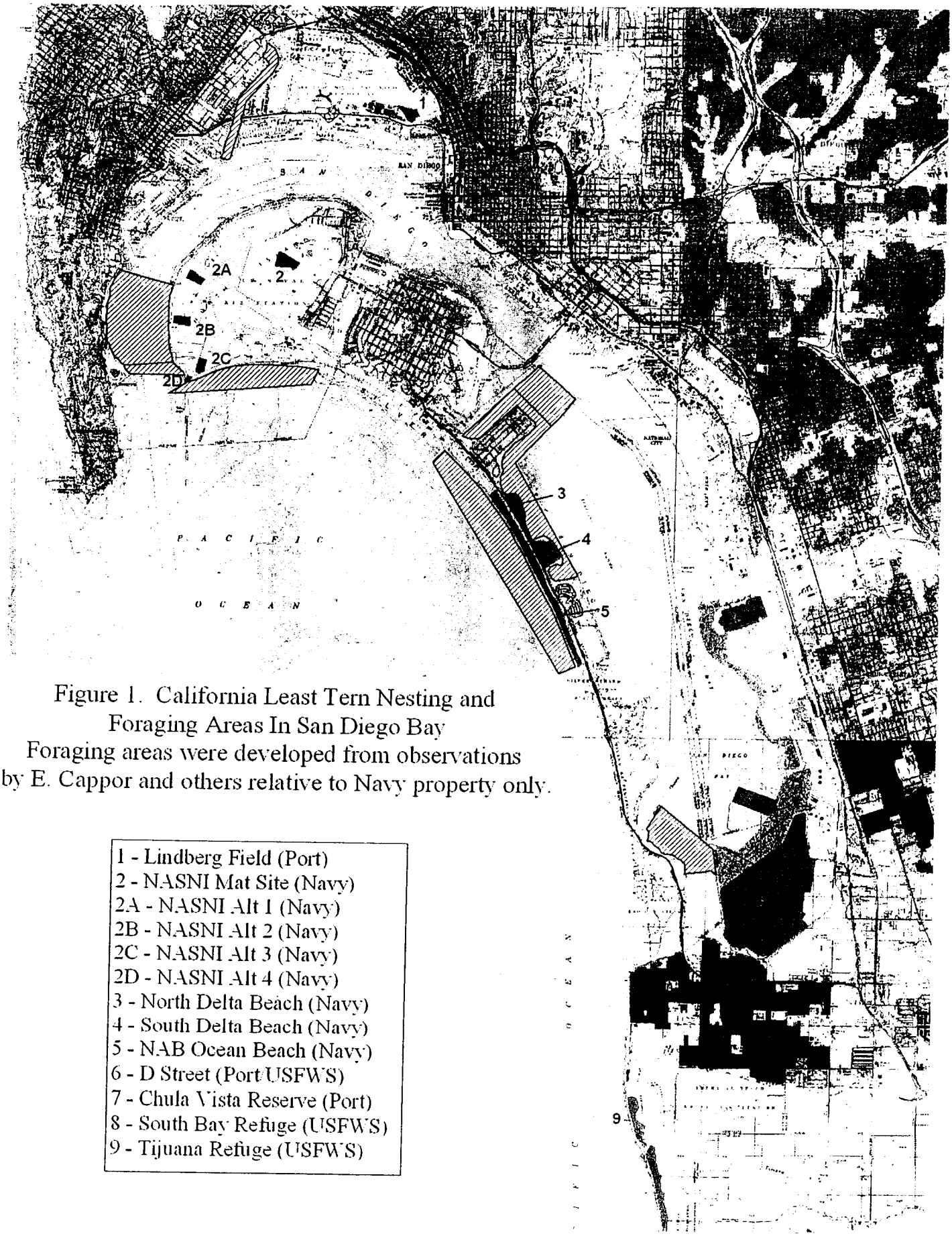


Figure 1. California Least Tern Nesting and Foraging Areas In San Diego Bay
Foraging areas were developed from observations by E. Cappor and others relative to Navy property only.

1 - Lindberg Field (Port)
2 - NASNI Mat Site (Navy)
2A - NASNI Alt 1 (Navy)
2B - NASNI Alt 2 (Navy)
2C - NASNI Alt 3 (Navy)
2D - NASNI Alt 4 (Navy)
3 - North Delta Beach (Navy)
4 - South Delta Beach (Navy)
5 - NAB Ocean Beach (Navy)
6 - D Street (Port/USFWS)
7 - Chula Vista Reserve (Port)
8 - South Bay Refuge (USFWS)
9 - Tijuana Refuge (USFWS)

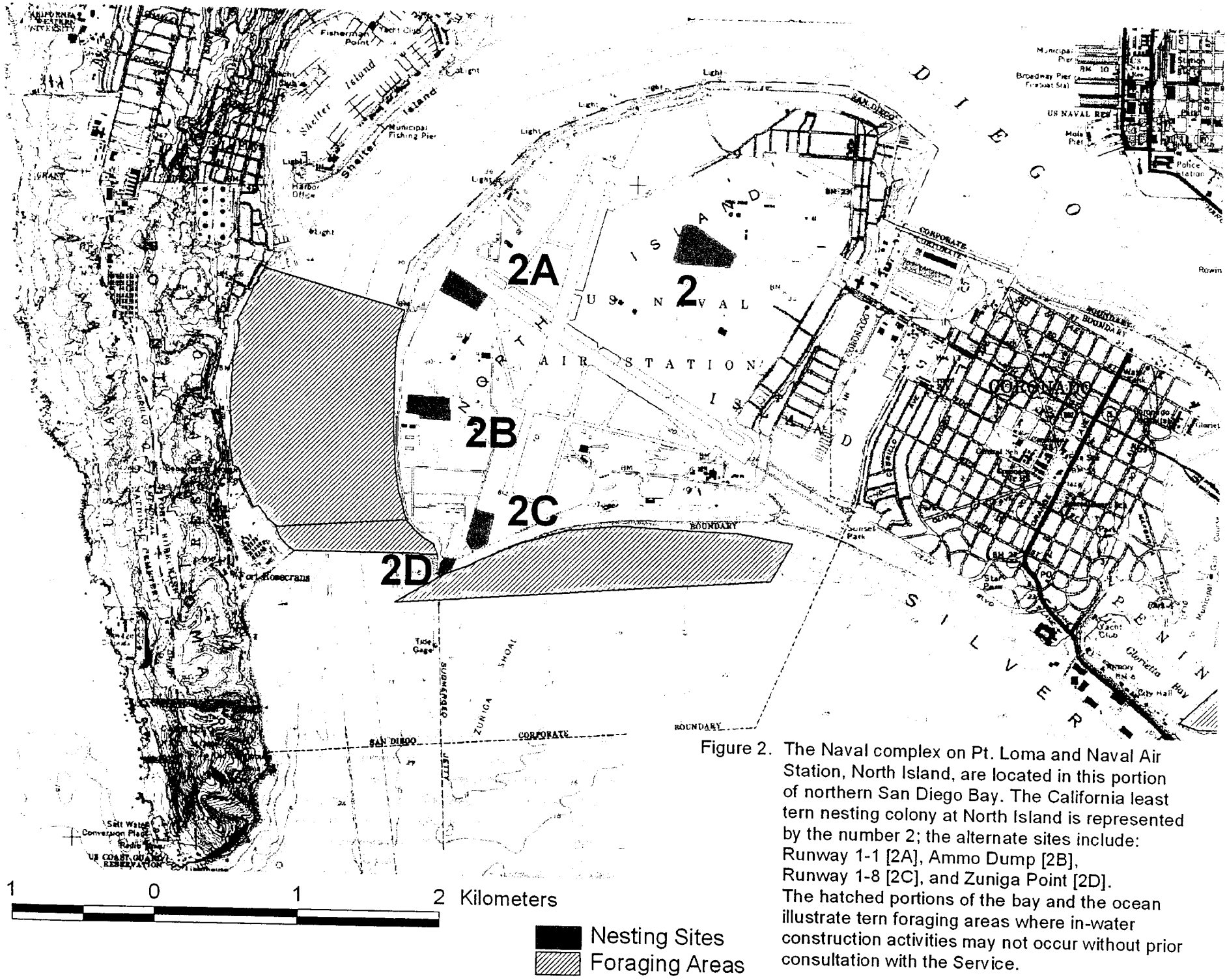


Figure 2. The Naval complex on Pt. Loma and Naval Air Station, North Island, are located in this portion of northern San Diego Bay. The California least tern nesting colony at North Island is represented by the number 2; the alternate sites include: Runway 1-1 [2A], Ammo Dump [2B], Runway 1-8 [2C], and Zuniga Point [2D]. The hatched portions of the bay and the ocean illustrate tern foraging areas where in-water construction activities may not occur without prior consultation with the Service.

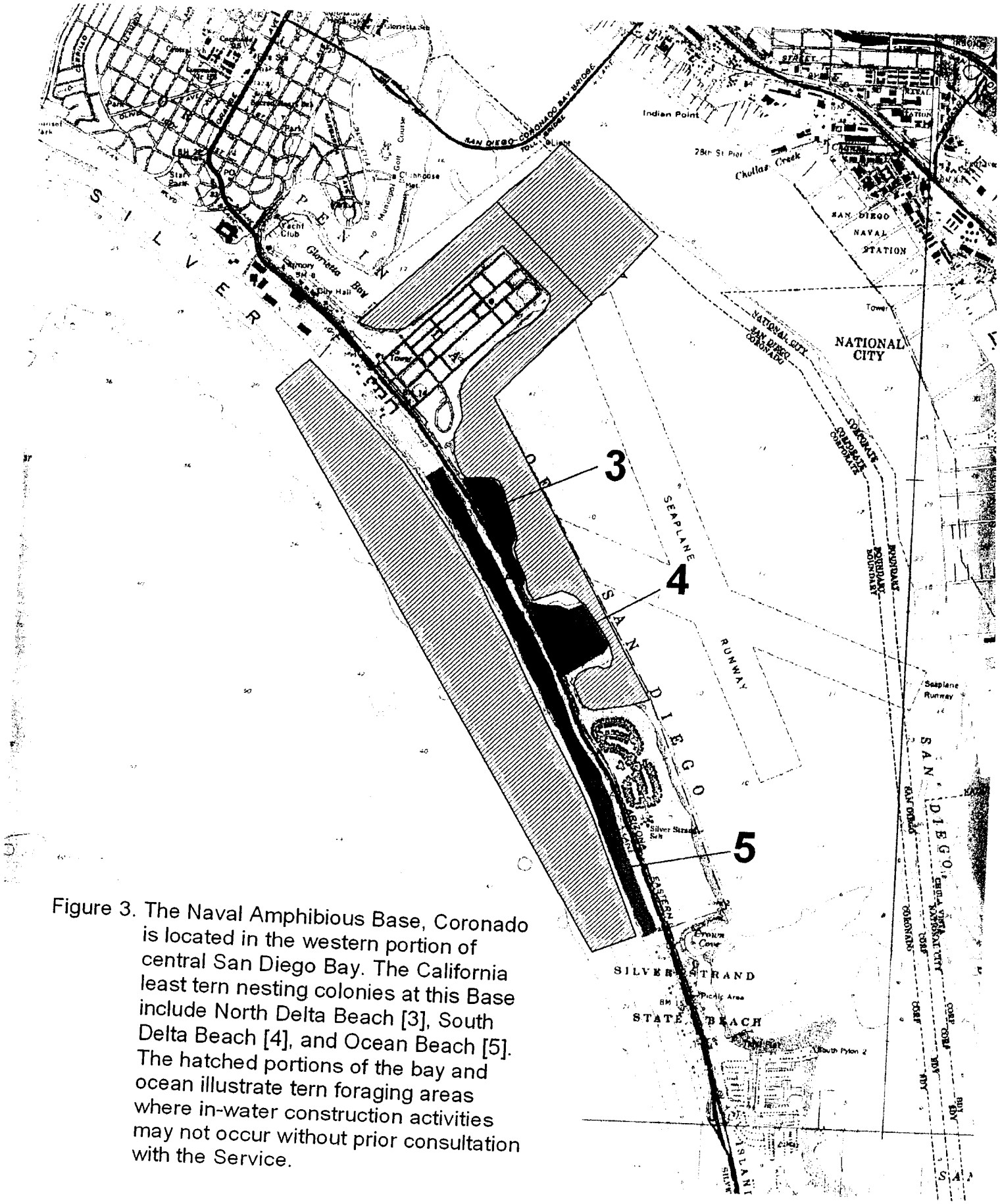


Figure 3. The Naval Amphibious Base, Coronado is located in the western portion of central San Diego Bay. The California least tern nesting colonies at this Base include North Delta Beach [3], South Delta Beach [4], and Ocean Beach [5]. The hatched portions of the bay and ocean illustrate tern foraging areas where in-water construction activities may not occur without prior consultation with the Service.

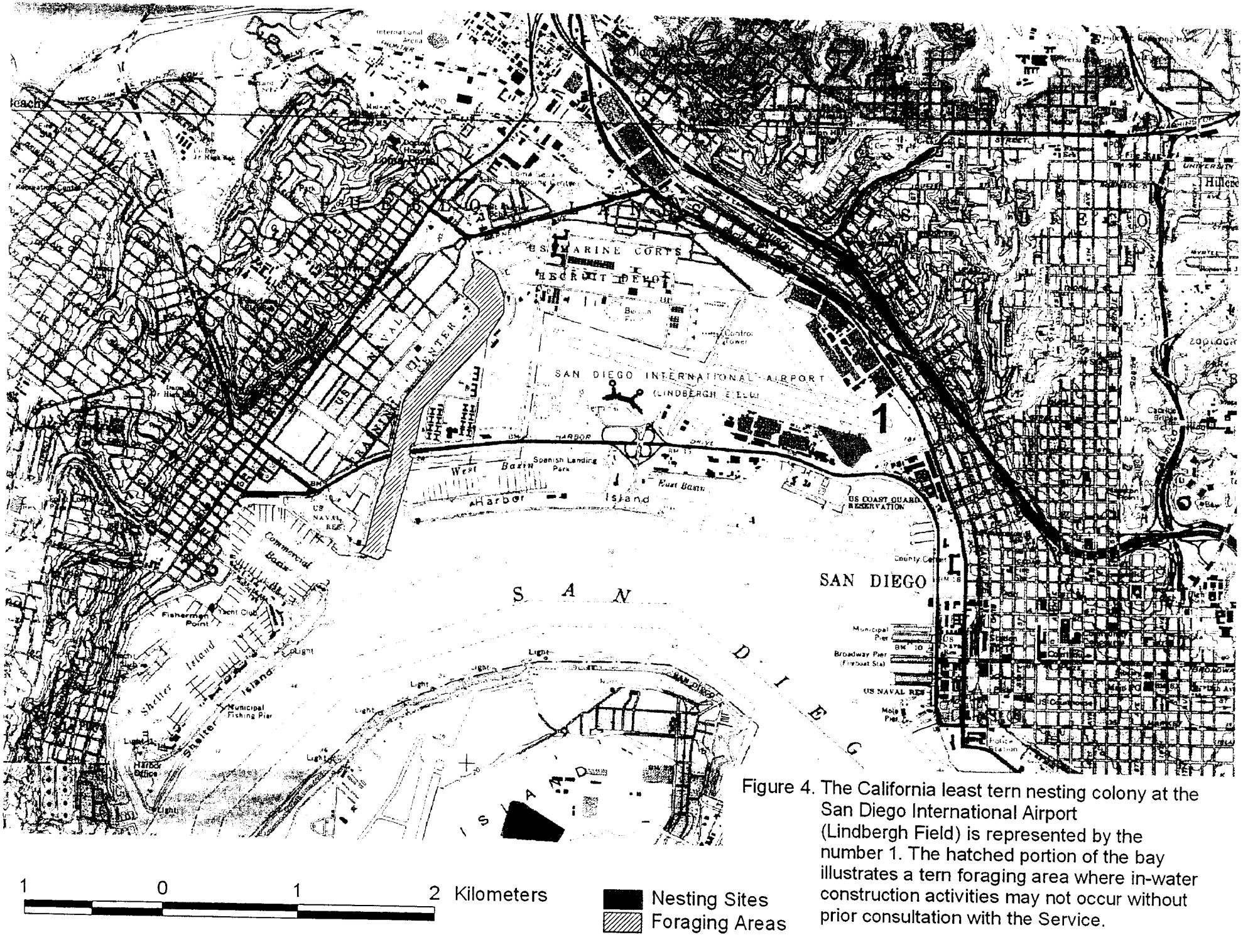
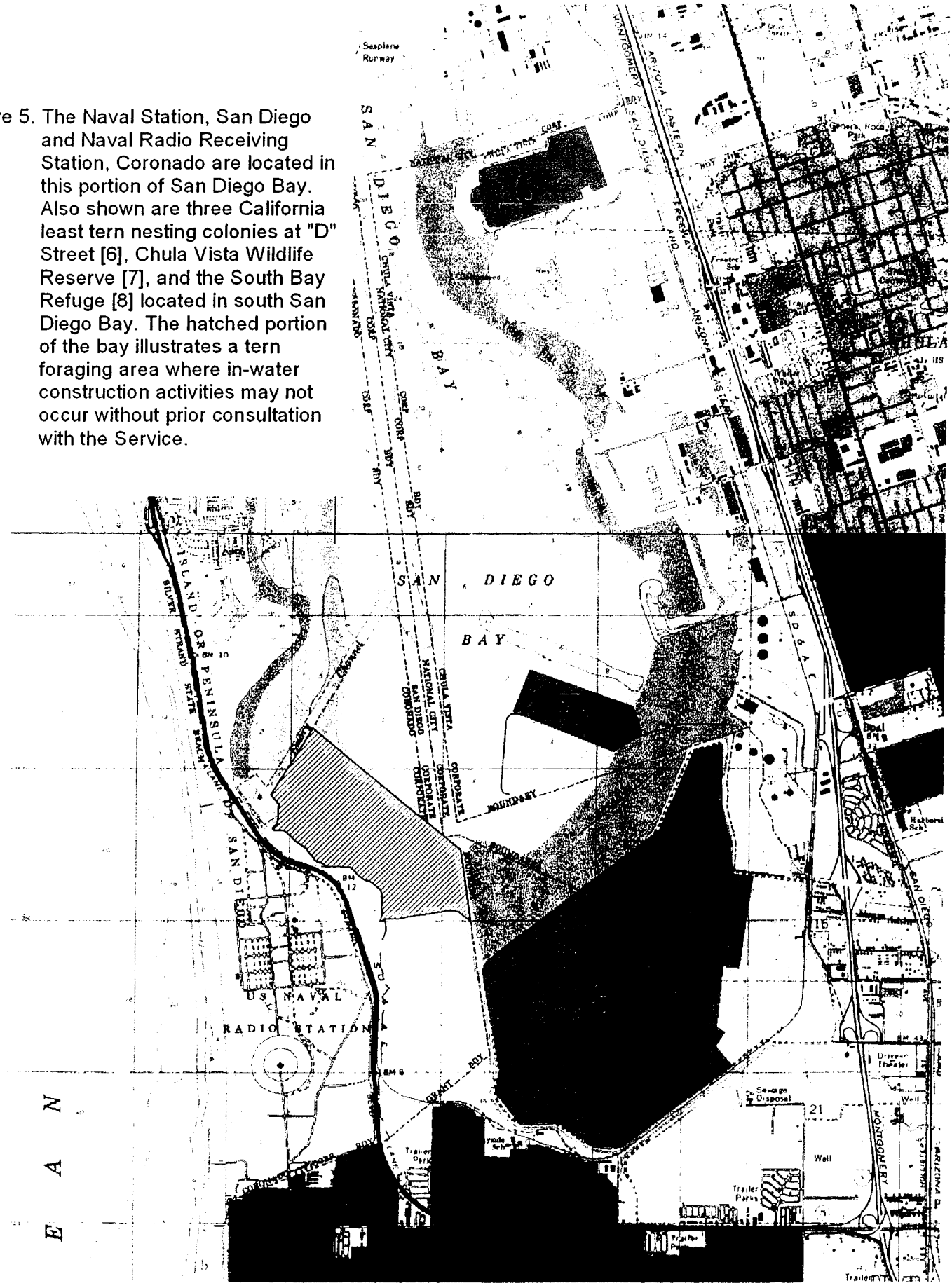


Figure 4. The California least tern nesting colony at the San Diego International Airport (Lindbergh Field) is represented by the number 1. The hatched portion of the bay illustrates a tern foraging area where in-water construction activities may not occur without prior consultation with the Service.

Figure 5. The Naval Station, San Diego and Naval Radio Receiving Station, Coronado are located in this portion of San Diego Bay. Also shown are three California least tern nesting colonies at "D" Street [6], Chula Vista Wildlife Reserve [7], and the South Bay Refuge [8] located in south San Diego Bay. The hatched portion of the bay illustrates a tern foraging area where in-water construction activities may not occur without prior consultation with the Service.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011

In reply refer to:
FWS-SDG-08B0211-08I0203

DEC 18 2007

Captain Anthony T. Gaiani
Commanding Officer
Naval Base Coronado
P.O. Box 357033
San Diego, California 92135-7033

Attn: Tammy Conkle, Mitch Perdue

Dear Captain Gaiani,

Over the past ten years, we have worked closely with your staff to achieve necessary conservation and protection of the California least tern in San Diego Bay, while facilitating ongoing training and facilities maintenance at Naval Base Coronado, Naval Base Point Loma, and Naval Base San Diego. An important tool that has streamlined our consideration and review of numerous projects in the Bay, while assuring appropriate measures to minimize the potential impacts to the California least tern, is a Memorandum of Understanding regarding in-water construction projects (MOU) that was most recently signed by our respective agencies in 2001. You may have reviewed this document in the early months of your tenure at Naval Base Coronado, as we had discussed the potential of better addressing impacts associated with physical covering of California least tern foraging habitat in future iterations of this MOU. We have periodically updated and amended this agreement, however the most recent amended MOU has expired. We have been continuing to recognize the tenets of the agreement, and it is our understanding that your respective staff has continued to implement the MOU as well.

We propose to continue to recognize the existing MOU until a new amendment is drafted and signed. We would also appreciate continued coordination on any projects that may be covered by the MOU and would be happy to provide concurrence e-mails regarding future projects to meet your regulatory requirements with the Army Corps of Engineers and other regulatory agencies. Please let us know if this meets your needs. If you have questions or would like to develop a timeline for finalizing an updated amendment to the MOU, please contact Sandy Vissman at (760) 431-9440 extension 274.

Sincerely,

Therese O'Rourke
Assistant Field Supervisor

TAKE PRIDE IN AMERICA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011

FACSIMILE TRANSMITTAL FORM

Date Sent:	***No. of Pages:***	***Time Sent: (Pacific Time)***
12/18/07	2	1630

TO: Tammy Conkle — ***Fax No.:*** 619-545-3489

FROM: Sandy Vissman — ***Fax No.:*** (760) 431-5902 ***Phone No.:*** (760) 431-9440

SUBJECT: MOU Ext LTR

COMMENTS:

If you have any problem receiving this fax, please call (760) 431-9440, extension 283. Thank you.

California Gnatcatcher

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.

TAKE PRIDE IN AMERICA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

In Reply Refer To:
FWS-SDG-08B0503-09F0517-R001

AUG 17 2012

Captain Gary Mayes
Commanding Officer
Naval Base Coronado
P.O. Box 357033
San Diego, California 92135-7033

Subject: Amendment to the Biological Opinion on the U.S. Navy's Silver Strand Training Complex Operations (FWS-SDG-08B0503-09F0517), Naval Base Coronado, San Diego, California

Dear Captain Mayes:

On April 25, 2012, we received the U.S. Department of the Navy's (Navy) request to amend the biological opinion addressing Silver Strand Training Complex (SSTC) Operations (FWS-SDSG-08B0503-09F0517) on federally listed endangered and threatened species. This amendment addresses a study to evaluate the effects of military working dogs on the California least tern (*Sternula antillarum browni*, least tern) and western snowy plover (*Charadrius alexandrinus nivosus*, snowy plover), which the Navy will implement to fulfill Avoidance Measure 6.3 and Term and Condition 1.6.5 of the biological opinion.

The Navy implemented Phase 1 of the working dog study during the 2012 least tern and snowy plover breeding season, and plans to continue work during the 2013 breeding season. The Navy submitted a general study design for our review and approval as required by Term and Condition 1.6.5. The study included the following activities and measures to minimize potential impacts to least terns and snowy plovers:

1. Researchers, under supervision of experienced monitors approved by the Carlsbad Fish and Wildlife Office (CFWO), will install, monitor, and remove video cameras at up to 175 least tern nests and 20 snowy plover nests at the SSTC and Delta Beaches. Camera installation and removal will only occur during periods of moderate weather, consistent with existing monitoring weather guidelines. The Navy will submit the list of researchers and monitors, their relevant experience and the specific activities that will be conducted by each to the CFWO for approval. The cameras will be installed, monitored, and removed as follows:

    a. Up to 4 cameras will be attached to a digital video recorder (DVR), via cables. Three of the cameras will be directed at individual nests, and one of the cameras will be directed toward the route of travel (e.g., beach or sand road). Two camera systems

(four cameras attached to a DVR) may be operated in different areas at the same time. Each camera system will be monitored by a researcher. The DVR and researcher will be stationed in a blind that will be at least 33 yards from nests, or will be hidden from the line of sight of nests by topography (e.g., dune or beach crest) or other physical features (e.g., fence).

b. Camera system installation and removal will be minimized to approximately 20 minutes each. The researcher has developed the technique for installation and removal to minimize the disturbance to the colony, by setting up the blind first, then quickly installing or removing the equipment from the blind to and from the nests.

c. The monitor will observe nest(s) prior to installing camera equipment to assure that least terns or plovers are actively incubating target nests.

d. Up to: i) 100 least tern nests and 15 snowy plover nests in the northern 7 beach lanes of SSTC-N beach; and ii) 75 tern nests and 5 plover nests on the southern 3 beach lanes of SSTC-N, SSTC-S or Delta beaches will be observed using the camera system described above. Nests within these areas will be observed by camera for up to 3 sequential days (i.e., before, during, and after existing dog training). This will entail setup and removal of the camera system each day. The daily observation period will be for approximately 2 hours. The same nests will also be observed on 1 to 2 additional days later in the breeding cycle to gather additional behavioral data during periods without dog training activity.

e. The researcher or monitor will record the departure time of any least terns or snowy plovers that are flushed from the target nest(s) during camera installation, and also record the time that birds return to the nest. If birds do not return within 20 minutes of camera installation, researchers will remove the blind and depart from the area. The researcher or monitor will then continue to monitor target nest(s) through a scope from outside the colony, if possible without exacerbating disturbance, and record the length of time of absence and any other relevant observations (i.e., predation of unattended nest). If it is not possible to monitor the nest(s) without additional disturbance to the colony, the monitor will note the nest number(s) and return to these nests on the following day to confirm continued incubation. The hatch rate and daily survivorship of nests at which incubation was not resumed within 20 minutes of camera installation will be compared to the colony-wide hatch rate and daily survivorship at the end of the season to determine if such nests experience a reduced hatch rate or survivorship. The Navy will report to the CFWO within 24 hours if any incubating least tern or snowy plover fails to return to a nest within 20 minutes of camera installation and will coordinate with the CFWO to determine whether additional disturbance minimization measures are necessary.

f. The researcher and monitor will remain inside the blind during the observation period, to reduce the potential for disturbance.

g. Patrice Baumhardt, Joelle Fournier, and Emily Rice will be authorized to install, monitor and remove nest cameras for this study, unless additional researchers are deemed necessary and are approved by the CFWO.

2. Researchers, under supervision of experienced monitors approved by the CFWO, will install, monitor and remove data loggers at up to 150 least tern nests and 30 western snowy plover nests at the SSTC and Delta beaches. Fifteen of the least tern nests with data loggers will be filmed for up to 5 hours to verify that the temperatures recorded by the data logger correspond to the least tern nest attendance. Data logger installation and removal will only occur during periods of moderate weather, consistent with existing monitoring weather guidelines. The Navy will submit the list of researchers and monitors, their relevant experience, and the specific activities that will be conducted by each to the CFWO for approval. The data loggers will be installed, monitored and removed as follows:

   a. Data loggers will be placed under the sand at the center of the nest after 2-3 days of nest incubation. An additional data logger will be placed adjacent to the nest to act as a control.

   b. To reduce the potential for data logger installation and removal to affect nesting, installation and removal time will be minimized to approximately 3 minutes for each nest, and installation and removal will minimize disturbance to each nest scrape.

   c. If necessary, eggs will be temporarily moved, or otherwise protected during installation and removal of data loggers.

   d. The researcher or monitor will observe nest(s) prior to installing data loggers to assure that least terns or snowy plovers are actively incubating target nests.

   e. The researcher or monitor will record the departure time of any least terns or snowy plovers that are flushed from the target nest(s) during data logger installation. The researcher or monitor will then continue to monitor target nest(s) through a scope from outside the colony, if possible without exacerbating disturbance, and record the length of time of absence and any other relevant observations (i.e., predation of unattended nest). If it is not possible to monitor the nest(s) without additional disturbance to the colony, the monitor will note the nest number(s), and return to these nests on the following day to confirm continued incubation. The hatch rate and daily survivorship of nests at which incubation was not resumed within 20 minutes of data logger installation will be compared to the colony-wide hatch rate and daily survivorship at the end of the season to determine if such nests experience a reduced hatch rate or survivorship. The Navy will report to the CFWO within 24 hours if any incubating least tern fails to return to a nest within 20 minutes of data logger installation and will coordinate with the CFWO to determine whether additional disturbance minimization measures are necessary.

f. Joelle Fournier, Tiffany Shepherd, and Emily Rice will be authorized to install and remove data loggers and temporarily move tern and plover eggs, unless additional researchers are deemed necessary and are approved by the CFWO.

3. The researchers will develop maps for review during the bi-weekly coordination meetings with the Navy and CFWO that depict the locations of all cameras and data loggers installed to date, to compare to the nest distribution and success.

4. The Navy will submit a report to the CFWO at the end of the working dog study. The Navy will submit a copy of researcher's draft report to the CFWO, and provide the CFWO 14 days to submit comments to the Navy, prior to submitting the final report. The report will include the following:

   a. The duration of observed parental absences associated with study equipment installation and removal, and military dog training.

   b. A comparison of the hatching rate of least terns and snowy plovers at nests that were and were not subject to study equipment installation and removal, and military dog training.

   c. Representative video footage that shows the range of responses observed of least terns and snowy plovers to study equipment installation and removal, and military dog training.

   d. Recommendations for minimizing disturbance associated with study equipment installation and removal, and military dog training.

The military working dog study is expected to temporarily disturb nesting least terns and snowy plovers. Installation, monitoring and removal of the cameras, blind and data loggers are likely to result in the temporary departure of least terns and snowy plovers from nests that are under incubation. The continued presence of the monitor or researcher during filming may increase the length of parental absence after camera installation. Eggs exposed when the adult is absent from the nest could be preyed upon or experience temperature changes that could affect egg viability. Adults could also respond to the installation and removal of the data loggers by moving eggs or nest material, or by abandoning the nest. We expect, however, that the duration of adult absence from the nest caused by installation, monitoring, and removal of study equipment will be short, based upon the observations of nest monitoring staff (Joelle Fournier, pers. comm. 2012), results of previous efforts to film least terns and snowy plovers (Jeff Allen, pers. comm. 2012, Demers and Robinson-Nilsen 2012, St Clair et. al 2010), the proposed set-back distance of the camera equipment, and the departure of researchers from the area if birds do not return within 20 minutes of equipment installation.

The proposal to install and remove cameras and data loggers only during moderate weather, as defined by existing monitoring protocols, will also reduce the potential for temperature effects associated with interruption of incubation. The potential for adverse effects associated with the presence of a researcher during filming will be reduced by using a blind placed outside the colony or out of sight of incubating birds.

Therefore, we do not expect an increase in nest abandonment or egg predation, or decrease in egg viability to result from the camera study. Based upon the response of least terns and snowy plovers to previous nest relocations, we do not expect nest abandonment associated with installation and removal of the data loggers.

Implementation of the study will allow researchers to observe and quantify the responses of least terns and snowy plovers to military dog training at SSTC beaches. Analysis of the information collected is likely to improve our understanding of least tern and snowy plover response to, and help inform future minimization measures for, military dog training. Therefore, the benefit of the information that will be obtained is expected to outweigh the temporary disturbances associated with the study.

In conclusion, while it is likely to cause temporary disturbance to nesting least terns and snowy plovers, we do not anticipate that the working dog study will cause any additional take of these species beyond that authorized in the biological opinion on the STCC Operations. Should study plans change or if additional information on the effects to least terns and snowy plovers becomes available, this determination may be reconsidered and further section 7 consultation may be required.

We appreciate the Navy's efforts to implement the avoidance measures and terms and conditions of the biological opinion on the STCC Operations and look forward to our continued coordination on implementation of the working dog study. If you have any questions concerning this amendment, please contact Sandy Vissman at (760) 431-9440, extension 274.

Sincerely,

Karen Goebel
Assistant Field Supervisor

Literature Cited

Demers SA, Robinson-Nilsen CW. 2012. Monitoring western snowy plover nests with remote Surveillance systems in San Francisco Bay, California. Journal of Fish and Wildlife Management 3(1):123–132; e1944-687X. doi: 10.3996/062011-JFWM-036

St Clair, J.J.H., P. Herrmann, R.W. Woods & T. Székely. 2010. Female-biased incubation and strong diel sex-roles in the Two-banded Plover *Charadrius falklandicus*. J Ornithol 151: 811–816.

U.S. Fish and Wildlife Service. 2010. Biological Opinion FWS-SDG-08B0503-09F0517. Military Training Activities at Silver Strand Training Complex. 167 pages.

U.S. Navy. 2012a. Proposal to Study the Effects of Military Dog Training on Nesting Plovers and Terns.

U.S. Navy. 2012b. Amended Proposal to Study the Effects of Military Dog Training on Nesting Plovers and Terns.

Zimmerman, P. 2008. Nocturnal Predation of California Least Terns and a Southern California Least Tern Colony. Master's Thesis, Humbolt State University, Humbolt, California.

Personal Communications

Allen, J. 2012. Telephone communication concerning previous cameral work conducted at Naval Base Coronado and San Diego Bay National Wildlife Refuge.

Fournier, J. 2012. Communication regarding observed responses of terns and plovers to monitoring activity, conducted during bi-weekly California least tern meeting on April 25, 2012.

POLICY AND PROCEDURE REGARDING SICK, INJURED, OR DEAD ANIMALS

Navy Region Southwest

April 2013

This document has been prepared to assist Navy Region Southwest military and civilian personnel in the event that sick, injured, or dead animals are encountered in or around the workplace. Wildlife, in general, should NOT to be handled. However, when sick or injured animals must be handled, it should be done with EXTREME CAUTION. Animals can behave erratically when stressed. Wild animals should not be handled as if they were household pets. Always use a pair of gloves, non-permeable preferred, when handling wildlife and drape a piece of thick fabric [e.g., a sweat shirt or towel] over the head of the animal [reduces stress]. Place the animal in a dark container, such as a box, in order to keep it calm. Once an animal is confined, it should NOT be given food or water as it can result in more damage to an already ill animal. To prevent bites it is recommended that personnel minimize interactions with all wildlife, since some animals may be vectors to potentially dangerous diseases such as rabies. If you have handled an animal, even wearing gloves, wash your hands to reduce the potential for disease transmission.

This document is organized into sections regarding procedures, contact information, and safety guidelines for specific situations. The sections are organized A through H and cover the respective topics: sick or injured terrestrial animals, removal of dead terrestrial animals, sick or injured marine mammals, removal of dead marine mammals, dealing with nuisance animals, Avian Influenza, West Nile Virus, and Rabies. A reference list is included at the end of the document listing all the phone numbers mentioned throughout the instructions.

Due to the large areas of land under the management of Navy Region Southwest within the San Diego Metropolitan Area and because of the lack of suitably trained personnel and appropriate equipment, the Natural Resources Office cannot respond to all sick, injured or dead wildlife. If sick, injured or dead wildlife is encountered, the guidance below should be followed. Questions

should be directed to the **Natural Resources Department** (for Naval Base Coronado: **[619] 545-3703**, for Naval Base San Diego or Naval Base Point Loma: **[619] 532-2686)** or the **installation environmental staff (Appendix A)**

.

A. <u>Sick or Injured Wildlife [Terrestrial]</u>

1. <u>Assistance</u>: Navy Region Southwest utilizes the services of local private conservation organizations to assist sick and injured animals. Wildlife Assist and Project Wildlife are willing to respond to calls for assistance on Navy property; however, only Wildlife Assist will retrieve animals. Sky Hunters is a resource for sick or injured raptors (eagles, owls, hawks). Arrangements with Sky Hunters must be made through the Natural Resources Department. A satellite responder is available on San Clemente Island.

a. **Wildlife Assist** - Ms. Marie Molloy [Call numbers in priority order below]

[1] Emergency Cellular telephone - **[619] 921-6044**

[2] Business telephone - **[858] 278-2222**

b. **Project Wildlife** [Injured animals must be transported to participating centers]

[1] Business telephone - **[619] 225-9453**

[2] Location- 887 ½ Sherman Street, San Diego, CA 92110-4014 [see below]

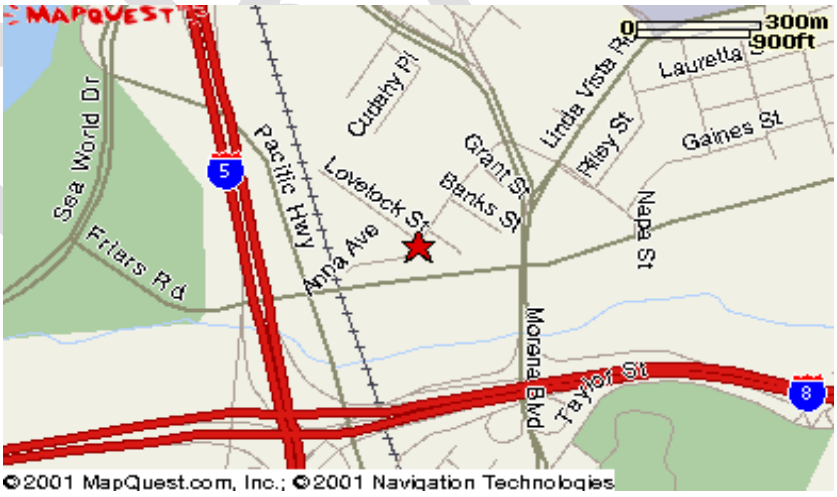


Figure 1. Location of Project Wildlife care center

c. **Sky Hunters** [birds of prey only, arrangements must be coordinated through Natural Resources Department]

[1] Business telephone- **[619] 445-6565**

d. **San Clemente Island-**

[1] During business hours - Jaelean Carrero **[619] 524-9104**

[2] After working hours – James Coler **[619] 726-5639**

2. Information Needed: When contacting the above organizations, have as much of the following information available as possible in order to facilitate animal retrieval: [1] type (as precise as possible) and size of animal, [2] disposition, [3] location, [4] contact person, [5] location of the installation, [6] building number with general directions, [7] telephone number, and [8] time called [if message to voice mail]. It may be necessary to meet the wildlife rescue representative at the entrance to the installation in order to escort them to the location of the animal.

3. Protected or Sensitive Species: If you know or suspect that the injured or sick animal is listed as a federally endangered or threatened species, contact the installation **Natural Resources Department.** *NOTE: **Do not contact regulatory agencies**, such as the U.S. Fish and Wildlife Service, California Department of Fish and Game, or National Marine Fisheries Service. Natural Resources Department compliance personnel will notify the appropriate agencies.*

B. Removal and Disposal of Dead Animals [Terrestrial]

1. Removal: The individual or command reporting the dead animal should take responsibility for appropriate carcass disposal. If the individual or command can not dispose of the carcass, at a minimum, the installation **Public Works Office** must be contacted (see Quick Reference List below for Trouble Desk number). Removal of dead animals should be accomplished as soon as possible to avoid unnecessary human exposure and to facilitate the transport of the animal, should that be required. The flesh of putrefied animals often rips easily, exposing personnel to body fluids and complicating the removal process. If animals must be handled in any way, it is recommended that disposable non-permeable gloves be worn or a plastic bag be used. The potential of contracting disease from the type of animals encountered within the San Diego Metropolitan Area is currently low. For information on Avian Flu and West Nile Virus transmittal, handling, and prevention, please refer to Sections F and G, respectively. If the animal is banded or tagged, notify the Natural Resources Department immediately and record the band identification number.

a. Small animals [under 50 lbs.] can be double-wrapped using black plastic garbage bags, closed with a twist-tie, and placed into a dumpster. Health hazards are not imposed in so doing, since there is no human contact with the disposed carcass. Complaints from personnel in the vicinity of the container will be avoided because the animal will be inconspicuous, will not generate odors, and will be mixed with a large volume of other debris. County of San Diego Ordinance and the City of San Diego allow the transport to and disposal of dead animals in landfills.

b. Larger animals [over 50 lbs.] may require burial. Burial should be deep enough to obviate inadvertent subsequent exposure and should be in soft, moist soil – not only for the ease in digging, but also to promote decomposition. If it is easy to do so, the body cavity may be opened, however the organisms associated with decomposition are in the large intestine, i.e., decay proceeds from the inside out. Plastic bags should never be associated with the burial of an animal. They neither promote decomposition nor are biodegradable. If found near the ocean, carcasses should be buried 4 feet deep and up away from the high tide water mark to prevent spreading botulism. Burial in or near nesting areas for the California Least Tern and Western Snowy Plover must be coordinated with the NBC mainland Wildlife Biologist (see Appendix A). The installation **Public Works Officer [PWO]** should be contacted for assistance with burial of larger animals. Contact the **Navy Region Southwest Trouble desk at [619] 556-1309.**

2. Bird/Animal Aircraft Strike Hazard [BASH]: If a dead animal is located adjacent to an active airfield, it is critical that the animal be removed as soon as possible. A carcass can attract bird and other wildlife that can pose a threat to aircraft and aviation personnel. A possible BASH strike should be immediately reported to the Air Operations Air Traffic Controller, which can typically be reached via the Officer of the Day. All possible BASH strikes should be saved (preferably frozen) to determine whether a strike occurred and the species involved. For investigation of animals found near runways at NAS North Island and NOLF Imperial Beach, contact USDA Wildlife Services BASH biologist at **[619] 250-9847**.

3. Protected or Sensitive Species: As with live animals, if you know or suspect that the dead animal is a federally listed endangered or threatened species, contact the installation **Natural Resources Department** (see Appendix A) to ensure proper notification is made to regulatory agencies. It will be decided at this time who will dispose of the animal or whether it will need to be donated to a museum or federal agency.

C. Reporting of Sick or Injured Marine Mammals and Sea Turtles

1. Sick or Injured: Marine mammals [whales, dolphins, sea lions, and seals] exhibiting signs of illness or injury should be avoided, but may be watched from safe distances to discern condition. Do not enter the water to assist a sick or injured marine mammal. THIS IS EXTREMELY DANGEROUS. Many dying marine mammals cannot be assisted, for a host of reasons. In addition, only civilian personnel associated with the California Marine Mammal Stranding Network (CAMMSN), overseen by the National Marine Fisheries Service (NMFS) Southwest Stranding Coordinator, may legally assist live stranded marine mammals. These personnel have the appropriate emergency response training, skills, and permits for these situations. .

2. Beached Animals: Seals and sea lions often beach themselves to rest, promote molting, and to recover from injuries and sickness. Dolphins, porpoises, whales and sea turtles only beach themselves during extreme illness or death. If there is doubt about whether or not an animal is alive, approach with extreme caution, since startled animals can inflict serious injury to personnel. Never attempt to touch an animal that may be alive!

   a. Reporting: In the event that any marine mammal is beached alive, and appears sick or injured **SeaWorld,** the San Diego County CAMMSN POC for live strandings, should be **immediately** contacted at **1-800-541-SEAL.** Additionally, the NRSW marine biologist should be contacted at **[619] 532-2747.**

   b. Information Needed: When contacting the above POC's, please have as much information available as possible. In order to facilitate animal retrieval, the following will be needed: [1] type, size, and approximate weight of animal, [2] disposition (i.e. why you think the animal is injured or ill), [3] observed movement on the part of the animal, [4] contact person, [5] contact telephone number, [6] location of the animal (as precisely as possible), [7] location of the installation, [8] building number with general directions, and [9] time called (if message to voice mail).

   c. Summary Report: For each stranded cetacean or sea turtle, the NOAA Marine Mammal Stranding Data Sheet needs to be filled out and should be emailed or faxed to NRSW (walter.l.wilson2@navy.mil or 619-532-2283), who will forward to the

appropriate NMFS POC. . The form is located at www.nmfs.noaa.gov/pr/pdfs/health/levela.pdf.

D. Reporting and Removal of Dead Marine Mammals and Sea Turtles

1. Reporting:

a. Upon finding dead marine mammals or sea turtles, the **NRSW** marine biologist should first be contacted at **[619] 532-2747** (leave voicemail if necessary).

b. Concurrently and immediately, the San Diego County CAMMSN contact to report dead marine mammals and sea turtles is NMFS' **Southwest Fisheries Science Center** at **[858] 546-7162**.

c. Summary Report: In addition, for each dead marine mammal the NOAA Marine Mammal Stranding Data Sheet needs to be filled out and should be emailed or faxed to NRSW (walter.l.wilson2@navy.mil or 619-532-2283). The form is located at www.nmfs.noaa.gov/pr/pdfs/health/levela.pdf .

2. Disposal: Do not dispose of a dead dolphin, whale, porpoise or sea turtle without consulting with the NRSW marine biologist. **After contacting both the NRSW marine biologist and Southwest Fisheries Science Center**, large dead marine mammals may be dealt with in one of several ways. If the dead animal is found *floating* in Navy waters or in and around Navy piers, contact the **Port Operations Port Control Office** at **[619] 556-1433** and they may tow the carcass out to sea. Alternatively, the NMFS may suggest alternative towing destinations, and the Navy as part of a memorandum of understanding with the NMFS can assist to the best practival extent possible given operations, logistic, fiscal, or personnel constraints.

If the dead animal is found on shore, there are three options for disposal.

a. Natural tidal processes: leaving the carcass to decay where it lays is the first option. If it is in close proximity to personnel, or is an aesthetic nuisance, the carcass may be repositioned to allow removal by the next high tide [see movement techniques below]. However, this will be ineffective when the animal is within the confines of San Diego Bay.

b. Tidal and Sand Burial: only do this if tidal disposal is impossible or deemed inappropriate. The largest of animals can be moved using a strong plastic tarp. Laid adjacent to the carcass, the animal can be rolled or pushed onto the tarp, then dragged

to the water or burial site. All sand burials near the beach should be made at least four feet deep and up away from the high tide water mark to prevent spread of botulism. This is necessary to prevent further proliferation of diseases and to suppress odors. Sand burials at NAB Coronado from February through September must be coordinated with the Natural Resources Department to ensure nesting endangered birds are not impacted. Any tarp used in pushing an animal should be washed thoroughly in salt water [if used in the ocean], with a final rinse in fresh water. The **Trouble desk, [619] 556-1309,** should be contacted if heavy equipment is required and if necessary to enlist the assistance of cranes and/or rigging. Funding must be provided by the requesting command.

c. Dumpster Burial: When natural tidal processes or burial are impossible or inappropriate, an animal may be disposed of in a garbage dumpster on the installation. The animal must be wrapped in either a tarp or garbage bag and disposed of in a garbage dumpster. The animal must stay wrapped in the tarp inside of the dumpster. This tarp should not be retrieved.

3. Final Notification: After the removal of a carcass has been accomplished, the NRSW **marine biologist [619] 532-2747** should be contacted with final details of the event.

E. Nuisance Animals [Squirrels, Gophers, Rats, Mice, Bats, etc.]

1. For assistance with terrestrial wildlife, contact the **Navy Region Southwest Trouble desk** at **[619] 556-1309.** Please be aware of the possible risk of rabies transmission. Refer to Section H for information on rabies detection, assistance, and avoidance.

2. For assistance with bee swarms, contact the **Trouble desk at [619] 556-1309** for PWC Pest control assistance.

3. Bats get trapped in buildings and must be removed. If a bat is believed to be in the building, contact the installation **Natural Resources Department**. If the bats are presenting an immediate hazard, they can be removed but must be done with caution to prevent bites and disease. NEVER use bare hands to pick up or touch a bat! If you find an injured bat, gently scoop the animal into a small container (like a shoe box) using a cloth or piece of paper. Put a soft cloth into the box to give the bat somewhere to cling and hide. Cover the box and place it where it cannot be disturbed by pets or children. Once the bat(s) has been captured, contact the

installation **Natural Resources Department** or **Wildlife Assist** for response or the animal can be taken directly to the **Project Wildlife care center** (see Section A.1.b). For rabies information see section H.

F. Avian Influenza

Avian Influenza is a virus commonly found in bird intestines. It is spread in bird excretions and saliva; contact with infected bird secretions can infect poultry and domestic birds. Human infection is very **rare** and spread among humans has not been sustained. Symptoms of the virus can range from flu-like (cough, fever, sore throat, muscle aches, etc.) to pneumonia, acute respiratory distress, and other severe complications. There are a number of strains of the virus known to exist, but type A influenza virus is the one most commonly associated with birds. Refer to the **Center for Disease Control** Avian Influenza webpage: http://www.cdc.gov/flu/avian/ for more information.

While human infection is very rare, proper handling of bird carcasses will reduce the risk of infection of Highly Pathogenic Avian Influenza (HPAI H5NI). The following guidelines have been generalized from the Department of Interior U.S. Fish and Wildlife Service Avian Influenza procedures (see citation below).

1. Handling live and dead birds where HPAI is not suspected in the vicinity: Normal protective measures, handling, removal, and/or burial guidelines as outlined in Section B should be followed. Personal protective equipment (PPE) should be worn and disposed of properly.

2. Handling live and dead birds where HPAI has been diagnosed or is suspected: Aerosolization of particles increases the risk of personal flu infection, thus, basic PPE such as impermeable gloves, goggles, National Institute for Occupational Safety and Health (NIOSH) particulate respirator, disposable gown and coveralls, and rubber boots or covers. Contact of exposed skin (such as facial skin) with PPE (e.g. gloves) must be avoided, torn gloves must be replaced, and hands must be thoroughly washed. Proper handling, removal, and/or burial of the bird must be practiced as listed above in Section B. Contact with bird should be as limited as possible.

3. Handling of PPE: PPE should be removed and handled as follows: [1] remove and dispose of coveralls and boot covers, [2] disinfect rubber boots, [3] remove gloves and thoroughly wash

hands, [4] remove and disinfect eye protection, [5] remove and discard respirator, [6] rewash hands.

4. Additional guidance: Further questions or concerns regarding avian flu, please contact the **Center for Disease Control at [800] CDC-INFO**.

G. Handling birds infected with West Nile Virus

Humans can be infected with West Nile Virus after being bitten by an infected mosquito. Mosquitoes become vectors by biting infected birds. There is no evidence that human contact with infected dead birds will lead to infection, nor will person-to-person contact. The best protection against West Nile is to avoid mosquito bites and eliminate mosquito breeding grounds. The **San Diego County Department of Environmental Health** phone line, **[858] 505-6700**, offers additional information on West Nile Virus. The County's webpage also offers information and can be accessed at: http://www.sdcounty.ca.gov/deh/. Additional information can found on the **Center for Disease Control** West Nile Virus webpage: http://www.cdc.gov/ncidod/dvbid/westnile/.

1. Reporting dead birds: The **County of San Diego Department of Environmental Health Dead Bird Reporting Information Line** should be contacted at **[858] 694-2888** upon the discovery of a dead bird that meets the following qualifications: [1] must be a crow, raven, owls, jay, or hawk, [2] has been dead for LESS than 24 hours, [3] has NOT been damaged by animals or cars, [4] is NOT infested with maggots, ants, or flies, and [5] does NOT smell bad. The County will only accept and test fresh, intact carcasses. Birds accepted and tested by the County are: chickens, crows, ducks, egrets, herons, geese, gulls, hawks, jays, owls, pelicans, ravens, sandpipers, swans, and turkeys. An online reporting sheet may be submitted through the **Vector Control Program** homepage, **http://www.sdcounty.ca.gov/deh/eforms/chd_deadbird.html.**

H. Rabies Detection, Symptoms, and Avoidance

Rabies is an extremely dangerous and lethal disease. It is transmitted via bites or scratches. Raccoons, skunks, bats, and coyotes are the most commonly infected wild animals. Cats are the most commonly infected domesticated animals. Rabid animals usually display erratic behavior such as violence, confusion, friendliness, and muscle spasms. Nocturnal animals seen during the day may have rabies. Symptoms of human infection, though rare, include

tingling at wound site, flu-like symptoms, irritability, seizures, coma, and muscle spasms when exposed to water (www.emedicinehealth.com, 2005).

1. Initial response: If bitten by a possibly rabid animal, the individual should seek medical help as soon as possible. Their direct supervisor should be notified. Treatment is available at the Naval Medical Center San Diego (NMCSD) and at various Naval clinics. The **NMCSD Emergency Room** should be contacted at **[619] 532-8274** if bite occurs after clinic hours or on the weekends. The clinic or Emergency Room will proceed with testing and treatment. If the animal has been contained or able to be euthanized the Army Veterinary Techs will test it for rabies. The **San Diego County Health and Human Services** department should be contacted at **[619] 515-6620**. Response towards a potentially rabid wound should be immediate. The wound should be thoroughly washed and a physician or emergency room should be called without delay. If the animal is contained or euthanized, it can be tested for rabies. If this is not possible, a Post exposure Prophylaxis (PEP) regimen should begin at once. For further information refer to the **California Compendium of Rabies Control & Prevention, 2004** (see full citation).

a. The **NMCSD Preventative Medicine** unit can be contacted at **[619] 532-7638** for more information. The number for the main hospital is **[619] 532-6400**.

2. Rabies Post exposure Prophylaxis (PEP): If rabies infection is highly suspected, a regimen of rabies vaccine and Human Rabies Immune Globulin (HRIG) will proceed. The vaccination and immunization process must be completed uninterrupted to work effectively against infection.

3. Prevention: Contact with potentially rabid animals should be avoided if possible. Wild animals should not be fed. If contact is unavoidable, the utmost care and proper protective gear should be worn to protect from scratches or bites. Animals suspected of rabies should be contained, isolated, or euthanized. The **San Diego County Department of Animal Services** can provide assistance with handling rabid or possibly rabid animals and can be reached at **[619] 236-4250**. An isolated or euthanized animal can be tested for rabies by the **San Diego County Public Health Laboratory, [619] 692-8500**. The **San Diego County Health & Human Services** department can provide further information when contacted, **[619] 515- 6620.**

4. Additional information:

a. **San Diego County Health & Human Services:** online information

[1] Rabies brochure:

http://www2.sdcounty.ca.gov/hhsa/documents/rabiesflyer040904.pdf

b. **E medicine article**:

[2] E-medicine. Rabies. http://www.emedicinehealth.com/rabies/article_em.htm

10 August 2005.

QUICK REFERENCE LIST:

Navy Region Southwest Trouble Desk (contact for current installation PWO numbers): [619] 556-1309

Natural Resources Department – Naval Base Coronado: [619] 545-3703

Natural Resources Department – Naval Base San Diego and Point Loma: [619] 532-2686

Sick or Injured wildlife [terrestrial]

A. Wildlife Assist: Ms. Marie Molloy

[1] Response cellular telephone: [619] 921-6044

[2] Business telephone: [858] 278-2222

B. Project Wildlife

[1] Business telephone: [619] 225-9453

C. Sky Hunters (arrange through Natural Resources Department)

[1] Business telephone: [619]445-6565

Removal and Disposal of Dead Animals [terrestrial]

Navy Region Southwest, Trouble desk: [619] 556-1309

BASH Strike

USDA Wildlife Services [619] 250-9847

Trouble desk: [619] 556-1309

Sick or Injured Marine Mammals

A. SeaWorld:

[1] 1-800-541-SEAL

[2] [619]-226-3900

Removal of Dead Marine Mammals

A. NRSW Marine Biologist: [619] 532-2747

B. Dead cetaceans, sea turtles

[1] South West Fisheries Science Center: [858] 546-7162

C. Dead pinnipeds

[1] NOAA Fisheries [562] 980-4017

D. Assistance in moving mammal

[1] Trouble desk: [619] 556-1309

E. Floating mammal

[1] Port Operations Port Control Office: [619] 556-1433

Nuisance Animals [squirrels, gophers, rats, mice, etc.]

A. Natural Resources Department (Naval Base Coronado: [619] 545-3703, Naval Base San Diego and Point Loma: [619] 532-2686

B. Trouble desk: [619] 556-1309

C. Bee swarms: [619] 556-1309

D. Project Wildlife Bat Team: [619] 225-9453

Avian Influenza

A. Center for Disease Control Avian Flu Information webpage: http://www.cdc.gov/flu/avian/

B. General questions

[1] Center for Disease Control: [800] CDC-INFO

West Nile Virus

A. Information

[1] San Diego County Department of Environmental Health: [858] 505-6700

[2] Center for Disease Control West Nile Virus webpage: http://www.cdc.gov/ncidod/dvbid/westnile/

B. Dead Bird Reporting Information Line: [858] 694-2888

C. Online Reporting form: http://www.sdcounty.ca.gov/deh/eforms/chd_deadbird.html

Rabies

A. Naval Medical Center San Diego:

[1] Main hospital: [619] 532-6400

[2] Emergency Room: [619] 532-8274

[3] Preventative Medicine: [619] 532-7638

B. San Diego County Health & Human Services Department: [619] 515- 6620

C. San Diego County Department of Animal Services: [619] 236-4250

D. County Public Health Laboratory: [619] 692-8500

Appendix A

Environmental –Natural Resources Staff Phone List

Naval Base Coronado

Tiffany Shepherd, Wildlife Biologist, NBC Coastal Properties: [619] 545-3703

Arlene Arnold, Wildlife Biologist, NBC Inland Properties: [619] 545-5551

Melissa Booker, Wildlife Biologist, San Clemente Island: [619] 545-7188

Walt Wilson, Marine Biologist: [619] 532-2747

Luis Perez, Environmental Installation Program Manager: [619] 545-3429

Naval Base San Diego

Andrew Wastell, Wildlife Biologist: [619] 532-2686

Walt Wilson, Marine Biologist: [619] 532-2747

Mark Edson, Environmental Installation Program Manager: [619] 556-1532

Naval Base Point Loma

Andrew Wastell, Wildlife Biologist: [619] 532-2686

Walt Wilson, Marine Biologist: [619] 532-2747

Rob Chichester, Environmental Installation Program Manager: [619] 553-0526

References

Bat World Local Rescue, webpage. 10 April 2013. http://batworld.org/local-rescue/.

Center for Disease Control. *Avian Influenza (Bird Flu).* 10 April 2013. http://www.cdc.gov/flu/avian/

Center for Disease Control. 7 August 2007. *West Nile Virus* 14 August 2007. http://www.cdc.gov/ncidod/dvbid/westnile/

California Department of Health Services. 2004. *California Compendium of Rabies Control and Prevention, 2004*. 11 August 2007. http://www.dhs.ca.gov/ps/dcdc/disb/pdf/2004%20CA%20Rabies%20Compendium.pdf

eMedicine Health. 2005. *Rabies*. 11 August 2007. http://www.emedicinehealth.com/rabies/article_em.htm

San Diego County Health & Human Services. *Rabies homepage.* 10 August 2007. http://www2.sdcounty.ca.gov/hhsa/default.asp

San Diego County Department of Environmental Health. 11 June 2007. *Vector Control Program.* 10 August 2007. www.sdcounty.ca.gov/deh/

San Diego County Department of Environmental Health. 2007. *West Nile Virus Home Page.* 10 August 2007. www.sdcounty.ca.gov/deh/

U.S Department of the Interior. 2006. *Employee Safety and Health for Highly Pathogenic Avian Influenza Surveillance and Response Activities*. 11 August 2006. http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/AvianFlu/HPAI%20Response%20Plan%20final%20071707%20Edition.pdf

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

In Reply Refer To:
FWS-SDG-09B0277-09F0806

OCT 30 2009

Captain Yancy B. Lindsey
Naval Base Coronado
Department of the Navy
Box 357033
San Diego, California 92135-7033

Subject: Biological Opinion on the Formal Section 7 Consultation for the Navy's Remote Training Site Warner Springs, San Diego County, California

Dear Captain Lindsey:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion on the U.S. Department of the Navy's (Navy) proposed expansion and realignment of the Remote Training Site Warner Springs (RTSWS), in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*). The biological opinion addresses the effects of the proposed training and expansion and realignment of RTSWS on the federally endangered arroyo toad [*Anaxyrus* (=*Bufo*) *californicus*, "arroyo toad"] and Stephens' kangaroo rat (*Dipodomys stephensi*, "SKR").

Based on our review of the project, knowledge of endangered and threatened species in southern California, and an assessment of potential impacts on listed species in the general area, we have determined the project will not affect the endangered slender-horned spineflower (*Dodecahema leptoceras*), Quino checkerspot butterfly (*Euphydryas editha quino*), southwestern willow flycatcher (*Empidonax traillii extimus*), or least Bell's vireo (*Vireo bellii pusillus*).

This biological opinion is based on information provided in the following: (1) *Biological Assessment*, prepared by Tierra Data Incorporated, dated March 2008; (2) *Draft Environmental Assessment*, dated May 2009 (Navy 2009); and (3) correspondence, notes, and other information compiled during discussions with the Navy. The complete project file addressing this consultation is maintained at the Service's Carlsbad Fish and Wildlife Office (CFWO).

CONSULTATION HISTORY

The Navy requested initiation of consultation in a letter dated March 24, 2008, and received in our office on April 14, 2008. During the consultation period, we met and corresponded with your agency, U.S. Forest Service (USFS), and U.S. Bureau of Land Management (BLM) to

clarify project information and to discuss conservation measures to avoid, minimize, and offset impacts to SKR and arroyo toad.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action involves the Navy's continuation and expansion of training activities at the RTSWS facility for the duration(s) set forth in the land use agreements with USFS and BLM (Figure 1). Specifically, the proposed action consists of: 1) the expansion and realignment of training areas, portions of which will occur on BLM, USFS, and Vista Irrigation District (VID) lands; 2) continuation of ongoing training activities; 3) an increase in annual Survival Evasion Resistance Escape (SERE) student use; 4) accommodation of future training requirements of different military units and occasional users of RTSWS; and 5) replacement of the current Memorandum of Understanding (MOU) between the Navy and USFS with a Special Use Permit (SUP).

At present, RTSWS implements training on a footprint consisting of 2,492 hectares (ha) [6,158 acres (ac)] of land owned by USFS and VID (Figure 1) with a proposed expansion of 104 percent onto 5,076 ha (12,544 ac) of USFS, VID, and BLM lands.

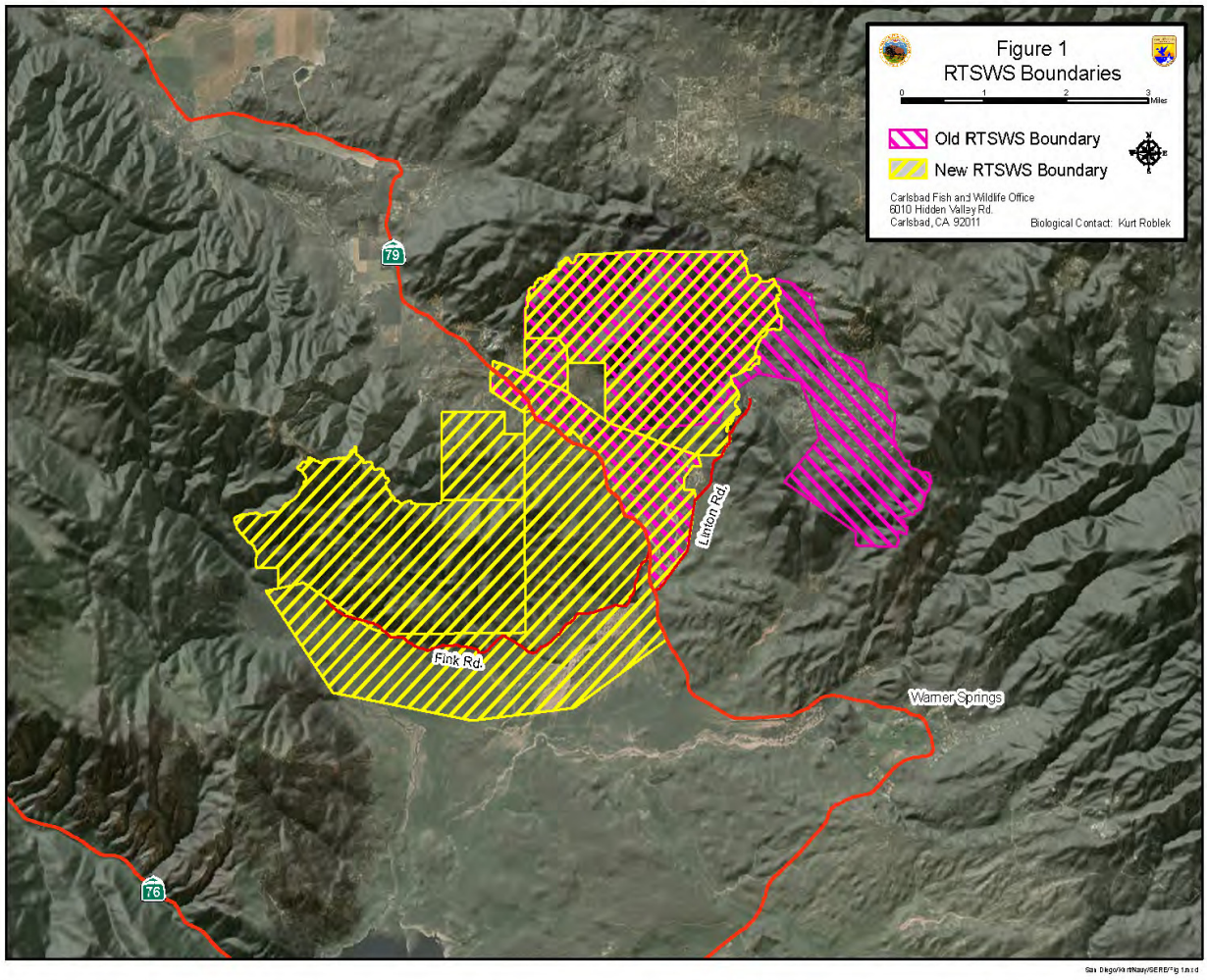
The SERE compound at RTSWS is located on USFS land and consists of a headquarters with an administrative building, several staff barracks buildings, a wastewater treatment plant, and a training compound consisting of several small structures. No other structural facilities are located on the RTSWS. Ten permanent duty personnel are stationed at the RTSWS, but none live at the RTSWS full time. The Navy proposes continued use and no expansion or change in operations at the SERE compound.

Six groups will routinely train at RTSWS: SERE; Naval Special Warfare (NSW) Sea Air Land (SEAL); 1st Marine Special Operation Battalion (1st MSOB); Naval Construction Force (NCF); Amphibious Construction Battalion-1 (ACB-1 (Seabees)); 1st Marine Expeditionary Force Training and Experimentation Group/Tactical Exercise Control Group (I MEF TEG/TECG); and other non-routine unit training. Each organization has different training objectives and use areas within the project footprint.

Current SERE Training Activities

The SERE training course teaches survival and evasion skills in the field over a 5-day time period. Survival training is taught first. Classes are divided into five groups of approximately 12 students, with 2 instructors per group (70 personnel total). Training occurs both day and night with most training activity consisting of dispersed foot traffic with periodic assembly for group training clinics. Training takes place throughout RTSWS. Students are taught methods to procure water; capture, field dress, and prepare animals for food; locate edible plants; navigate on

land; survive and evade enemies; build a shelter and fire, etc. During navigation training, students are given predetermined points to reach. Students navigate from the start point to navigation points by traversing cross country.



The last 2 days of survival and evasion training are spent practicing evasion in the field as two-person teams. Students are provided water, but they are not given food or weapons. Food is obtained by capturing animals and collecting plants in the wild. During the evasion period, students are given an objective to try to reach predetermined critical points, such as an extraction point.

After the survival and evasion phase, students are assembled and placed in the resistance training lab within the training compound. Finally, a 1-day debrief is conducted at an offsite location.

Proposed SERE Training Activities

The Navy proposes to increase the number of SERE students from 1,680 students to 2,072 students annually, a 23 percent increase. SERE students will train in the expanded footprint with no changes to the current SERE training curriculum.

Navigations points will be primarily located on VID land west of SR-79. The Navy has redistributed the navigation points to reduce the number occurring within SKR habitat.

Current NSW Training Activities

NSW SEAL personnel are trained on unconventional warfare and special tactical intelligence-gathering in hostile settings. This type of training occurs throughout RTSWS and is conducted typically three times a year with 4-6 SEALs. SEALs perform tactical navigation using foot patrol techniques, identify observation points, lay-up points and tactics. SEALs are taught to minimize disturbance (leave a small footprint), are required to carry out what they brought in, and do not build fires or capture and collect food during training.

Proposed NSW Training Activities

The Navy proposes to increase the number of training operations from three to six annually. No changes in the type of training currently conducted at RTSWS are proposed.

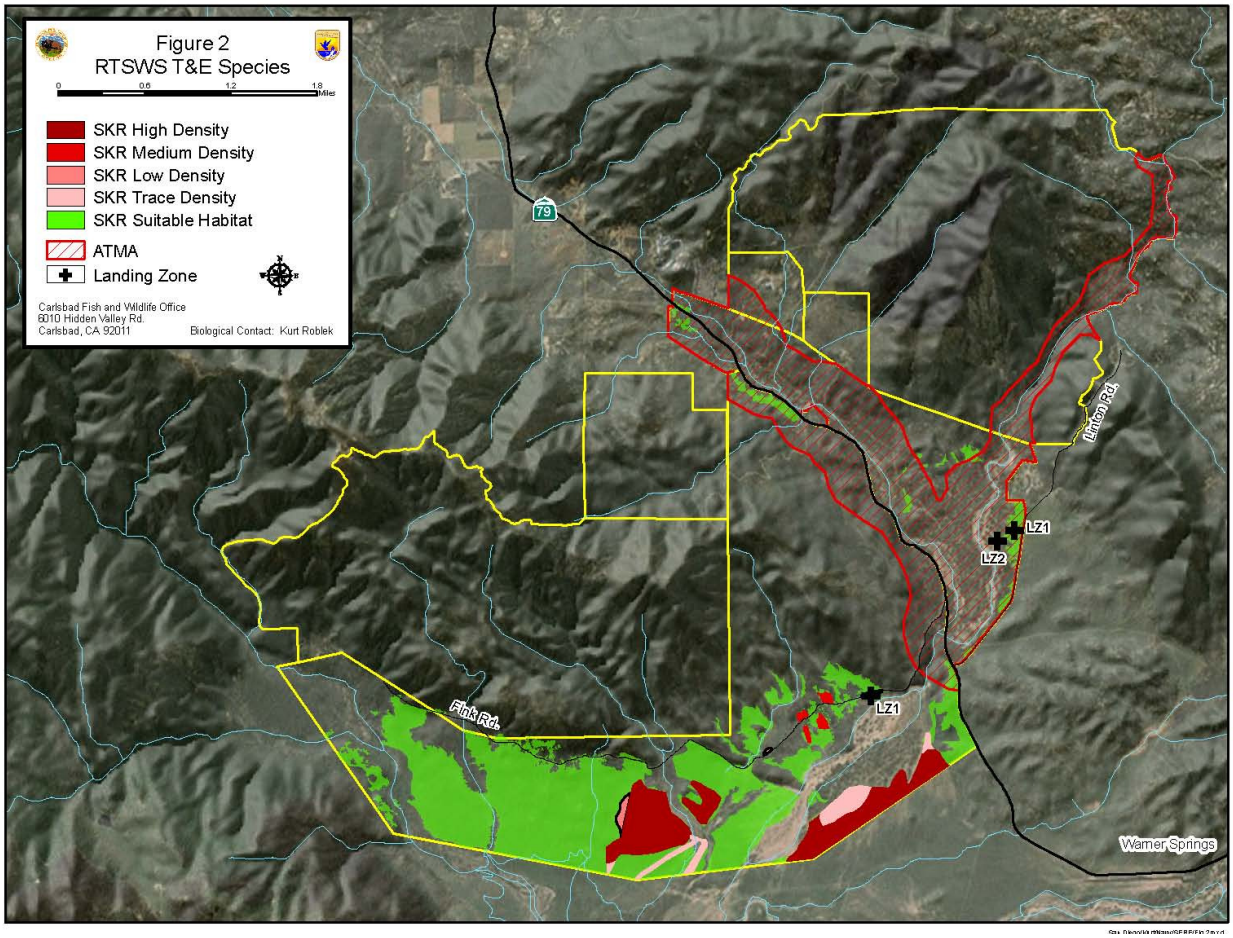
Current 1st MSOB Training Activities

Similar to SEAL training, 1st MSOB trains in unconventional warfare and special tactical intelligence gathering in hostile settings. 1st MSOB training occurs twice per year on VID land east of SR-79.

This training occurs over a 10-day period. During this timeframe, the Marines stay in the field and overnight in designated areas. Water is initially brought in, but as part of training, it must eventually be obtained via natural sources using a purifying pump. During training, no fires are built, no animals are taken, and all trash and expended ammunition casings are removed from the training area. Like NSW, 1st MSOB personnel are taught to leave a small footprint and are required to carry out what they have brought in.

Proposed 1st MSOB Training Activities

The 1st MSOB training will continue to occur at RTSWS twice a year. All aspects of the training will remain the same except for the addition of helicopters. Helicopters will be used for exercises requiring insertion or extraction of personnel. The locations of helicopter deployments are limited to those identified landing zones on the VID land: landing zones (LZ's) 1, 2, and 3 (Figure 2).



Current Seabee Training

Seabee training involves the teaching of military tactics that involve convoys, patrols (land navigation), and perimeter defense. Convoy training is conducted on established roads throughout RTSWS. Patrols typically involve squads of 12-14 personnel traversing on established paths and trails. Seabee training occurs up to 3 times per year, over 5 days. Ninety people, including the students and instructors, typically participate in the training. Seabees spend each night in the field, pitching tents on already disturbed ground. VID-leased land, east of SR-79, has been the main focal point of the Seabee training. All motorized operations remain on established roads. Food, water, and port-a-potties are provided. During training, no fires are built, no animals are taken, and all trash is removed from the training area.

Proposed Seabee Training Activities

The Navy proposes no change in the number of times training is conducted per year or any changes to the training activities. Seabee training activities will occur within the expanded RTSWS area.

Proposed I MEF TEG/TECG Training

Tactical Recovery of Aircraft and Personnel

The I MEF TEG/TECG does not currently have training exercises at RTSWS. The Navy proposes to conduct Tactical Recovery of Aircraft and Personnel (TRAP) and Non-Combatant Evacuation Operations (NEO) at RTSWS up to 4 times per year (2x each).

A TRAP training mission typically lasts for 24 hours and involves 30-50 people. During a TRAP operation, the rescue team [1 platoon-size element (24-36 people)] is transferred to RTSWS via helicopters to the vicinity of the "downed" aviator(s). During such missions, each helicopter will land twice in the course of the mission and will be on the ground for less than 10 minutes. Once on the ground, the rescue force fans out to locate, identify, and recover the downed aviator(s). Occasionally, there may be an additional 10-12 people to add to the realism.

This training will occur potentially day or night and use all LZ's. Water, food, and port-a-potties are provided. No fires will be built, and no animals will be taken.

Non-Combatant Evacuation Operations

A typical NEO mission would last 24 hours and involve up to 100 people including role players, simulating civilians, others that need to be evacuated, and a company of Marines (approximately 50 personnel). Typically four helicopters with 50 Marines land at LZ-1 where the remainder of the training operation is conducted. Once on land the Marines secure the area and start the identification, processing, and staging of role players. Once completed personnel are transported out by helicopter and bus. Food, water, and port-a-potties are provided. No fires would be built, and no animals would be taken.

Other Unit Training

Proposed Other Unit Training at RTSWS

SERE periodically receives requests from other units to conduct training at RTSWS. Requests are often for one-time training evolutions. SERE evaluates the training being requested for suitability and for the capabilities available. As standard operating procedure, all instructors from other units must receive a training area brief by SERE personnel prior to training. The command signs a statement with regard to what activities are allowed and what activities are prohibited, as well as any limitations due to current conditions and land use agreements. Any training conducted by other units will be of the same type and compatible with current training operations already being conducted at RTSWS.

Action Area

The action area is defined as all areas to be affected directly or indirectly by a Federal action and not merely the immediate area involved in the action (50 CFR §402.02). The action area for this project is confined to the RTSWS between the towns of Warner Springs and Sunshine Summit. Within RTSWS, most activities occur in and around Aguanga Ridge and Canada Aguanga River, West Fork San Luis Rey River, East Fork San Luis Rey River, and their respective watersheds.

Conservation Measures

1. After the initial 10 years of the 20-year biological opinion, the Service, Navy, USFS, BLM, and VID will meet to 1) discuss any changes to the project; 2) review the general status of the SRK and arroyo toad, including any relevant changes to the baseline status of these species in the action area (i.e., the "environmental baseline"); and 3) review information gained during the first 10 years in determining the effects of the training on SKR and arroyo toad. Any significant changes may require reinitiation and subsequent re-analysis of the effects of the training on SRK and arroyo toad for the remaining 10 years.

2. Digging (except holes done by hand for restoration), disking (except when approved by the Service to support revegetation and restoration efforts), grading, mechanical excavation or deposition of fill will avoid the Arroyo Toad Management Area (ATMA) and SKR-occupied habitat.

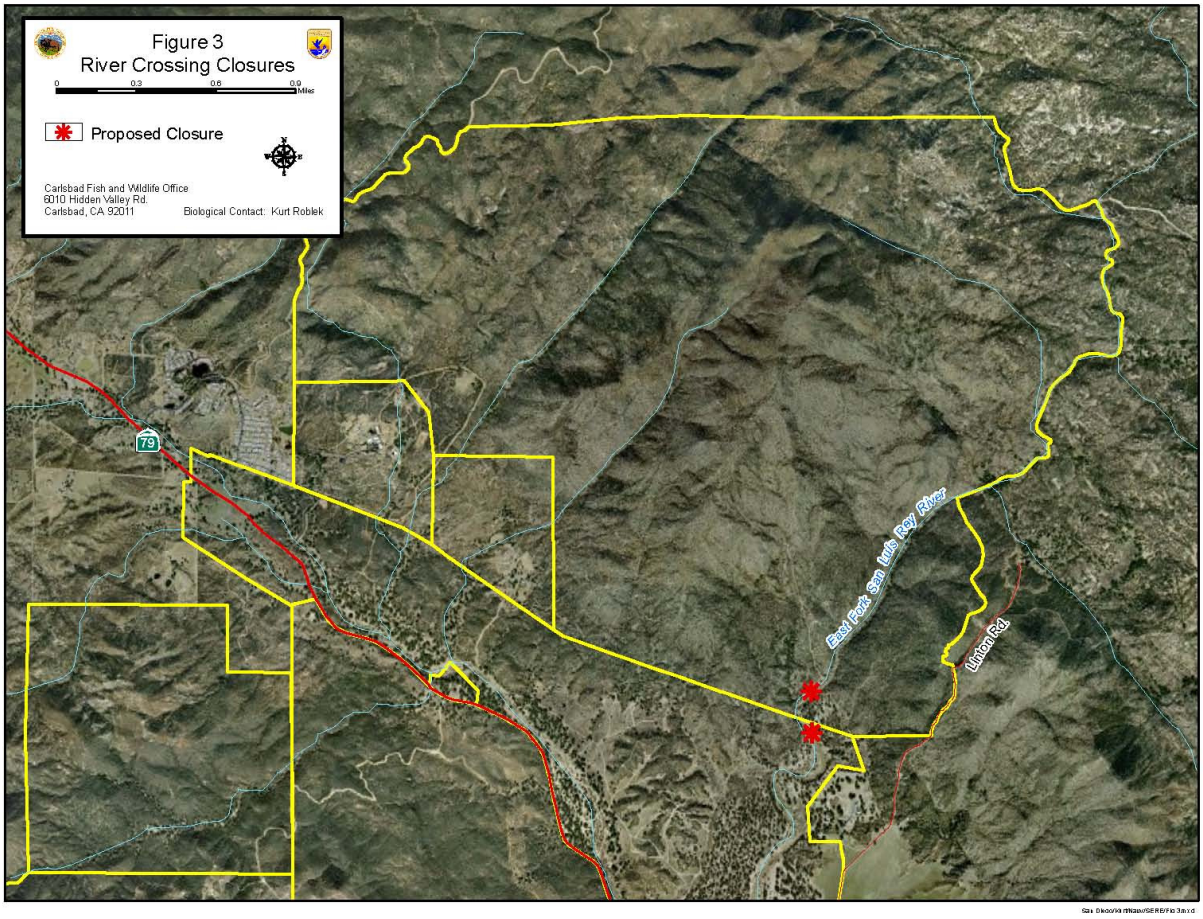
3. To minimize disturbance to arroyo toad, no exercises or activities will be conducted that will alter the natural processes or flow regime of the San Luis Rey River, including siltation, degradation of water quality, or the natural dynamics of downstream sand transport.

4. Training navigation points will be located at least 30 meters (m) [98 feet (ft)] from the bankfull edge of intermittent streams and 100 m (328 ft) from perennial streams.

5. Personnel will be instructed to urinate at least 30 m (98 ft) from the bankfull edge of intermittent streams and 100 m (328 ft) from perennial streams. Solid human waste will be buried at least 15 centimeters (cm) [6 inches (in)] deep and 91 m (300 ft) from any wash, stream, creek, or riparian area, and all toilet paper will be removed from the area. Portable toilets will be available in the field at assembly/encampment points for the unit training. Students will have access to portable toilets at points in the field upon arrival. These portable toilets will be located at the two main drop-off points.

6. No vehicle traffic will be permitted in riparian areas and across or along sandy alluvial habitats of the San Luis Rey River except for the existing dirt road crossings.

7. To offset adverse impacts on the arroyo toad, two dirt road river crossings on the San Luis Rey River will be permanently closed and may be restored as determined by the Naval Base Coronado (NBC) botanist (Figure 3). Unused roads may be blocked with natural debris, such as large dead trees or boulders, and additional measures implemented to promote reestablishment of native vegetation in degraded areas. In coordination with the land owner (VID, BLM, or USFS) and Service, site-specific assessments will be made prior to restoration efforts that are to be undertaken.



8. SERE instructors will be trained and knowledgeable about the fauna of the action area and able to identify/recognize SKR and arroyo toad.

9. Educational materials (e.g., a brochure) will be developed with information on, and a recognition guide to, arroyo toad and SKR. The brochure will provide information on how to differentiate between similar non-listed species and a synopsis of the training area rules and restrictions to avoid and minimize adverse impacts to these species (e.g., ATMA and speed limits).

The brochure will be provided as part of a briefing given by the SERE instructors to all SERE students and other users of the training area before they are allowed access to the training area. The briefing will include a discussion on the natural history of the training area and those federally listed species present in the training area as well as the training area rules and restrictions required to be followed to avoid any adverse impacts on these species.

10. All vehicle traffic will be restricted to currently established dirt or paved roads.

11. Areas where students and instructors congregate during the course of instruction will be selected based on the absence of federally listed species and their habitats.

12. Whenever the establishment of trails begins to be evident, passive restoration will occur by rotating training activities (e.g., field courses) away from the impacted areas. The intent is to have foot traffic remain dispersed and light throughout RTSWS

13. Active habitat restoration of established trails or other impacted areas will be included as a management action in the NBC Integrated Natural Resource Management Plan (INRMP). Restoration may be accomplished actively in some areas through seeding and planting.

14. All trash that may attract predators of SKR and arroyo toad (e.g., corvids, opossums, raccoons) will be removed from the training area and disposed of at least daily in areas or in bins that wildlife cannot access.

15. No pets, specifically cats and dogs, will be allowed as they may result in an increased level of predation or injury to SKR and arroyo toad.

16. Annual surveys to locate, and subsequent annual treatments (e.g., herbicide) of, invasive non-native plants will be included as a management action in the NBC INRMP. Non-native invasive plant species searches and spot treatment control efforts will be prioritized in riparian zones and areas of higher levels of training activity. Surveys and treatment will target species listed by the California Invasive Plant Council as 'severe', 'moderate', or 'limited' and any non-native plants that have the potential to alter ecosystem processes that are not already naturalized throughout the area.

17. Staff and students will be instructed to clean clothing and footwear by removing any soil and plant propagules prior to entering the field. All seed removed will be properly disposed.

18. Methods for controlling tamarisk (*Tamarix ramosissima*) and pampas grass (*Cortaderia jubata*) will be modeled after the currently successful methods in southern California. The proposed treatment method(s) will be approved by the landowner prior to implementation. The Navy will also consult with the Service if the work may affect federally listed species.

19. Consistent with BLM policy (U.S. Department of Interior 2007), and to avoid potential impacts to SKR and arroyo toad from herbicide drift, broadcast spray of any herbicide will be prohibited. Spot treatments will be conducted during periods when SKR (daytime) and arroyo toad (non-breeding season) are least active.

    When in or near riparian areas, wetlands, or aquatic habitats, treatment will be conducted with herbicides approved for use in or near aquatic habitats following label restrictions.

20. An ATMA, designed to avoid and minimize impacts to the onsite population of the arroyo toad, will be established on the east side of SR-79 (Figure 2). The boundary of the ATMA will extend 500 m (1,640 ft) from the center of the waterway on each side and along its entire length within RTSWS.

    a. Arroyo toad surveys will be conducted at least every 3 years to determine status and location. If arroyo toads are discovered in areas outside of the current ATMA, these locations will be added to the ATMA and managed accordingly. Furthermore, if arroyo toads are not discovered for many years (at least 9 years) in previously occupied locations, these areas may be eliminated from the existing ATMA. Updated maps depicting ATMA boundaries and arroyo toad locations will be provided to the Service upon survey completion and posted in appropriate locations at RTSWS.

    b. Informational signage will be installed at the access points to the ATMA as well as at strategic areas and river crossings, notifying personnel that the area is sensitive arroyo toad habitat and not to be impacted by off-road or off-trail vehicle traffic.

    c. A nighttime (sunset to sunrise) speed limit of 24 kilometers per hour (kph) [15 miles per hour (mph)] will be followed by all vehicles within the ATMA. Drivers will take all reasonable precautions to avoid vehicle strikes of arroyo toad.

    d. Three terrestrial toad species similar in appearance to arroyo toad are found at RTSWS. To avoid inadvertent death or injury to arroyo toad as a potential food source, killing or capturing of any toad or frog species for the purposes of survival training will be prohibited within the mapped ATMA.

    e. To avoid inadvertent death or injury of arroyo toad young as a potential food source, no tadpoles of any species will be captured for survival training within the ATMA during the arroyo toad breeding season (April 1-July 31).

    f. Control and removal of non-native bullfrogs (*Rana catesbeiana*) from riparian and wetland areas will be requested for funding as part of the INRMP.

21. Informational signage will be installed on Fink Road on VID land west of SR-79, notifying personnel that the area is sensitive SKR habitat and prohibiting off-road or off-trail vehicle traffic.

22. A nighttime (sunset to sunrise) speed limit of 24 kph (15 mph) will be posted and enforced for all vehicles within SKR habitat. Drivers will take all reasonable precautions to avoid vehicle strikes to any species of kangaroo rat, which are all similar in appearance.

23. Areas where students and instructors may congregate during the course of instruction will be sited away from mapped SKR habitat. Foot traffic will remain dispersed and light with rotation of activity areas (such as navigation points) whenever the establishment of trails begins to be evident.

24. SKR surveys will be conducted at least every 3 years to determine status and location. Updated occupancy maps will be provided to the Service upon survey completion and posted in appropriate locations at RTSWS.

25. To avoid death or injury to the SKR as a potential food source, the killing or capturing of any kangaroo rat species for the purposes of survival training is prohibited within occupied areas (Figure 2).

STATUS OF THE SPECIES

Stephens' Kangaroo Rat

Listing Status

The Service listed the SKR as endangered on October 31, 1988 (53 FR 38465), and a draft recovery plan was published on June 23, 1997 (Service 1999). Critical habitat designation at the time of listing was determined not prudent; therefore, none was proposed or designated.

Species Description

SKR is dark brown above, white underneath, and has a black and white tail. Adults weigh approximately 68 grams (2.4 ounces) (Bleich 1977). Adult body-plus-tail lengths range from 2.3-2.8 cm (9 to 11 in), with the tail 1.45 times the length of head and body (Bleich 1977). The SKR is 1 of 21 species of kangaroo rats (genus *Dipodomys*) that comprise a distinct group of rodents belonging to the family Heteromyidae (Williams et al. 1993). Characteristics common to all kangaroo rats include external fur-lined cheek pouches, large hind legs, relatively small front legs, long tails, and large heads (Williams et al. 1993). SKR is similar in appearance to the sympatric Dulzura kangaroo rat [*Dipodomys simulans simulans*, formerly the Pacific kangaroo rat, *Dipodomys agilis* (Sullivan and Best 1997)] but is paler and can be distinguished from the latter by its smaller ears and broader skull (Grinnell 1922, Lackey 1967a, Price et al. 1992).

Habitat Affinities

SKR typically inhabit areas characterized by low perennial and annual cover interspersed with large areas of bare ground (Grinnel 1933; Lackey 1967a; Bontrager 1973; Bleich 1973, 1977; Thomas 1975; O'Farrell et al.1986; O'Farrell and Clark 1987; O'Farrell and Uptain 1989; Price et al. 1994a, 1995; Goldingay and Price 1997). Typical habitat consists predominantly of native and non-native annual herbs and annual and perennial grasses. Many non-native grasses can exclude or otherwise degrade SKR habitat if they build up and develop a thatch (O'Farrell and Uptain 1989), and native grasses that become too dense may also limit or preclude occupation by SKR (O'Farrell 1990). The only non-native grasses that appear to be conducive to SKR are *Schismus barbatus* and *Vulpia myuros* (O'Farrell 1994, 1997). SKR is also found in sparse coastal sage scrub habitat, generally when shrub cover is less than 30 percent (O'Farrell and Uptain 1987). Based on a review of O'Farrell and Uptain (1989), the presence of well-drained friable soils appears to be very important to this species' distribution.

SKR occur in relatively dry inland valleys west of the Peninsular Ranges of southern California, where mean annual rainfall is below 3.8 cm (15 in) and highly variable temporally and spatially. The vegetative cover of grasslands and coastal sage scrub throughout the SKR's range also varies spatially and temporally from moderate to very sparse due to local rainfall, evaporative conditions, and wildfire frequency. These dynamic vegetative communities influence the short and long-term habitat suitability.

Life History

SKR is primarily granivorous but also consumes some green vegetation and insects (Lowe 1997). SKR forage primarily by scratch-digging, a process by which they harvest seeds intermixed with soil with their forelimbs (Morgan and Price 1992), and the behavior of food caching enables kangaroo rats to survive during extreme seasonal fluctuations in food availability (Morgan and Price 1992, Reichman and Price 1993). Typical of kangaroo rats, SKR can survive for extended periods with little free-water intake (Sork 1977, Lackey 1967b); the related Merriam's kangaroo rat (*D. merriami*) is known for its ability to live without water indefinitely on a completely granivorous diet (French 1993).

Some SKR may reproduce within the same year that they are born, but the proportion that breeds within their first year fluctuates with environmental conditions (Price and Kelly 1994). The average litter size for SKR ranges from 2.7-2.8 individuals (Lackey 1967b, Price and Kelly 1994). Gestation is approximated at 30 days (Price and Kelly 1994), and weaning occurs approximately 18-22 days postpartum (Lackey 1967b). The timing of breeding is highly variable, with reproduction likely triggered by the growth of vegetation subsequent to winter rain (Reichman and Van de Graaff 1975, McClenaghan and Taylor 1993, Price and Kelly 1994). Reproductive activities peak in spring, but females may remain reproductive until late fall as long as food resources are adequate (McClenaghan and Taylor 1993, Price and Kelly 1994). Extended reproduction can result in multiple litters (as many as five) under favorable environmental

conditions (Price and Kelly 1994). Prolonged breeding activity is associated with the generally mild climate across the SKR's range (O'Farrell 1990) combined with high food availability during years with higher than average rainfall (Price and Kelly 1994). Conversely, under poor environmental conditions, SKR may limit reproduction (Burke et al. 1991).

SKR home ranges vary according to habitat features, season, food availability, population density, and sex. Estimates for mean home ranges within a population vary between 0.02 and 0.13 ha (0.05 ac and 0.32 ac) (Thomas 1975, Ascanio and Price 1989, Kelly and Price 1992) with home ranges for males generally being larger than females. Burrow depths range between 20 and 45 cm (9 and 18 in), and multiple burrow openings may be adjoined. Burrow complexes consist of a network of tunnels connecting multiple entrances (O'Farrell and Uptain 1987) with tunnel pathways corresponding to surface runways. Except during brief periods within the reproductive season, each SKR burrow complex appears to be occupied by a single adult, although burrows of different individuals are often clustered near one another. SKR typically emerge from their burrows soon after sunset and may be active at any time during the night, but apparently they only spend limited time foraging or above ground (Burke et al. 1991).

Price et al. (1994b) found that SKR generally are highly sedentary, but they recorded one instance of an individual moving over 1 km (0.6 mi) between trapping grids. The median maximum distance moved by individual SKR between captures was within 29 m (96 ft) of the initial point of capture. The median distance between first and last monthly home-range centers was 18 m (58 ft) for individuals captured in 2 or more months. Males were found to be more mobile than females, and lactating females were found to be especially sedentary, but dispersal distances were found to be similar for juveniles and adults. In contrast to Price et al. (1994b), O'Farrell (1994) found that 40 percent of the population was mobile at any one time, and movements in excess of 396 m (1,300 ft) were found to be relatively common.

Some kangaroo rat species can live up to 7 years in captivity (Price and Kelly 1994); however, definitive information on SKR life span in the wild is lacking. Recent studies have estimated average SKR survivorship to be between 4.5 and 6.6 months, with some individuals persisting for as long as 19 months (McClenaghan and Taylor 1991, Price and Kelly 1994), but these estimates are probably low due to the limited time frame of the studies and the inability to distinguish between actual mortality and emigration. Adults appear to have higher survival rates than subadults (McClenaghan and Taylor 1993, Price and Kelly 1994), but the evidence for differences in survival rate between sexes is inconclusive. Nocturnal raptors, such as barn owls (*Tyto alba*) and long-eared owls (*Asio otus*), appear to be the primary predators of SKR (Bleich 1977).

Population Dynamics

Populations of SKR fluctuate markedly from year to year (McClenaghan and Taylor 1993, Price and Endo 1989, Price and Kelly 1994, Barrows 2001), with population declines or increases up to five-fold or more. Population fluctuations appear to be driven by variability in survival and

reproduction that are in turn affected by precipitation (McClenaghan and Taylor 1993, Price and Endo 1989, Price and Kelly 1994, Barrows 2001), natural and anthropogenic habitat disturbances (O'Farrell 1997), and successional habitat changes (O'Farrell and Uptain 1989, Barrows 2001). Naturally occurring fluctuations in abundance make small SKR populations highly susceptible to chance local extirpation (Price and Endo 1989, Goldingay et al. 1997).

Due to naturally high fluctuations within SKR populations, estimates of abundance traditionally have been characterized by estimating the extent of occupied habitat and providing a range of SKR densities within that area. Within its entire range, SKR is believed to occupy approximately 6,070 ha (15,000 ac) in San Diego County and approximately 13,355 ha (33,000 ac) in Riverside County (O'Farrell et al. 1986, O'Farrell and Uptain 1989, Service 1993, Montgomery et al. 1996, Ogden 1998, Dudek and Associates 1998). The density of SKR in occupied areas ranges from less than 1 to greater than 20 individuals per 0.4 ha (1 ac) (Service 1997). Habitat managed to optimize favorable conditions has the potential to support relatively stable, high density populations (Price et al. 1995).

Status and Distribution

At the time of its listing in 1988, the SKR's range was reported as encompassing the Perris, San Jacinto, and Temecula valleys in western Riverside County (Temecula Valley was mistakenly reported as located in San Diego County), and the San Luis Rey Valley in San Diego County (53 FR 38465). Since the listing, the range of the SKR has been extended to the northwest, east, and south with the discovery of additional populations in the general vicinity of Norco and Anza in western Riverside County, and Rancho Guejito and Ramona Grasslands in San Diego County (Montgomery 1990, Montgomery 1992, Pacific Southwest Biological Services, Inc. 1993, Ogden 1997). SKR are patchily distributed throughout their range, and only occupy a small fraction of their total range. SKR usually occur at lower elevations in flat or gently rolling grasslands and are typically replaced on steeper slopes and shrublands by the Dulzura kangaroo rat (*Dipodomys simulans*)(Price and Endo 1989).

The primary cause of SKR's decline has been habitat loss and degradation resulting in highly fragmented habitat and isolated populations (53 FR 38465). The primary factors which contributed to this threat included urban development, agriculture, edge effects (e.g., invasive species, predation from urban-associated predators), and removal of habitat disturbance events that promote succession of grasslands into unsuitable dense vegetation and shrub habitat (Service 1997). By the late 1930's, urbanization and extensive agricultural development had reduced available SKR habitat to 37 percent of its original distribution in western Riverside County (Price and Endo 1989). In more recent decades, rapid urban development posed a greater threat than previous agricultural development because the urbanization was essentially irreversible (Price and Endo 1989). Since the listing of the SKR, the Service has worked with project proponents to avoid or offset the loss of occupied SKR habitat caused by development projects. This has been achieved through conservation and/or enhancement of open grasslands, as agreed to during interagency section 7 consultations and through the development of habitat conservation plans

(HCP). The persistence of SKR is now reliant upon perpetual management to maintain the habitat suitability within these conserved areas and where other large populations remain (e.g., Lake Henshaw).

Threats and Conservation Needs

SKR habitat has been greatly reduced as a result of agriculture, and more recently, urban development. This has resulted in increased fragmentation of the remaining habitat, resulting in populations of SKR being more susceptible to effects of grazing, off-road activity, use of rodenticides, genetic bottlenecks, local extirpation, and predators such as domestic cats (Service 1997).

The Service has used the HCP process to address these threats, in which large-scale development planning has been used to conserve SKR and their habitat on private lands throughout large portions of their range. In 1996, the Service issued a permit for the *Habitat Conservation Plan for the Stephens' Kangaroo Rat in Western Riverside County,* which designated seven core reserves totaling 6,070 ha (15,000 ac) of occupied habitat. In 2004, the Service issued a permit for the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) that will conserve an additional 7,784 ha (19,458 ac) of occupied SKR habitat. The Service has determined that these plans will conserve core populations of SKR in Riverside County. Currently, the Service is working with the County of San Diego to develop two HCPs that will conserve SKR populations in San Diego County.

Arroyo Toad

Listing Status

The Service listed the arroyo toad as endangered on December 16, 1994 (59 FR 63264), and a recovery plan was completed on July 24, 1999 (Service 1999). Critical habitat was designated for the toad on February 7, 2001 (66 FR 9414), but it was vacated by court order on October 30, 2002, and remanded for re-designation. Critical habitat for the toad was re-proposed on April 28, 2004 (69 FR 23254), and designated on April 13, 2005 (70 FR 19562); no critical habitat was designated within the action area. On October 13, 2009, the Service re-proposed critical habitat for the arroyo toad (74 FR 52612). The action area includes proposed critical habitat.

Species Description

The arroyo toad is a small, dark-spotted toad of the family Bufonidae. The parotoid glands, located on the top of the head, are oval-shaped and widely separated. A light/pale area or stripe is usually present on these glands and on top of the eyes. The toad's underside is buff-colored and usually without spots (Stebbins 1985). Recently metamorphosed individuals visually blend with the substrate and are usually found adjacent to water. At the time of listing, the toad was described as the arroyo southwestern toad (*Bufo microscaphus californicus*). Gergus (1998)

published genetic justification for the reclassification *Bufo californicus*, and renamed as arroyo toad. According to Frost et al. (2006) and Crother (2008), the currently recognized name for the arroyo toad is *Anaxyrus californicus*.

Habitat Affinities

Toads require shallow, slow-moving streams, and riparian habitats with natural flooding regimes that maintain areas of open, sparsely vegetated, sandy stream channels and terraces (Service 2001b). Optimal breeding habitat consists of low gradient stream reaches with shallow pools and fine textured substrates (e.g., sand or gravel). Upland habitats used by toads during the breeding and non-breeding seasons include alluvial scrub, coastal sage scrub, chaparral, grassland, and oak woodland (Griffin et al. 1999, Service 2001b). This species has been observed moving approximately 2.6 km (1.6 mi) within a stream reach and up to 1.1 km (0.7 mi) away from the stream into native upland habitats (Holland and Goodman 1998, Sweet 1992) or agricultural areas (Griffin et al. 1999). On Cristianitos Creek at Camp Pendleton, Holland and Sisk (2001) found about 89 percent (323 of 364) of captures of adult and subadult toads were within the riparian area and 11 percent (41 of 364) were in upland habitats; no metamorphic toads were captured in uplands. Of the 41 captures, distances from the edge of the riparian area varied greatly from 25-1,142 m (82-3,747 ft) [mean 539 m (194 ft) (SD = 330 m (1,083 ft)]. Movement distances may be regulated by topography and channel morphology (Holland and Sisk 2000). Toads require upland terraces and the marginal zones between stream channels and upland terraces during the non-breeding season, especially during periods of inactivity, generally late fall and winter (Sweet 1992). Adult and juvenile toads burrow into loose soils in stream terraces and uplands, where they may remain during daylight hours or for longer periods during the dry season (Sweet 1989).

Life History

Toads typically breed from February to July on streams with persistent water (Griffin et al. 1999) and remain active above ground into late August (EDAW 2006). Female toads must feed for a minimum of approximately 2 months to develop the fat reserves needed to produce a clutch of eggs (Sweet 1992). Eggs are deposited, and larvae develop in shallow pools with minimal current and little or no emergent vegetation, and the substrate in these pools is generally sand or fine gravel overlain with silt. Toad eggs hatch in 4-5 days, and the larvae are essentially immobile for an additional 5-6 days. They then begin to disperse from the pool margin into the surrounding shallow water, where they spend an average of 10 weeks. After metamorphosis (June-July), the juvenile toads remain on the bordering gravel bars until the pool no longer persists (usually from 8-12 weeks depending on site and yearly conditions) (Sweet 1992). Male toads reach adulthood in 1-2 years, and females become sexually mature in 2-3 years. Individuals may become sexually mature by the following spring if conditions are favorable (Sweet 1992, 1993).

Toad larvae feed on loose organic material such as interstitial algae, bacteria, and diatoms. They do not forage on macroscopic vegetation (Sweet 1992, Jennings and Hayes 1994). Juvenile toads rely on ants almost exclusively (Service 1999). By the time they reach 1.8-2.3 cm (0.7-0.9 in) in length, they take more beetles, along with ants (Sweet 1992, Service 1999). Adult toads probably consume a wide variety of insects and arthropods including ants, beetles, spiders, larvae, caterpillars, and others.

Status and Distribution

The toad was historically found in 22 river basins in California, from Monterey County to San Diego County and southward to the vicinity of San Quintín, Baja California, Mexico. They have been extirpated from an estimated 75 percent of their former range in the United States, and now occur primarily in small, isolated areas in the middle to upper reaches of streams. The current distribution of the toad in the United States is from the Salinas River Basin in Monterey County, south to the Tijuana River and Cottonwood Creek Basin along the border with Mexico. Although the toad occurs principally along coastal drainages, it also has been recorded at several locations on the desert slopes of the Transverse Range (Patten and Myers 1992, Jennings and Hayes 1994). The current elevational range for most toad populations in San Diego County is about 305-1,402 m (1,000-4,600 ft), although they were historically known to extend into the lower portions of most river basins (Service 1999), and populations on Camp Pendleton extend to just above sea level (Holland and Goodman 1998).

The San Luis Rey River is one of the few remaining occupied drainages that has habitat conditions conducive to supporting a large, robust population. The largest populations of arroyo toads in San Diego County can be found here. Key features distinguishing it from most other occupied drainages are: high stream order (4th to 5th order), low elevation [below 305 m (1,000 ft)], and broad stream terraces. The only other drainages that support similar conditions, to any extent, are the San Antonio River (Monterey County), San Juan Creek (Orange County), San Mateo Creek (Orange/San Diego Counties), the Santa Margarita River (San Diego/Riverside Counties), Santa Ysabel Creek (San Diego County), and the Sweetwater River (San Diego County) (J. Stephenson, Service, pers. com. 1997). Yet the amount of such high-quality habitat is small on most of these drainages; the San Luis Rey River has the longest stretch of intact high quality habitat. Its geographic position is also highly significant, lying between the Santa Margarita River and Santa Ysabel Creek. Overland movement between these drainages closer to the ocean is still possible and is likely critical to maintaining genetic interchange and metapopulation viability (J. Stephenson, Service, pers. com. 1997). The connection of the San Luis Rey River population to the closest existing population (Santa Margarita River) is slowly being severed by development along the Interstate 15 (I-15) corridor. Loss of the San Luis Rey population would effectively sever connectivity between key populations to the north (e.g., San Juan, San Mateo, Santa Margarita) and the south (e.g., Santa Ysabel, Sweetwater).

Arroyo toads initially were found in the San Luis Rey River on May 23-24, 1927, when J. R. Slevin collected a large series of specimens on the river 4.8 km (3 mi) west of Bonsall (California Academy of Science 62908-62915, San Francisco). Historically, arroyo toads were noted from near the mouth of the San Luis Rey River (L. M. Klauber, unpubl. field notes, April 2, 1932) to Indian Flats Campground in the Cleveland National Forest (California Academy of Science 173699-173700, San Francisco), a distance of about 32 km (20 mi) and an elevational range of 25-1,280 m (80-4,200 ft). Today, arroyo toads have scattered breeding sites within the main river between the headwaters above Lake Henshaw to the Town of Bonsall downstream [elevation 825-1,280 m (2,700-4,200 ft)].

Population Dynamics

Toad populations vary considerably from year to year, depending on environmental conditions. Approximately three-fold changes have been observed from one year to the next (Sweet 1993), and greater variations would likely be observed with more data on toad populations. Because female toads lay an average of approximately 5,000 eggs during the breeding season (Sweet 1992), there is the potential for rapid increases in population size given favorable conditions, but toad recruitment reflects the inherent variability of their environment. During years of drought, pools may dry before larvae have reached metamorphosis, and females may forego breeding altogether. If flooding occurs after eggs have been laid, a large percentage of the eggs and larvae can be lost. Finally, heavy predation pressure by birds, mammals, reptiles, and other amphibians on metamorphosing and newly metamorphosed juveniles can drastically reduce recruitment. Once toads have reached the subadult stage, survivorship is higher. Annual mortality of adults and subadults has been estimated between 35 percent and 70 percent (Sweet 1993, Holland and Sisk 2000, 2001), which would mean that few toads survive past 5 years in the wild.

Stream order, elevation, and floodplain width are important factors in determining the size and long-term viability of a toad population (Sweet 1992, Barto 1999, Griffin 1999). Streams with the greatest potential to support self-sustaining populations are typically of a high stream order (e.g., 3rd to 6th order), at low elevations [below 914 m (3,000 ft)], with wide floodplains (Sweet 1992, Barto 1999, Griffin 1999). Because of the dynamic nature of toad populations and their habitat, movements of individuals are likely important for colonizing areas where toads have been locally extirpated or where new habitat has been created due to flooding events or changes in human management.

Insufficient information regarding population dynamics and suitable habitat is available to estimate the range-wide arroyo toad population (Service 1999). The density of toads is unevenly distributed in space and time, with particular sites having high densities of larvae, metamorphs, subadults, and adults present under favorable ecological conditions, but absent during poor conditions (Holland et al. 2001). Dramatic natural fluctuations in all life-stage categories and difficulty in detecting adult toads under all but the most optimal conditions make accurate estimation of populations difficult. Due to the mobility of toads and other factors affecting their

spatial and temporal heterogeneity, estimating toad densities (per unit area) at given sites is considered to be inaccurate.

The USFS regularly surveys (non-protocol) for arroyo toads in the upper watershed of the San Luis Rey River at Indian Flats Campground and within Barker Valley. Arroyo toads breed in the Indian Flats Campground area during most years (USFS 2007). In years with high rain fall, most recently in 2005, many young were observed (USFS 2007). However, the USFS has observed the pools drying up quickly and therefore expects a moderate level of survivorship. Tadpoles and adults have been observed in Barker Valley (West Fork of the San Luis Rey River) with the most recent observation of tadpoles in 2005 (USFS 2007). The USFS believes the population of arroyo toads is very small and increases and flourishes in high rain years and then are not detectable in drought years.

Threats and Conservation Needs

Many arroyo toad populations were reduced in size or extirpated due to extensive habitat loss from 1920 to 1980 (Service 1999), mainly because toad habitats (e.g., broad, flat floodplains in southern California) are favored sites for flood control projects, agriculture, urbanization, and recreational facilities such as campgrounds and off-highway vehicle parks. The loss of habitat, coupled with habitat modifications due to the manipulation of water levels in many central and southern California streams and rivers, as well as predation from introduced aquatic species, caused toads to disappear from a large portion of their previously occupied habitat in California (Jennings and Hayes 1994). In 2001, a telemetry study of toads in San Juan Creek indicated that exotic predators and vehicle traffic were the cause of mortality for 2 of the 13 study animals (Cadre Environmental 2003). One toad was tracked by its transmitter to the gut of a bullfrog**,** and another was tracked to the treads of a dump truck that had driven on a dip-crossing through San Juan Creek. Other observations from the telemetry study included the desiccation of toad larvae in pools along the creek that dried up prior to the completion of toad metamorphosis (Cadre Environmental 2003). The authors speculated that drying of these pools may have been due to decreased rainfall or to groundwater pumping for agricultural practices that affected creek water levels.

Threats to toad populations include stream alteration, urban and rural development, mining, recreation, grazing, drought, wildfire, large flood events, and presence of exotic animal and plant species, such as the bullfrog, crayfish (*Procambarus* spp.), salt cedar (*Tamarix* spp.), and giant reed (*Arundo donax*) (59 FR 63264, 69 FR 23254). Conservation needs, as described in the recovery plan, include protecting and managing breeding and non-breeding habitat throughout the range of the species, monitoring existing populations to ensure recovery actions such as exotics removal are successful, identifying additional toad habitat and populations, obtaining research data to guide management efforts, and conducting outreach and public education regarding the toad.

Several incidental take permits pursuant to Section 10(a)(1)(B) of the Act have been issued for the arroyo toad addressing the effects of urban development on this species. In 1997 and 1998, the Service issued permits to the City of San Diego and the County of San Diego, respectively, for subarea Multiple Species Conservation Plans (MSCP). In 2004, the Service issued a permit for the Western Riverside County MSHCP. In 2007, the Service issued permits for the Orange County Southern Subregion HCP. These plans are expected to provide long-term protection for arroyo toads and their habitat in these counties. For example, all known locations and about 78 percent of riparian suitable habitat will be conserved by the San Diego MSCP; conservation of 93 percent of arroyo toad locations (39 of 42 locations) is anticipated under the Western Riverside County MSHCP; 75 percent of modeled arroyo toad habitat [535 ha (1,322 ac)] will be conserved and managed under the Orange County Southern Subregion HCP. Conservation of arroyo toads through these HCPs address, at least in part, task 3 of the recovery plan to identify and secure additional populations and suitable habitat (on non-Federal lands).

In September of 2005, the USFS published a Land Management Plan for the southern California National Forests (U.S. Forest Service 2005), which identified the distribution of arroyo toads in southern California forests, including Cleveland National Forest. The plan proposed no new roads or trails in the area occupied by arroyo toads and stated that any new project in an area occupied by arroyo toads or other federally listed species should "promote the conservation and recovery of these species and their habitats."

Wildfire impacts on the arroyo toad from fire related effects in 2003 and 2007 have not been quantified for this species. As most arroyo toads were aestivating when the fires occurred, fast moving fire fronts would not have contributed much heat to the soil sub-surface; however, areas of higher fire intensity may have lead to mortality of subsurface individuals. Field investigations during the 2007 fires by the Department of the Interior, Burned Area Emergency Response (BAER) team confirmed arroyo toad habitat was largely unburned or suffered low vegetation mortality (BAER 2007). Post-fire precipitation during the winter of 2007 and spring of 2008 did not result in any documented significant debris flows that otherwise could have inundated suitable habitat. The significant post-fire growth of exotic and nuisance plants species in arroyo toad habitat may have long-term adverse effects on arroyo toad and its habitat.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR §402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of State and private actions which are contemporaneous with the consultation in progress.

Habitat in the action area contains five vegetation communities consisting of 3,347 ha (8,270 ac) of chaparral, 665 ha (1,650 ac) of grassland, 580 ha (1,440 ac) of upland woodland, 260 ha (640

ac) of scrub, and 165 ha (410 ac) of riparian. Terrain slope and watercourses generally flow from north to south. RTSWS and the expansive amount of habitat on site are bisected east and west by SR-79. Traffic volume along SR-79 is approximately 2,300 annual average daily traffic (AADT) (http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2008all/r071-80i.htm). Gated Fink Road bisects the far southern quarter of RTSWS with current maximum traffic volumes not expected to exceed 20 AADT. Linton Road creates the eastern boundary of RTSWS with current maximum traffic volumes not expected to exceed 10 AADT.

Status of the Species in the Action Area

SKR - The majority of identified SKR habitat within the action area occurs on VID land west of SR-79, with the remainder occurring on USFS land. VID-owned land around Lake Henshaw is managed as watershed for the reservoir, which includes cattle grazing leases on the property (Service 1997). Cattle grazing has occurred in the area for at least the previous 150 years since the Spanish Land Grant in the 1800's. VID manages the leases in 20 grazing pastures throughout the property with five pastures overlapping the action area. While grazing utilization studies and effects on SKR have not been conducted, stocking rates are available. The two pastures occupied by SKR (Potato Camp and Solar Site #1) have a 10-year average of 1 animal/0.75 ha (1 animal/ 1.85 ac) while the unoccupied pastures (West Fork Upper, West Fork Lower, and Red Potato) have a 10-year average of 1 animal/0.67 ha (1 animal/1.65 ac) (VID unpublished data 2009).

The Lake Henshaw area is believed to have the largest known contiguous population of SKR (Montgomery 2006). The habitat occupied by SKR encompasses the grassland areas north and east of the lake. This population was originally described by O'Farrell et al. (1986, 1987) and at one time may have encompassed thousands of acres (Montgomery 2006). The project action area overlaps with the northern extent of the Lake Henshaw SKR population.

Specific information is not available regarding the extent of the SKR population in the action area prior to 2006; therefore, it is uncertain whether the current population is larger or smaller in size than historically occurred in the area. In 2006, a live trapping study was conducted within the proposed RTSWS boundary; a total of 978 survey trap-nights resulted in 25 live captures of SKR (TDI 2007). Approximately, 142 ha (350 ac) of SKR habitat were mapped and rated according to density (TDI 2007) (Figure 2). Of the 142 ha (350 ac), approximately 117 ha (290 ac) were determined to be occupied by SKR [1 SKR/5 ha (1 SKR/12 ac)] (TDI 2007).

Due to a lack of survey effort, little else is known about the distribution and abundance within the action area or other areas around Lake Henshaw. Field investigations suggest that SKR are likely to exist more extensively within the action area than is currently known, but their distribution is likely limited by topography (e.g., steep slopes to north) and the distribution and intensity of historical and ongoing grazing (K. Roblek, Service, personal obs. 2009).

Arroyo toad – The Canada Aguanga River and East Fork San Luis Rey River are the primary waterways supporting arroyo toad in the action area. Occupied reaches of the waterways occur

primarily on VID-owned land east of SR-79. The West Fork San Luis Rey River is located in the far western portion of RTSWS. The reach going through RTSWS is also located on VID-owned land and is occupied by arroyo toad further upstream.

Protocol surveys were conducted within the action area in 2006 and resulted in nine arroyo toad observations. Arroyo toad tadpoles were observed in quiet pools, and foraging adults were observed along damp sandbars at night along the mainstems of the Canada Aguanga River and East Fork San Luis Rey River east of SR-79 (TDI 2007). While more favorable habitat conditions occur on the east side of SR-79, suitable habitat exists for several hundred meters west of SR-79 downstream of the river confluence. Arroyo toads may occupy these areas in wetter years (TDI 2007). Protocol surveys in the action area along the West Fork San Luis Rey River were negative. Data from this survey effort were used to model and identify the limits of the ATMA[1] (Figure 2). Approximately, 624 ha (1,543 ac) of arroyo toad occupied habitat are within the ATMA.

Factors Affecting the Species' Environment within the Action Area

SKR - Native Americans likely used fire in southern California since prehistoric times to maintain grasslands and open habitat favored by herbivores (Zedler et al. 1997). Prior to the Navy operating in the action area, lands now composing the VID portion of RTSWS were grazed by cattle (Don Smith, VID, pers. comm. 2009). Due to these past and ongoing land use practices, we presume native grassland was much more extensive, whereas now non-native grassland habitats prevail. Grazing also benefits SKR by maintaining early plant successional seres and sparse vegetation cover needed by SKR. Without grazing or other periodic disturbance, grassland habitats can become overgrown with thatch to a point where SKR abandon the area.

Arroyo toad - Wildland fires pose a threat to arroyo toad by changing run-off and sedimentation patterns and changing water chemistry (including nutrient and contaminant levels). Severe fires may result in significant leaching of post-fire ash and releases of nutrients into streamwater (Wright and Bailey 1982). Large deposits of sediment in the river channel following fires can affect the amount of habitat available for amphibian breeding and rearing, reducing reproductive output and recruitment (S. Sweet, in litt. 1997; Gamradt and Kats 1997).

Existing and potential threats to arroyo toad populations in the action area include a variety of ongoing military training activities that can crush individuals by vehicle or foot traffic. Additionally, students may consume arroyo toad, of all life stages, during SERE survival training.

No studies have been conducted to determine how ongoing military training affects arroyo toad. Training may be compatible with sustaining the arroyo toad population in the action area; however, benefits to the species from training are not expected. Ongoing training activities

[1] Model identifies uplands within 500 m (1,640 ft) of an occupied stream and confined to a 25-m (82 ft) change in elevation (TDI 2007).

require vehicles to stay on established dirt and paved roads. This requirement likely reduces the incidence of arroyo toad disturbance, injury, mortality, and habitat degradation, although these impacts probably occur at a low rate.

Existing Consultations in the Action Area

In 2005, non-jeopardy biological and conference opinions (FWS-SDG-773.9) were issued that addressed the Revised Land Management Plans for the four southern California national forests. These plans provide guidance through zoning and standards for land use allocations and individual project authorizations as follows: 1) ongoing activities will be neutral or beneficial to certain areas with arroyo toad, 2) new activities will be neutral or beneficial to SKR and arroyo toad, and 3) expansion of existing facilities or new facilities will focus recreational use away from SKR and arroyo toad. Exceptions were included in the plans for fuel treatments in wildland-urban interface areas and to allow for projects with short-term effects and long-term benefits. Although the plans set important parameters for authorization of specific projects, individual project approvals depend on analysis of site-specific effects, project-level section 7 consultation and NEPA review, and consistency with other applicable legal requirements.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat that will be added to the environmental baseline, along with the effects of other activities that are interrelated and interdependent with that action. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

The following analyses consider only those training activities identified in the above *Description of the Proposed Action* section of this biological opinion, including the "Conservation Measures" committed to by the Navy to avoid, minimize, and offset potential impacts to the SKR and arroyo toad. The training activities include foot traffic (on and off trail), animal and plant consumption as part of wilderness survival, fixed facility operations, vehicle traffic on established roads, helicopter operations, and combat service support activities. The following analyses are qualitative and attempt to predict the likelihood of occurrence and the relative level of impact expected from training activities based on best information available. In our analyses, the following terms and meanings are used to describe the estimated level of effect on the subject species: 1) "unlikely" – no reasonable likelihood of effect to any individuals by the described training activity; 2) "rare" – few (two or three) individuals affected every 5 - 10 years; 3) "infrequent" – several individuals affected once every few years; 4) "regular" – up to several individuals affected most years; 5) "common" – several to many individuals affected every year.

Training Activities – General

Training activities analyzed include all ongoing and proposed training in the action area (e.g., SERE, NSW, 1st MSOB, etc.).

Wilderness survival, as part of SERE training, educates students on what animals and plants may be eaten in the wild. At RTSWS, SKR and arroyo toad may be captured during instruction or by students during practice and testing by hand, in snares, or by other means. Trapping or handling of SKR or arroyo toad, of any life stage, may kill or injure the individual(s), whether field dressing for demonstration or ingesting for food.

Specific Conservation Measures prohibit the capture of any kangaroo rat species within or adjacent to SKR-occupied habitat, as well as avoiding capture of any species of frog or toad in the ATMA during the breeding season. Measures also include education materials to help instructors identify SKR and arroyo toad and provide information on occupied SKR areas and the ATMA. These measures will prevent the capture and ingestion of SKR within or adjacent to SKR-occupied habitat or arroyo toad within the ATMA.

Arroyo toad surveys once every 3 years will adjust the perimeter of the ATMA, but because arroyo toads are mobile animals, they will potentially occupy different areas of suitable habitat over the course of a single breeding season. Thus, outside of the designated ATMA boundaries, it is possible that consumption of arroyo toad could accidentally occur by a student or instructor conducting survival training; however, given the measures in place to delimit the boundaries of the ATMA and educate instructors and students to identify and recognize arroyo toad, we believe such consumption is unlikely to happen

Foot Traffic

SKR - Foot traffic will expand into additional SKR-occupied areas west of SR-79 not used in the past. Foot traffic on roads at any level up to battalion is unlikely to lead to the direct mortality of SKR when they are above ground because SKR are mobile enough to avoid moving troops. Although SKR have a tendency to burrow within areas along the road periphery, burrows are likely deep enough to protect SKR within burrows from being killed or injured by crushing due to foot traffic over their burrows. Considering the proposed expansion, it is unlikely that foot traffic on roads will be frequent or intense enough to disturb SKR or cause SKR to abandon areas adjacent to roads.

Similarly, foot traffic off established roads and trails is unlikely to lead to the direct mortality of SKR when they are above ground because SKR are mobile enough to avoid moving troops. Additionally, burrows are typically deep enough to protect SKR within burrows from being killed or injured by crushing due to troop movement off-road over their burrows. Land navigation will occur throughout the action area in identified SKR habitat. Discussion during

formal consultation led to a large reduction of predetermined navigation points inside SKR habitat, which will substantially eliminate any adverse effects from foot traffic in SKR habitat.

Repetitive loading and unloading of troops from helicopters at LZ#3, as well as students congregating for instruction at specific areas, may lead to some habitat modification. Modification could lead to more open habitat preferred by SKR. To date the majority of habitat surrounding LZ#3 remains unoccupied with occupied areas 100 m (300 ft) away. It is unlikely that off-road foot traffic, in and of itself and at the levels proposed, will disturb SKR enough to disrupt breeding activities or that SKR will abandon areas. In addition, Conservation Measures 10, 11, and 22 will result in the avoidance of troop congregation in SKR habitat and the rotation of navigation points to reduce the level of adverse effects. In summary, it is unlikely that foot traffic training will affect SKR or their habitat to a level that results in harm, injury, or death of SKR.

Arroyo toad - Foot traffic on roads and trails at any level up to a battalion is unlikely to lead to direct mortality of arroyo toads when they are above ground because of the low density and dispersed distribution of arroyo toads. Seabee, TRAP and NEO training will occur at RTSWS a total of approximately 20 days per year. A portion of these trainings will likely overlap with the 6-month time period when adult arroyo toads are regularly active above ground (March to August). While these activities could accidentally result in death or injury to arroyo toads, we believe it would be extremely unlikely given the low number of training days per year that will coincide with the expected low density and dispersed nature of arroyo toad above-ground movements.

Foot traffic on paved roads is unlikely to impact arroyo toad as there is no training-related foot traffic on SR-79 and habitat along Fink Road is used for aestivation only. Foot traffic on Linton Road is also unlikely to adversely affect arroyo toad due to the low density and dispersed distribution of toads in the area.

During the breeding season, cross-county foot traffic off established roads and trails is unlikely to cause death or injury of arroyo toads moving between upland aestivation habitat and breeding sites (and vice versa) because of the low density and dispersed distribution of arroyo toads in the action area. During the aestivation season, burrows are typically deep enough and under some type of vegetation so it is extremely unlikely that cross country foot traffic will kill or injure arroyo toads.

Repetitive loading and unloading of students at LZ's #1 and #2 and students congregating for instruction in specific areas has already lead to habitat modification by compacting the soils and removing vegetative cover (K. Roblek, Service, personal observation. 2009). The proposed increase in students will continue to modify the habitat near these areas. Habitat modification will result in more open habitat and compacted soils not preferred by arroyo toad. Arroyo toad will avoid these areas as they likely already do.

Vehicle Operations

SKR - SKR moving along or across roads may be injured or killed by direct vehicle strikes (Ashley and Robinson 1996, Main and Allen 2002). Traffic volume is estimated to increase along Fink Road and Linton Road to 2 trips per day (750 trips annually) (Tierra 2007). Vehicle strikes are expected to occur primarily around nighttime when SKR are active above ground. Injury or death of SKR through direct vehicle strikes during on-road vehicle operations is expected to commonly occur, with approximately 5 individuals killed per year due to the spatial and temporal co-occurrence of SKR adjacent to Fink Road, frequency of nighttime training, and speed at which vehicles may travel along Fink Road. Thus, over the 20-year limit of this analysis, we anticipate that up to 100 SKR will be injured or killed over the life of the 20-year USFS and BLM permits.

SKR likely have territories and burrows adjacent to Fink Road and will be temporarily disturbed by indirect effects from vehicles for a short duration. The disturbance from noise, vibration, lights, etc. is likely to occur primarily during the night when SKR are active above ground, although ground vibrations from vehicle operations may disturb SKR within their burrows during the day. The presence of SKR immediately adjacent to Fink Road indicates vehicle activity at current levels is not adversely affecting or disrupting site occupancy on a population scale, despite the anticipated loss of individual SKR.

Specific Conservation Measures requiring a nighttime speed limit of 24 kph (15 mph) on roads will reduce vehicle strikes of SKR crossing Fink Road or other roads in RTSWS to a common level, as described above. This measure only applies to the Navy, so other parties (e.g., VID) using Fink Road are not required to abide by the special speed limit. The 24 kph (15 mph) speed limit will be posted along Fink Road so ancillary avoidance by reducing nighttime speed by other users may occur.

Vehicle strikes along Linton Road are not expected due to the absence of SKR in the area. Vehicle strikes of SKR during off-road vehicle operations are unlikely because off-road activity is prohibited.

Arroyo toad – Vehicle strikes and the crushing of arroyo toad tadpoles or egg masses are likely to rarely occur where numerous dirt roads cross waterways in the ATMA along the Canada Aguanga and East Fork San Luis Rey rivers. However, the presence of suitable habitat for egg mass and tadpole development is likely to be an unusual situation that would occur only when the combination of an adequate amount of precipitation/stream flow and suitable river morphology coincides with the precise location of the road crossings. Therefore, due to the low density and number of arroyo toads in the action area and the need for numerous coinciding factors to create specific habitat conditions at fixed locations, vehicle strikes of egg masses and tadpoles will rarely occur, likely totaling only a few egg masses or tadpoles crushed during the 20-year analysis period.

Vehicle strikes of adult arroyo toad at dirt road waterway crossings will be a rare event, as vehicle speed must be slow to navigate the crossings, but not slow enough to allow an arroyo toad to evade on oncoming vehicle. Vehicle strikes will be reduced by Conservation Measures 6 and 19, which will close two vehicle crossings in the ATMA (Figure 3) and require a nighttime speed limit of 24 kph (15 mph) on roads within the ATMA (SR-79 excluded).

Adult arroyo toad may be crushed on SR-79 when they are seeking aestivation habitat or dispersing from the Canada Aguanga and East Fork San Luis Rey rivers. This is more likely to occur during precipitation events when arroyo toads are active above ground and on paved roads. On SR-79, between the entrance to the fixed training facilities and Linton Road, traffic volume is 2,300 AADT with a small percentage being Navy vehicles (employee and training traffic). The speed limit on SR-79 in the ATMA is posted at 88 kph (55 mph) and is expected to be followed by Navy personnel. Due to the posted limit being too fast for an arroyo toad to avoid a moving vehicle, Navy vehicles will inevitably but infrequently strike arroyo toads along SR-79. We estimate 5 individuals killed every few years resulting in 30 arroyo toads over the course of the 20-year analysis. Vehicles strikes of arroyo toads are not expected outside of the ATMA because suitable habitat, based on site visits, surveys, and modeling, is not present and the population of arroyo toad in the area is low.

Helicopter Operations

SKR - Helicopters will land twice per month at LZ #3, which is adjacent to SKR-occupied habitat. The probability that helicopter landings will kill or injure SKR above ground or collapse burrows and injure or kill SKR within their burrows is extremely unlikely. SKR above ground are mobile enough to avoid being struck and their burrows are deep enough so that SKR individuals would not be expected to be crushed while within their burrows. While burrow entrances could collapse, SKR have the ability to dig out, and most SKR burrow systems have multiple entrances.

SKR may be disturbed by helicopter downwash, noise, and movement. Though no research exists on SKR habituation or avoidance of helicopters, we do not anticipate that the level of proposed disturbance will cause SKR to abandon occupied habitat at LZ#3.

Arroyo toad - Helicopters will land at LZ's #1 and #2 within the ATMA up to twice per month in each LZ, with each landing lasting only a few minutes. It is unlikely helicopters will crush arroyo toads as the landing zones are in already disturbed habitat not suitable for aestivation. Adverse effects from downwash, noise, or visual disturbance are extremely unlikely to occur, as past helicopter activities have occurred in the two landing zones and arroyo toads continue to use the adjacent suitable habitat.

Fixed Training Facilities

Operations of the fixed training facilities on 24 ha (60 ac) have occurred since the mid-1900's when RTSWS started in its current footprint. The construction of paved roads, administration buildings, a mock prisoner-of-war camp (resistance training lab), and a landing pad removed primarily red shank chaparral habitat at that time. SKR and arroyo toad seldom occur in this habitat type and unlikely inhabited this area under prior conditions. Daily operation of the fixed training facilities, excluding roads, are unlikely to affect SKR or arroyo toad as the activities associated with the fixed facilities (maintenance, office work) are low impact and outside of SKR or arroyo toad habitat.

Impact on Recovery

The predicted limited loss of SKR and arroyo toad individuals is primarily associated with vehicle strikes along established roads and at river crossings. There will be limited, if any, loss of suitable habitat. Considering the regional context of hundreds of hectares of occupied high quality habitat for each species, the loss of a limited number of individuals is not expected to be demographically significant on a population scale in the action or adjoining areas. We expect the existing populations of SKR and arroyo toad to be sustained at baseline levels in the action area over the 20-year project term despite the increased training activities and small annual loss of individual SKR and arroyo toad. Efforts to conduct surveys, control invasive species, and restore habitat along established trails and other impacted areas will support recovery of the SKR and arroyo toad.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, 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 consultation pursuant to section 7 of the Act. We have not identified any cumulative effects in the action area that should be considered in this biological opinion.

CONCLUSION

After reviewing the current status of the SKR and arroyo toad, environmental baseline for the action area, direct and indirect effects of the proposed action, and cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the SKR or arroyo toad. We reached this conclusion for the following reasons:

1. The number of SKR and arroyo toad individuals adversely affected is minimal relative to the abundance and distribution of the species range-wide population demographics;

2. Impacts to individual SKR and arroyo toad will be minimized and offset by the proposed Conservation Measures; and

3. Actions will be carried out by the Navy in support of recovery of the SKR and arroyo toad.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, 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 behavior 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, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

AMOUNT OR EXTENT OF TAKE

Injury and death of SKR is anticipated along Fink Road as a result of vehicle strikes. The conservation measure limiting vehicle speed to 24 kph (15 mph) during nighttime hours will reduce the expected amount of this take but will not completely eliminate it. Though difficult to quantify, we estimate that up to several individual SKR (1 to 5) will be injured or killed in most years, resulting in about 100 SKR injured or killed over the 20-year analysis period. The take threshold will be met if more than 5 injured or killed SKR are detected along Fink Road during any 12-month period.

Injury and death of arroyo toad is anticipated at river crossings and along SR-79 as a result of vehicle strikes. The conservation measure eliminating two river crossings will reduce the expected amount of take but will not completely eliminate it. We cannot determine the precise number of egg masses and tadpoles or adults that may be injured or killed during vehicle river crossings within the ATMA, but we estimate no more than 6 egg masses or tadpoles will be crushed over the 20-year analysis period. In addition, we estimate no more than 6 adult arroyo toads will be injured or killed during river crossings within the ATMA over the 20-year analysis period. If more than 3 egg masses or tadpoles or more than 3 adult arroyo toads are injured or killed during the initial 10-year analysis phase, the take threshold will be met.

Adult arroyo toads may also be injured or killed by Navy vehicle strikes along Linton Road and the main evasion road (adjacent to SR-79) over the 20-year analysis period. We estimate no

more than 5 adults every 3 years or 30 adults over the 20-year analysis period will be injured or killed as a result of vehicle strikes. The take threshold will be met if more than 5 injured or killed adult arroyo toads are detected along Linton Road or the main evasion road (adjacent to SR 79) during any 3-year period.

EFFECT OF TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to SKR or arroyo toad.

REASONABLE AND PRUDENT MEASURES

We believe the following reasonable and prudent measure is necessary and appropriate to minimize the impact of incidental take of SKR and arroyo toad.

1. The Navy shall conduct surveys to monitor and assess the number of SKR and arroyo toad taken.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Navy must comply with the following terms and conditions, which implement the reasonable and prudent measure described above.

1.1. Road kill surveys shall occur when SKR and arroyo toad are most active (April through July for both species) and shall follow immediately (within 2 days) after training activities. Road kill surveys along Fink Linton and the main evasion road (adjacent to SR-79) shall occur during training exercises to differentiate between Navy and non-Navy fatalities.

1.2. Survey results shall be provided to the Service annually, who may recommend other measures to reduce road kill.

Disposition of Sick, Injured, or Dead Specimens

The CFWO shall be notified within 3 working days should any endangered or threatened species be found dead or injured as a direct or indirect result of the implementation of this project. Notification must include the date, time, and location of the carcass, and any other pertinent information. Dead animals should be marked in an appropriate manner, photographed, and left on site. Injured animals should be transported to a qualified veterinarian. Should any treated animals survive, this office should be contacted regarding the final disposition of the animals. The office contact person is Kurt Roblek, who may be contacted at the letterhead address or at (760) 431-9440.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act 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. We have not identified any conservation recommendations that would further the purposes of the Act and benefit endangered and threatened species in the action area beyond the actions already committed to by the Navy and identified as Conservation Measures to be carried out as a part of the proposed action.

REINITIATION NOTICE

This concludes formal consultation on the Navy's proposed expansion and realignment of the RTSWS as outlined in materials submitted to us. 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. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

With regard to (4) above, on October 13, 2009, the Service re-proposed critical habitat for the arroyo toad (74 FR 52612), and the action area includes proposed critical habitat. If critical habitat is designated within the action area, the Navy will need to evaluate whether the proposed action affects the revised designation and determine if reinitiation of consultation is warranted.

If you have any questions regarding this document, please contact Kurt Roblek at (760) 431-9440, extension 308.

Sincerely,

Jim A. Bartel
Field Supervisor

LITERATURE CITED

Ascanio, R. and M. Price. 1989. The use of powder tracking techniques and trapping grids in estimating the home range sizes of two *Dipodomys stephensi* populations. Unpublished report submitted U.S. Fish and Wildlife Service and California Department of Fish and Game. 11pp.

Ashley, E. and J. Robinson. 1996. Road mortality of amphibians, reptiles and other wildlife on the Long Point Causeway, Lake Erie, Ontario. The Canadian Field-Naturalist 110:403-412.

Barrows, C. 2001. Annual report for the year 2000 management activities at the March Stephens' Kangaroo Rat Preserve. Unpublished report prepared by The Center for Natural Lands Management. January 2001. 20pp.

Barto, W. S. 1999. Predicting potential habitat for the arroyo toad (*Bufo microscaphus californicus*) in San Diego County using a habitat suitability model and digital terrain data. Masters thesis for San Diego State University, San Diego.

Bleich, B. 1973. Ecology of rodents at the United States Naval Weapons Station Seal Beach, Fallbrook Annex, San Diego County, California. M.A. thesis, California State University, Long Beach. July 1973. 102pp.

Bleich, B. 1977. *Dipodomys stephensi*. American Society of Mammalogists. Mammalian Species 73:1-3.

Bleich, V. and O. Schwartz. 1974. Western range extension of Stephens' kangaroo rat (*Dipodomys stephensi*), a threatened species. California Fish and Game 60:208-210.

Bontrager, D. R. 1973. Rodent Ecology of the Santa Rosa Plateau, Riverside County, California. M.A. Thesis, California State University, Long Beach. vii + 115 pp.

Burke, R., J. Tasse, C. Badgley, S. Jones, N. Fishbein, S. Phillips, and M. Soulé. 1991. Conservation of the Stephens' kangaroo rat (*Dipodomys stephensi*): planning for persistence. Bulletin of the Southern California Academy of Sciences 90(1):10-40.

Crother, B. (ed.). 2008. Scientific and standard English names of amphibians and reptiles of North America, North of Mexico, with comments regarding confidence in our understanding. 6th Edition. Shoreview Society for the Study of Amphibians & Reptiles, Shoreview, Minnesota. Herpetological Circular No. 37. 96pp. http://ssarherps.org/pages/HerpCommNames.php

Dudek and Associates. 1998. Stephens' kangaroo rat assessment for Montecito Ranch, San Diego County, California. Unpublished report prepared for Caprock Three LLC, Bakersfield, California. June 5, 1998. 15pp.

EDAW Inc. 2006. State Route 76 Arroyo Toad Surveys, San Diego County, California. Unpublished data.

French, A. 1993. Physiological ecology of the Heteromyidae: economics of energy and water utilization. In: H. Genoways and J. Brown (eds). Biology of the Heteromyidae. The American Society of Mammalogists, Special Publication No. 10. Pp. 509-538.

Frost, D R., T. Grant, J. Faivovich, R. H. Bain, A. Haas, C. F. B. Haddad, R. O. De Sa, A. Channing, M. Wilkinson, S. C. Donnellan, C. J. Raxworthy, J. A. Campbell, B. L. Blotto, P. Moler, R. C. Drewes, R. A. Nussbaum, J. D. Lynch, D. M. Green, and W. C. Wheeler. 2006. The amphibian tree of life. Bulletin of the AMNH; No. 297. 370pp. http://hdl.handle.net/2246/5781

Gamradt, S. C. and L. B. Kats. 1997. Impact of chaparral wildfire induced sedimentation on oviposition of stream-breeding California newts (*Taricha torosa*), Oecologia, 110:546-549.

Gergus, E. W. A., L. L. Grismer, and K. Beaman. 1997. Geographic distribution. *Bufo californicus*. Herpetological Review 28 (1):47.

Goldingay, R., P. Kelly, and D. Williams. 1997. The kangaroo rats of California: endemism and conservation of keystone species. Pacific Conservation Biology 3:47-60.

Goldingay, R. and M. Price. 1997. Influence of season and a sympatric congener on habitat use by Stephens' kangaroo rat. Conservation Biology 11(3):708-717.

Griffin, P. C. 1999. *Bufo californicus*, arroyo toad movement patterns and habitat preferences. M.A. Thesis for University of California, San Diego.

Griffin, P. C., T. J. Case, and R. N. Fisher. 1999. Radio telemetry study of *Bufo californicus*, arroyo toad movement patterns and habitat preferences. Contract Report to California Department of Transportation Southern Biology Pool. 66pp.

Grinnell, J. 1922. A geographical study of the kangaroo rats of California. University of California Publications in Zoology 24:1-124.

Grinnell, J. 1933. Review of the recent mammal fauna of California. University of California Publications in Zoology 40:71-234.

Holland, D. C. 1995. Sensitive species hydroecological evaluation - Margarita River. Unpublished report.

Holland, D. C. 1998. Sensitive species of amphibians and reptiles on MCB Camp Pendleton, San Diego County, California, with management recommendations. Prepared for AC/S Environmental Security, Resource Management Division, MCB Camp Pendleton. Contract # Moo681-94-C-0039.

Holland, D. C. and R. H. Goodman. 1998. Sensitive species of amphibians and reptiles on MCB Camp Pendleton, San Diego County, California, with management recommendations. Prepared for AC/S Environmental Security, Resource Management Division, MCB Camp Pendleton. Contract # M00681-94-C-0039. November 18, 1998. 48pp.

Hirst, R., R. Pywell, R. Marrs, and P. Putwain. 2003. The resistance of a chalk grassland to disturbance. Journal of Applied Ecology 40:368-379.

Jennings, M. R. and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California. Final Report Submitted to the California Department of Fish and Game Inland Fisheries Division, Rancho Cordova, California.

Kaufman, D., E. Finck, and G. Kaufman. 1990. Small mammals and grassland fires. In: S. Collins and L. Wallace (eds). Fire in North American Tallgrass Prairies. University of Oklahoma Press, Norman and London.

Kelly, P. and M. Price. 1992. Home Range Use of Stephens' kangaroo rats: implications for density estimation. Unpublished report to Riverside County Habitat Conservation Agency. January 15, 1992. 26pp.

Kirtland Biological Services. 1999. Presence/Absence trapping studies for the Stephen's kangaroo rat, Marine Corps Base Camp Pendleton, San Diego County, California. Prepared for Dean Ryan Consultants. Unpublished report attached as an appendix *in* Final Biological Assessment for the Armor/Anti-Armor Tracking Range. August 20, 1999. 16pp.

Lackey, J. 1967a. Biosystematics of *Heermanni* group kangaroo rats in southern California. Transaction of the San Diego Society of Natural History 14(22):313-344.

Lackey, J. 1967b. Growth and Development of *Dipodomys stephensi*. Journal of Mammalogy 48:624-632.

Lawrence,G. 1966. Ecology of vertebrate animals in relation to chaparral fire in the Sierra Nevada foothills. Ecology 47:278-291.

Letnic, M., B. Tamayo, and C. Dickman. 2005. The response of mammals to La Niña (El Niño Southern Oscillation)-associated rainfall, predation, and wildfire in central Australia. Journal of Mammalogy 86:689-703.

Lowe, M. 1997. Diet of Stephens' kangaroo rat, *Dipodomys stephensi*. The Southwestern Naturalist 42(3):358-361.

Main, M. and G. Allen. 2002. Landscape and seasonal influences on roadkill of wildlife in southwest Florida. Florida Scientist 65:149-158.

McClenaghan, L. 1994. Survey for Stephens' kangaroo rat in the Sierra, Whiskey and Zulu impact areas of the Marine Corps Base, Camp Pendleton. Unpublished report prepared for AC/S, ES, Marine Corps Base, Camp Pendleton. July 13, 1994. 33pp.

McClenaghan, L. and E. Taylor. 1991. Temporal and spatial patterns of demography of *Dipodomys stephensi* from Riverside County, California. Submitted to Regional Environmental Consultants. June 24, 1991. 37pp.

McClenaghan, L. and E. Taylor. 1993. Temporal and spatial demographic patterns in *Dipodomys stephensi* from Riverside County, California. Journal of Mammalogy 74(3):636-645.

Montgomery, S. J. 1990. Trapping and habitat mapping survey for Stephens' kangaroo rats on the 235-acre Norco Hills property. Prepared for Robert Starr, Windward Development Co., Newport Beach, California.

Montgomery, S. J. 1992. Preliminary site check and trapping survey for Stephens' kangaroo rats on the approximately 800-acre Cahuilla Country Club Estates property. Prepared for Cahuilla Country Club Estates, Newport Beach, California.

Montgomery, S. J. 1999. Final results of a 1996 baseline field study for Stephens' kangaroo rats at Marine Corps Base, Camp Pendleton, California. Unpublished report attached as Appendix A in: Draft biological assessment and management plan for Stephens' kangaroo rat, Marine Corps Base Camp Pendleton, California (prepared by Tetra Tech, Inc., San Bernardino, California). December 23, 1999. 13pp.

Montgomery, S. 2006. Results of Field Surveys for the Federally Endangered Stephens' Kangaroo Rat (*Dipodomys stephensi*) and Incidental Mammal Observations at the RTS Warner Springs, San Diego County, California. Unpublished.

Montgomery, S., J. Sawasaki, and D. Mitchell. 1996. Survey report for Stephens' kangaroo rat on Marine Corps Base, Camp Pendleton, California. Unpublished report prepared by Tetra Tech, Inc. for Marine Corps Base Camp Pendleton. August 12, 1996. 41pp.

Morgan, K. and M. Price. 1992. Foraging in Heteromyid rodents: the energy cost of scratchdigging. Ecology 73(6):2260-2272.

Natural Resources Assessment, Inc. 2000. Presence/absence trapping studies for the Stephens' kangaroo rat, Marine Corps Base Camp Pendleton, San Diego County, California. Prepared for Dean Ryan Consultants. Unpublished report attached as an appendix *in* Final Biological Assessment for the Armor/Anti-Armor Tracking Range. November 8, 2000. 15pp.

O'Farrell, M. 1990. Stephens' kangaroo rat: Natural history, distribution, and current status. Memoirs of the Natural History Foundation of Orange County 3:78-84.

O'Farrell, M. 1997. Stephens' kangaroo rat habitat enhancement/management studies at the Shipley/Skinner Reserve. Draft Final Report prepared for the Riverside County Regional Park and Open-Space District. September 1997. 48pp.

O'Farrell, M. and W. Clark. 1987. Habitat utilization by Stephens' kangaroo rat (*Dipodomys stephensi*). Report to WESTEC Services, San Diego, California. March 1987. 29pp.

O'Farrell, M., S. Juarez, and C. Uptain. 1986. An addition to the known range of Stephens' kangaroo rat, *Dipodomys stephensi*, in San Diego County, California. California Fish and Game 72:187-189.

O'Farrell, M. and C. Uptain. 1987. Distribution and aspects of the natural history of Stephens' kangaroo rat (*Dipodomys stephensi*) on the Warner Ranch, San Diego County, California. Wasmann Journal of Biology 45:34-48.

O'Farrell, M. and C. Uptain. 1989. Assessment of population and habitat status of the Stephens' kangaroo rat (*Dipodomys stephensi)*. Report to the State of California, The Resources Agency, Department of Fish and Game, Wildlife Management Division. July 1989. 19pp.

Ogden Environmental and Energy Services, Inc. (Ogden). 1997. Stephens' kangaroo rat study for the Ramona Airport Expansion Project, Ramona, California. Prepared for KEA Environmental, San Diego, California and County of San Diego, San Diego, California. December.

Ogden Environmental and Energy Services Co., Inc (Ogden). 1998. Stephens' kangaroo rat study for the Ramona Airport expansion project, Ramona, California. January 1998. 28pp.

Pacific Southwest Biological Services Inc. 1993. San Diego County Water Authority Emergency Water Storage Project Biological Resource Assessment. Prepared for Ogden Environmental and Energy Services, Inc., and the San Diego County Water Authority, California.

Patten, M. A. and S. J. Myers. 1992. Geographic distribution: *Bufo microscaphus californicus*. Herpetological Review 23(4):122.

Price, M. and P. Endo. 1989. Estimating the distribution and abundance of a cryptic species, *Dipodomys stephensi* (Rodentia: Heteromyidae), and implications for management. Conservation Biology 3(3):293-301.

Price, M., W. Longland, and R. Goldingay. 1991. Niche relationships of *Dipodomys agilis* and *D. stephensi*: two sympatric kangaroo rats of similar size. American Midland Naturalist 126:172-186.

Price, M., R. Goldingay, L. Szychowski, and N. Waser. 1994. Managing habitat for the endangered Stephens' kangaroo rat (Dipodomys stephensi): Effects of shrub removal. American Midland Naturalist 131:9-16.

Price, M. and P. Kelly. 1994. An age-structured demographic model for the endangered Stephens' kangaroo rat. Conservation Biology 8(3):810-821.

Price, M., P. Kelly, and R. Goldingay. 1992. Distinguishing the endangered Stephens' kangaroo rat (*Dipodomys stephensi*) from the Pacific kangaroo rat (*Dipodomys agilis*). Bulletin of the Southern California Academy of Science 91(3):126-136.

Price, M., P. Kelly, and R. Goldingay. 1994. Distances moved by Stephens' kangaroo rat (*Dipodomys stephensi*) and implications for conservation. Journal of Mammalogy 75(4):929-939.

Price, M., N. Waser, K. Taylor, and K. Pluff. 1995. Fire as a management tool for Stephens' kangaroo rat and other small mammal species. In: J. Keeley and T. Scott (eds). Brushfires in California Wildlands: Ecology and Resource Management. International Association of Wildland Fire, Fairfield, Washington. Pp. 51-61.

Reichman, O. and M. Price. 1993. Ecological aspects of Heteromyid foraging. In: H. Genoways and J. Brown (eds). Biology of the Heteromyidae. Special Publication No. 10. The American Society of Mammalogists. Pp. 539-574.

Reichman, O. and K. Van de Graaff. 1975. Influence of green vegetation on desert rodent reproduction. Journal of Mammalogy 53:503-506.

Sork, V. 1977. A comparison of physiological and behavioral adjustments to water stress in three species of kangaroo rats. The Southwestern Naturalist 23(1):95-101.

Stebbins, R. C. 1985. A field guide to western reptiles and amphibians. Second edition, revised. Houghton-Mifflin Company, Boston, Massachusetts. xiv +336 pp.

Sullivan, R. and T. Best. 1997. Systematics and morphologic variation in two chromosomal forms of the agile kangaroo rat (Dipodomys agilis). Journal of Mammalogy 78(3):775-797.

Sweet, S. S. 1992. Initial report on the ecology and status of the arroyo toad (*Bufo microscaphus californicus*) on the Los Padres National Forest of Southern California, with management recommendations. Contract report to USDA, Forest Service, Los Padres National Forest, Goleta, California. 198 pp.

Sweet, S. S. 1993. Second Report on the Biology and Status of the Arroyo Toad (*Bufo microscaphus californicus*) on the Los Padres National Forest of Southern California. Report to U.S. Department of Agriculture, Forest Service, Los Padres National Forest, Goleta, California. 73 pp.

Tetra Tech, Inc. 1999. Draft Biological Assessment and Management Plan for Stephens' Kangaroo Rat, Marine Corps Base Camp Pendleton, California. Unpublished report prepared for AC/S, ES, Marine Corps Base Camp Pendleton. April 1999.

Thomas, J. 1975. Distribution, population densities, and home range requirements of the Stephens' kangaroo rat (*Dipodomys stephensi*). M.A. thesis, California State Poly. University, Pomona. May 29, 1975. 64pp.

Tierra Data Incorporated. 2007. Biological Assessment for the Expansion and Realignment of Training Areas at Remote Training Site Warner Springs Naval Base Coronado, California. Unpublished report prepared for U.S. Navy. March 2008.

U.S. Forest Service. 2007. Biological Assessment for Reinitiating Consultation on the Province Consultation Biological Opinion (1-6-00-F-773.2). Unpublished.

U.S. Fish and Wildlife Service (Service). 1987. Endangered and threatened wildlife and plants; Determination of endangered status for Stephens' kangaroo rat; Proposed Rule. Federal Register 52:44453-44456.

U.S. Fish and Wildlife Service (Service). 1988. Endangered and threatened wildlife and plants; Determination of endangered Status for the Stephens' kangaroo rat; Final Rule. Federal Register 53:38465-38470.

U.S. Fish and Wildlife Service (Service). 1993. Stephens' kangaroo rat study, Naval Weapons Station, Fallbrook Annex, San Diego County, California. Unpublished report prepared for U.S. Navy Southwestern Division, Naval Facilities Engineering Command, San Diego, California. Principal Investigator: Art Davenport. July 1993. 38pp.

U.S. Fish and Wildlife Service (Service). 1997. Draft recovery plan for the Stephens' kangaroo rat. U.S. Fish and Wildlife Service, Region 1, Portland, Oregon. April 1997. 71pp.

U.S. Fish and Wildlife Service (Service). 1999 Arroyo toad (*Bufo microscaphus californicus*) recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon. vi + 119 pp.

U.S. Fish and Wildlife Service (Service). 2001. Endangered and threatened wildlife and plants; Final designation of critical habitat for the arroyo toad; Final rule. Federal Register 66: 9414-9474

U.S. Fish and Wildlife Service (Service). 2005. Endangered and threatened wildlife and plants; final designation of critical habitat for the arroyo toad (*Bufo californicus*). Federal Register 70(70): 19562-19633.

U.S. Marine Corps (Marine Corps). 1998. Camp Pendleton Wildland Fire Management Plan Update. Marine Corps Base Camp Pendleton, California. Prepared for AC/S Environmental Security, Camp Pendleton. Contract No. N68711-95-D-7605/0020 with Southwest Division Naval Facilities Engineering Command. Prepared by Tierra Data Systems. October 1998.

U.S. Marine Corps (Marine Corps). 2001. Endangered and threatened wildlife and plants; Final designation of critical habitat for the arroyo toad; Final rule. Federal Register 66:9414-9474.

U.S. Marine Corps (Marine Corps). 2002. Range and Training Regulations. Base Order P3500.1L. Marine Corps Base Camp Pendleton, California. March 2002.

U.S. Navy. 2005. Naval Weapons Station Seal Beach Detachment Fallbrook Draft Integrated Natural Resources Management Plan. Prepared by Tierra Data Inc. Contract #9T1S522DB. September 2005 draft.

U.S. Navy. 2009. Draft Environmental Assessment for Remote Training Site at Warner Springs, California. May draft.

Valette, J., V. Gomendy, J. Marechal, C. Houssard, and D. Gillon. 1994. Heat transfer in the soil during very low-intensity experimental fires: the role of duff and soil moisture content. International Journal of Wildland Fire 4:225-237.

Williams, W., H. Genoways, and J. Braun. 1993. Taxonomy. In: H. Genoways and J. Brown (eds.) Biology of the Heteromyidae. Special Publication No. 10. The American Society of Mammalogists. Pp. 38-196.

Wright, H. A. and A. W. Bailey. 1982. Fire ecology – the United States and Canada. John Wiley and Sons. New York, New York.

DEPARTMENT OF THE NAVY
NAVAL AIR STATION
NORTH ISLAND
BOX 357033
SAN DIEGO, CALIFORNIA 92135-7033

IN REPLY REFER TO:

NBCINST 5100.2G
LEGAL
10 Jan 06

NAVAL BASE CORONADO INSTRUCTION 5100.2G

Subj: ANIMAL CONTROL ON BOARD NAVAL BASE CORONADO (NBC) INSTALLATIONS AND DOG BEACH

Ref: (a) Commander Navy Region Southwest P11101.43E, Handbook for Residents of Navy Region Southwest (NRSW) Military Family Housing

1. Application. The regulations contained herein apply to all activities and personnel falling under the military jurisdiction of the Commanding Officer, Naval Base Coronado (NBC), unless specifically detailed otherwise, including: Naval Air Station North Island (NASNI), Naval Amphibious Base (NAB), Coronado; Naval Outlying Landing Field (NOLF), Imperial Beach; Naval Auxiliary Landing Field (NALF), San Clemente Island (SCI); Silver Strand Training Complex, formerly known as the Naval Radio Receiving Facility (NRRF); La Posta Mountain Warfare Training Facility; and the Survival, Evasion, Resistance and Escape (SERE) Training Facility, Warner Springs.

2. Purpose. To promulgate policy for animal control onboard NBC in the interest of the health and safety of the general public, animal welfare and the protection of natural resources. This instruction also includes the 1200 feet of beachfront property licensed to the City of Coronado known as "Dog Beach."

3. Cancellation. NASNIINST 5100.2F

4. Scope. This instruction applies to all persons, military and civilian, while on board NBC installations and Dog Beach. This instruction is punitive in nature and any violation of this instruction subjects the offender to prosecution under the Uniform Code of Military Justice (UCMJ), Federal law, or California law, as appropriate.

5. Policy

a. Animals, including cats and birds, are not permitted to run loose on board NBC.

b. Except for guide and military working dogs, animals are not allowed in the barracks, workspaces or recreational facilities at any time. Except for guide and military working dogs, military or civilian personnel who are in a duty/work status may not bring animals on board NBC.

c. Possession or feeding of wild/feral animals is prohibited, regardless of the animal's docility or tameness.

d. All dogs brought on board NBC or Dog Beach must be properly vaccinated against rabies and must be currently licensed by an animal-licensing agency within San Diego County. License tags must be securely affixed to the dog's collar.

e. Dogs must be confined to a leash within the fenced perimeter of NBC. The leash must be held in the hand of the owner/responsible party.

f. Dogs off leash while on Dog Beach must be within sight of their owner/responsible party at all times and under complete direct and effective voice, sound or gesture control to prevent attacking, biting or otherwise causing injury to any person or animal or from damaging property.

g. No animal shall be left in an unattended or poorly ventilated vehicle.

h. No animal shall become a nuisance due to noise, odor, sanitation, or destructiveness.

i. Dogs shall not be allowed to urinate or defecate on grounds used for recreational/exercise purposes including, but not limited to, playgrounds, parks, baseball/football/soccer fields, basketball/tennis courts or running tracks. The owner/responsible party shall carry materials necessary for the immediate removal of the dog's feces from the ground and shall properly dispose of the feces in a trash receptacle.

j. NBC housing residents are further guided by reference (a).

6. Action. Violations of this instruction shall be immediately reported to NRSW Dispatch at (619) 524-2030 or NBC Security at (619) 545-7419.

T. G. ALEXANDER

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011

In Reply Refer To:
FWS-SDG-3908.5

Jul 20 2005

Captain Townsend G. Alexander
Commanding Officer
Naval Base Coronado
P.O. Box 357033
San Diego, California 92135-7033

Captain Anthony J. Gonzales
Program Director for Environment
Commander Navy Region Southwest
140 Sylvester Road
San Diego, California 92106-3521

Attn: Tammy Conkle, Wildlife Biologist

Re: Biological Opinion on Phase 1 of the Navy Lodge Expansion Project, Naval Air Station North Island, Naval Base Coronado, San Diego County, California (1-6-05-F-3908.5)

Dear Captain Alexander and Captain Gonzales:

This document transmits the Fish and Wildlife Service's (Service) biological opinion based on our review of Phase 1 of the Navy's proposed expansion of the Navy Lodge at Naval Air Station, North Island (NASNI), Naval Base Coronado located in San Diego County, California. This biological opinion was prepared in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your December 7, 2004, request for formal consultation on the proposed action was received on December 13, 2004. At issue are the effects of construction and use of Phase 1 of the Navy Lodge Expansion Project on the threatened western snowy plover (*Charadrius alexandrinus nivosus*, snowy plover). Critical habitat is proposed for the western snowy plover at NASNI, however the proposed project is not likely to result in adverse modification of critical habitat, therefore the Navy has not requested, and is not required to initiate formal conferencing with the Service. Although two other listed species are present within the action area (California least tern (*Sterna antillarum brownii*) and California brown pelican (*Pelecanus occidentalis californicus*)), we concur with the Navy's assessment that these species are not likely to be adversely affected by the proposed action.

This biological opinion is based on information provided in: (1) Biological Assessment for the Navy Lodge Complex Expansion (December 2004); (2) the Service's 2003 and 2004 Biological Opinions (1-6-03-F-3452.1, and 3452.2) on military training operations and associated management strategies for least terns and snowy plovers at Naval Amphibious Base Coronado (NAB), the Naval Radio Receiving Facility (NRRF), and NASNI; (3) the Service's 2005 Biological Opinion on airfield and beach uses of NASNI (3908.4); (4) a report entitled "The Naval Air Station Wildlife Hazard Assessment" (Wildlife Services 1996); (5) a series of 2004, correspondence concerning the presence of snowy plovers on the airfield; (6) site visits

conducted by Service staff; and (7) meetings held between the Service and the Navy on: September 10, 2003; October 2, 2003; December 2, 2003; February 10, 2004; March 24, 2004; March 26, 2004; August 13,2004; September 2, 2004; September 17, 2004; November 19, 2004; January 20, 2005; January 27, 2005; and February 9, 2005. A complete administrative record of this consultation is on file at the Service's Carlsbad Fish and Wildlife Office.

CONSULTATION HISTORY

The newer segment of the Navy Lodge was constructed in 1995 after the listing of the western snowy plover. The Navy has attempted to ameliorate the likely indirect effects of human activities on the NASNI recreational beach by implementing management actions including predator management, nest avoidance, and protection of some areas from foot traffic.

The Navy requested consultation on Phase 1 of the Navy Lodge expansion on December 7, 2004, two months after initiating consultation on airfield operations and beach activities at NASNI (Biological Opinions 3908.3 and 3908.4). The Service finalized Biological Opinion FWS-SDG-3908.3 on April 1, 2005. On April 4, 2005, the Service delivered a transmittal memo for the Opinion and conducted a site visit at the proposed location of the Navy Lodge expansion project on Naval Air Station, North Island. On April 13, 2005, the Service received a letter from the Navy expressing disagreement with the necessity of three Terms and Conditions. On May 13, 2005 the Navy and Service met to discuss the Navy's continued concern regarding plover management on NASNI. As a result of this meeting, the Service amended Biological Opinion FWS-SDG-3908.3. The amended Opinion (FWS-SDG-3908.4) reflects the Service and Navy agreement to: (1) attempt to conserve the existing snowy plover population on NASNI (12-13 pairs) with measures amenable to Navy management and; (2) implement additional measures if the approach is ineffective at conserving this plover population. Service staff conducted a follow-up site visit on May 25, 2005. The site visit included the area proposed for Navy Lodge expansion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Overall Concept for Complete Expansion

The Navy proposes to significantly expand the size and footprint of the Navy Lodge at NASNI and expand the existing Island Club. The Navy has completed a proposed concept for renovation and construction of new facilities that include construction of: (1) six 2-story residential buildings; (2) a reception/lobby building; (3) three parking lots (300 spaces, 120 spaces, 100 spaces); (4) 10 duplex beach cottages, each with 2 bedrooms (40 rooms, total); (5) a beach-front boardwalk and entry steps; (6) 4 tennis courts; (7) a beach front splash pool; (8) a kids court and quiet court; and (9) 3 beachfront pavilions. Proposed construction would span approximately

628,360 square feet (14.76 acres) adjacent to the NASNI beach (Table 1). Buildings would be constructed primarily on previously disturbed areas off of beach sand. Parking lots would be constructed on upland habitat and on previously disturbed areas.

As part of the complete expansion, the Navy would install new drainage control devices to ensure that surface runoff is collected properly and carried to an off-site storm drain. A detention/desiltation basin to control the rate of runoff discharge would be constructed. This basin would be designed to detain the peak runoff and would discharge runoff at a rate comparable to the existing system. The design of the detention/desiltation basin would include an energy dissipating system, including riprap and a headwall, which would discharge runoff at non-erosive velocities. New drainage facilities would include an underground drainpipe system capable of handling a 10-year storm event.

Table 1: Surface area of proposed facilities for Navy Lodge expansion

Building (Complex)	**Estimated Area square feet (acres)**
New residential buildings (6 total)	340, 600 (8.00)
Reception building	24,700 (.58)
300-space parking lot	183,200 (4.30)
120-space parking lot	35,460 (.83)
100-space parking lot	26,400 (.62)
Duplex beach cottages (10 total)	18,000 (.42)

Proposed Action for Consultation; Phase 1 of Complete Expansion

The project has been divided into two or more phases, and the first phase (Phase 1) comprises the proposed action at this time. Phase 1 includes: (1) demolition of Buildings 1400 and 1402 (older lodge buildings); (2) construction of three or four 2-story lodge buildings (50-65 rooms each); (3) construction 10 duplex beach cottages (likely placed over the current locations of buildings 1400 and 1401); and (4) construction of a 200-car parking lot adjacent to the lodge facilities. The boundaries of the project area for Phase 1, addressed in this consultation, are outlined in Figure 1. Phase 1 does not include any construction activities on beach sand and does not include construction of the new reception building, drainage control devices, boardwalk, kids court, quiet court, pavilions, entry steps, or landscaping.

Proposed Avoidance and Minimization Measures for the Western Snowy Plover

1. The Navy would continue to monitor and band western showy plovers at NASNI.

2. The Navy would continue to mark and avoid any western snowy plover nests detected on NASNI. All western snowy plover nests on the NASNI Beach would be marked with blue stakes placed in a 30-meter buffer around the nest. Markers would be removed 7 days after chicks hatch.

3. The Navy would continue to avoid areas marked with blue stakes when conducting beach raking activities, including marked plover nests and other areas marked for plover conservation.

4. The Navy would maintain, mark, and protect from foot traffic at least 14.9 acres of suitable plover habitat on NASNI. This acreage would include the area south of the NASNI Pistol Range, the area in front of existing Building 710, and additional area identified as mission compatible by the NASNI command. The Navy would prohibit foot traffic in these areas during the breeding season (Figure 1) (Note: this conservation measure was discussed and agreed to at meetings between the Navy and Service after completion of the Biological Assessment).

5. The Navy would conduct predator control activities on NASNI to protect western snowy plovers.

6. The Navy would distribute educational material regarding the western snowy plover at the Navy Lodge, including maps delineating areas protected for plovers during the breeding season.

7. The Navy would post signs around western snowy plover nests.

Additional Avoidance and Minimization Measures Proposed During Construction of Phase 1

1. Any lighting required during construction would be directed away from the beach and shielded to assure that plover habitat is not artificially illuminated.

2. Building and project design would incorporate Bird/Animal Air Strike Hazard (BASH) and/or avian anti-perch reduction devices.

3. A contractor training program would be established to train all construction personnel on the status, description, biology, and protection measures for the western snowy plover and the California least tern. Training would also include information on reporting procedures and contact information to report observed nests, chicks, adults, or incidental take.

STATUS OF THE SPECIES

Western Snowy Plover

The Pacific coast population of the snowy plover was listed as a threatened species on March 5, 1993 (58 FR 12864).

The initial proposal to designate snowy plover critical habitat was published on March 2, 1995 (60 FR 11768). The final rule designating critical habitat was published on December 7, 1999 (64 FR 68508) and included 28 areas totaling about 18,000 acres and 180 miles of coastline. Of the 28 critical habitat areas, two are designated in Washington, seven in Oregon, and 19 in California. Critical habitat for the snowy plover was designated on NAB ocean beaches on January 6, 2000, but was vacated in 2003. A new proposal for designation of critical habitat was published on December 17, 2004 (69 FR 75608). The new proposal includes the NASNI beach and some adjacent upland areas within the action area.

Factors that resulted in the Service's decision to list this species included: poor reproductive success resulting from human disturbances; predation; and inclement weather. These factors combined with permanent or long-term loss of nesting habitat to urban development and the encroachment of introduced beach grass, led to the decline in active nesting colonies, as well as an overall decline in the breeding and wintering population of the snowy plover along the Pacific coast of the United States. The breeding range of the snowy plover extends along coastal beaches from the southern portion of Washington State to southern Baja California, Mexico. Larger concentrations of breeding birds occur in the south rather than the north, suggesting that the center of the plovers' coastal distribution lies closer to the southern boundary of California (Page and Stenzel 1981). Prior to 1970, snowy plovers bred at 53 locations along coastal California (Page and Stenzel 1981). Presently, breeding occurs at only 20 locations representing a 62 percent decline in breeding sites. The greatest losses of habitat have occurred in southern California, where breeding snowy plovers have been extirpated from parts of San Diego, Ventura, and Santa Barbara counties, most of Orange County, and all of Los Angeles County. In all of these areas, the plovers' absence can be correlated with industrial or residential development and/or heavy recreational use of former beach nesting areas (Page and Stenzel 1981).

In addition to the loss of nesting habitat, the breeding population of snowy plovers in California, Oregon, and Washington experienced a 17 percent decline between 1977 and 1989 (Page et al. 1991). The breeding population in California declined from an estimated 1,565 adults in 1980 (Page and Stenzel 1981) to 1,386 adults in 1989, with a 55 percent decline occurring in north San Diego County and a 41 percent decline at San Diego Bay (Page et al. 1991). Follow-up statewide breeding season snowy plover surveys have been tallied by Point Reyes Bird Observatory since 1991 (Table 2). Statewide estimates are "window surveys". Window surveys are point counts that can be highly influenced by weather conditions, tidal cycles, accessibility of the site, and the number and experience of the people conducting the count. Although these surveys do not provide accurate information regarding the exact number of plovers on a particular site, they are important to evaluating populations and sub-populations of adult snowy plovers over time. Based on such surveys, the current estimate of western snowy plover adults and the west coast of the U.S. is 2,578 adults.

Table 2. Western snowy plover numbers detected during window surveys.

Year	1980[1]	1989[2]	1991[3]	1995	2000[3]	2002[3]	2003[3]	2004[3]	2005
Breeding Season Survey Ca. Coast	1565 adults	1386 adults	1371 adults	n/a	976 adults	1387 adults	1444 adults	1904 adults	n/a
Winter Survey Ca. Coast	n/a	n/a	n/a	n/a	2342	n/a	n/a	4192	3426
SD County	n/a	n/a	83 adults	92 adults	144 adults	157 adults	233 adults	250 adults	n/a

[1] Page and Stenzel 1981 [2] Page et al. 1991 [3] L. Stenzel, in litt. 2004

Snowy plovers breed in loose concentrations with the number of adults at coastal breeding areas ranging from 2 to 318 (Page and Stenzel 1981). Sand spits, dune backed beaches, sparsely to unvegetated beach strands, open areas around estuaries, and beaches at river mouths are the preferred coastal nesting areas of the snowy plover (Page and Stenzel 1981, Wilson 1980, Powell et al. 1997). Other areas utilized by nesting snowy plovers include dredge spoil fill, dry salt evaporation ponds, airfield ovals, and salt pond levees (Widrig 1980, Wilson 1980, US Navy, 2004, Page and Stenzel 1981). Nest sites typically occur in flat, open areas with sandy or saline substrates with little or no vegetation (Widrig 1980, Wilson 1980, Page and Stenzel 1981, Welchell and Keane 1998, Fancher 1998). Although the majority of snowy plovers are site faithful, returning to the same breeding location in subsequent breeding seasons, some dispersal occurs (Warriner et al. 1986, Stenzel et al. 1994). Snowy plovers are sometimes found nesting in similar habitats as the least tern, such as occurs at Batiquitos Lagoon (Welchell and Keane 1998) and Camp Pendleton (Powell et al. 1996) in San Diego County, California.

The breeding season of the snowy plover typically extends from March 1 through September 15. Egg laying in southern California has been documented as early as February 19 (Copper 2002, pers. comm.), but most often begins in mid-March and continues through late-July. Generally, three (3) eggs are laid in a nest that consists of a shallow depression scraped in sandy or saline substrates. Incubation does not begin until the full clutch is laid and continues for 27-33 days with an average of 27 days before eggs are hatched (Warriner et al. 1986). Both sexes incubate the eggs.

Snowy plovers clutches are frequently destroyed by predators, people, or weather, but they renest readily after these losses- up to six times in some locations (Wilson 1980, Warriner et al. 1986, Page et al. 1995). Snowy plovers may also double or triple brood during favorable years. Renesting may occur in the same scrape (rarely), in close proximity to the initial nest, or in a new location distant from the first attempt (Warriner et al. 1986, Powell and Collier 1994, Powell et al. 1997). Nests are rarely reused because weather typically destroys scrapes within days of hatching (Page et al. 1995).

Polygamy has been observed in snowy plovers along coastal California (Warriner et al. 1986). Snowy plover females may abandon chicks as young as 6 days old to find another mate leaving the male to care for the brood (Warriner et al. 1986). Males attend the young for 29-47 days (Warriner et al. 1986) and then may renest with a new partner if sufficient time remains in the season (Stenzel et al. 1994). This results in a serial polygamous breeding system in which males may double clutch and females may triple clutch.

Both unpaired males and pairs defend territories against conspecifics by posturing, chasing, or fighting (Page et al. 1995). On the California coast, unpaired males defend territories for up to 45 days before procuring a mate (Page et al. 1995). Paired birds use territories for courtship, nest sites, and sometimes feeding (Page et al. 1995). On the central California coast, territories were less than 0.5 hectares (ha) at a salt pan, but probably larger on the beach (Warriner et al. 1986). Nests documented within a symbolically fenced polygon on the NASNI recreational beach occurred at a density of approximately 1 per 1.5 acre (based approximations of 2004 nesting area ((approximately 3.0 acres)). Nests documented on the NAB beach occurred at a maximum density of 1 nest per 7.3 ha (1.8 acre) (Orange 2), when calculated by number of nests per training lane. The density estimate calculated for the Navy training lane Orange 1 may be affected by training activities and by the proximity of California least terns, which nest adjacent to snowy plovers on this beach. The estimate does, however, fall within the recorded range of densities for this species. In other parts of North America, estimated snowy plover nesting density has ranged from 0.1 ha (Great Salt Lake, based on nearest neighbor distances), to .5 ha on the salt pan, with larger territories on the beach (Warriner, 1986), to a mean of 0.5-1.0 ha (2 Great Plains sites; Boyd 1972, Grover and Knopf 1982). Broods rarely remain within the nesting territory (Warriner et al. 1986), but the male may lead the brood to a brood territory, which can range from 2-3 acres (Fancher, 2003). Birds are able to fly within approximately 31 days of hatching.

Snowy plover adults and young forage on invertebrates along intertidal areas, along beaches in wet sand and surf cast kelp, in foredune areas of dry sand above the high tide, on salt pans, and along the edges of salt marshes and salt ponds. Page et al. (1981) observed snowy plovers moving between salt pans, tidal flats, and beaches indicating these areas function together in providing habitat for the species.

Human disturbances, which have a detrimental effect to nesting snowy plovers, include unintentional disturbance and destruction of eggs and chicks that may occur during off-road vehicle use, horse-back riding, and beach raking. Intensive beach use by humans has resulted in abandonment of nesting sites, and reductions in nesting density and nesting success, although coupled with positive management, some colonies have increased in size despite concurrent human use of nesting beaches (Service Biological Opinion 1-03-F-3452.1).

Human disturbance can interfere with normal snowy plover behavior. Disturbances to incubating adults can leave nests exposed to extreme temperatures resulting in non-viable eggs or blowing

sand, which buries the eggs. Snowy plover chicks which are separated from their attending adult as a result of human disturbances or predators, may become more susceptible to hypothermia since young chicks are unable to thermoregulate. It has been shown that increased human disturbance forces piping plover chicks (*Charadrius melodius*), an East coast species with habitat requirements very similar to the snowy plover, to expend more energy avoiding disturbances and less time foraging (Fleming et al. 1988). Frequently disturbed piping plover chicks fed less often and at a reduced rate with fewer chicks surviving to 17 days in areas heavily disturbed by humans (Fleming et al. 1988). Proximity of snowy plover nests to segments of infrequently disturbed beach, combined protection of the nest site, may offset the effect of disturbance adjacent to nest sites. For example, plovers continue to successfully nest at NAB (where nest site protection is employed, and nest sites are adjacent to protected beach segments) despite adjacent disturbance associated with training activities. At NAB, the Navy has protected a buffer around nest sites to preclude trampling or vehicular disturbance, and has also protected larger stretches of adjacent beach from training activities. In addition, training activities at NAB are sometimes intermittent, when compared to the daily disturbances associated with many recreational beaches. The combination of nest protection with reasonably close proximity to relatively undisturbed foraging area has allowed plovers to succeed, despite ongoing training close to nesting birds.

Areas that receive significant off-road vehicle activity support lower densities of plover nests (Page and Stenzel 1981). Powell and Collier (1994) reported a shift in beach usage by snowy plovers from areas of heavy vehicular traffic to more protected sites. Direct mortality to snowy plovers as a result of vehicular activity on beaches has been documented (Persons 1994, Copper 1997). Research has shown a decrease in piping plover chick survivorship with as little as 10 vehicular passes per day (Melvin et al. 1994). Snowy plovers, especially the flightless young, are particularly vulnerable to being run over or trampled since crouching in depressions, such as footprints and tire tracks, appears to be a behavioral characteristic (James et al. 1992).
The goal to achieve the long-term survival and recovery of the Pacific coast snowy plover population, as identified in the *Western Snowy Plover, Pacific Coast Population, Draft Recovery Plan*, includes three criteria: (1) maintain for 10 years an average of 3,000 breeding adults distributed among six recovery units (e.g., Recovery Unit 1 Washington and Oregon, 250 breeding adults; and in California, Recovery Unit 2 Del Norte to Mendocino Counties, California 150 breeding adults; Recovery Unit 3 San Francisco Bay, California 500 breeding adults, Sonoma to Monterey Counties, California 400 breeding adults, San Luis Obispo to Ventura Counties, California 1,200 breeding adults, and Los Angeles to San Diego Counties, California 500 breeding adults); (2) maintain a five-year productivity of at least one fledged chick per male in each recovery unit in the last five (5) years prior to delisting; and (3) establish participation plans among cooperating agencies, landowners, and conservation organizations to assure protection and management of breeding, wintering, and migration areas listed in "Appendix B: Information on Snowy Plover Breeding and Wintering Locations" to maintain the subpopulation sizes and average productivity specified in criteria (1) and (2) above (Service 2001). The draft Western Snowy Plover Recovery Plan includes a management objective of 20 snowy plover adults at NASNI.

Information collected to date during the 2005 breeding season, both range-wide and within the action area indicates that plover nest numbers are lower than in 2004 (Jim Watkins, Kevin Clark, Elizabeth Copper pers. comm.). Within the San Diego Bay area, nest numbers are significantly lower than in 2004. The minimum pair estimate to date in the San Diego Bay area (derived by assessing the number of simultaneous active nests) is 26 pairs, compared to 43 pairs for the same area in 2004.

Since 2003, an unusually high number of sick or dead western snowy plovers have been recovered off of beaches in the San Diego Bay area during the breeding season. This season the number of sick or dead plovers recovered off of San Diego Bay area beaches has exceeded 2003 (6 plovers) and 2004 (19 plovers), as 25 adult western snowy plovers have been recovered between February and May 29, 2005. The number of plovers recovered to date represents approximately 20-30 percent of the local breeding population. Although the cause of the mortality is unknown, it is likely that this significant reduction in the local population size is, in part, responsible for the lower number of nests observed to date.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress.

Coronado, including NASNI, NAB, and Silver Strand State Beach, is a key snowy plover nesting area within San Diego County. In addition, potentially suitable, but currently unmanaged, habitat occurs on the Coronado Beach (owned by the State Lands Commission). Habitat within the action area (NASNI) has included beach area as well as upland areas on ovals within the boundaries of the NASNI airfield (Table 3). The availability of habitat has been dynamic, as portions of the NASNI Beach are very narrow and subject to erosion during winter storms. During some years, the western end of the NASNI Beach has supported plover pairs, and during others (including 2005) the beach is too narrow and eroded to provide nesting substrate that is safe from high tides. Plovers have nested on upland areas relatively far from the water on "ovals" within the boundaries of the NASNI airfield. Due to health and human safety concerns, the Navy now harasses plovers from these areas in an effort to prevent nesting, and removes eggs from active nests. Hazing of snowy plovers and removal of plover nests has been conducted on the airfield, as exempted under Biological Opinion 3908.3 and the associated amendment. Hazing efforts, which included general harassment and the use of pyrotechnics, does not seem to be effective although its use was delayed due to the issuance date of Biological Opinion 3908.3. To date, 15 nests have been detected on the airfield. Of these, 10 nests have been brought into

captivity, one (1) nest has failed due to predation, and one (1) has been run over or otherwise crushed. Twenty-eight eggs have been removed from North Island and taken to Project Wildlife. Twenty-five chicks have successfully hatched from these eggs, and are now being raised in captivity by Project Wildlife.

Table 3. NASNI Plover Nests and Pairs. Data Collected by Biologists Under Contract with Navy.

Year	NI Beach Max. Act. Nests = pairs	nests/ broods	nests hatching young	Nest Hatching Rate	NI Airfield Max. Act. Nests = pairs	nests/ broods	nests hatching young	Nest Hatching Rate	NI - All Sites Max. Act. Nests = pairs
1999	0	0	0	0	0	0	0	0	0
2000	2	4	4	100%	0	0	0	0	2
2001	5	13	12	92%	0	0	0	0	5
2002	12	26	20	77%	0	0	0	0	12
2003	4	12	9	75%	10	10/9	19	0%	13
2004	6	13	10	77%	10	23	15	65%	12

Factors likely to have affected nest distribution: soil cement of airfield (1998-1999); beach raking; presence/absence of guard at dog beach; fence at dog beach; lifeguard activity; provision of protected areas; soil cement of ovals (2004)

During 2005, fewer plovers are present at NASNI than during 2004 (Elizabeth Copper, pers. comm.). Two sick plovers were recovered from the NASNI beach during May 2005. Of these, one died and one survived, was released, and has returned to NASNI. One dead plover and one injured plover have also been recovered from NASNI.

During 2005, a total of six (6) snowy plover nests have been initiated on the NASNI Beach. As noted in Opinion 3908.3, the western end of the NASNI Beach is eroded and reduced in size compared to the recent past and one nesting attempt at this end of the beach has failed due to tidal activity. A second nest in this area was brought into captivity because as the adults tending the nest were found sick or dead.

Several large mounds of soil and crushed pavement are present to the north east of the beach adjacent to the 4.19 acre area prepared to accommodate snowy plover nesting. The piles of debris are of significant height and were noted as corvid perches in April. This has reduced the suitability of this area for plover nesting, and may have contributed to the lack of plover nest initiations observed in this area. Plover nests, however, were not observed in this area in 2003 or 2004, prior to establishment of the debris piles, so other variables may contribute to the absence of plover nests. The soil and crushed pavement mounds are scheduled for removal on July 17, 2005 (Tammy Conkle, pers. comm.).

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical

habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

The proposed action is likely to result in indirect effects to the western snowy plover population at NASNI. Indirect effects will likely result from: (1) disturbances during construction of Phase 1; (2) an increase in recreational use of the NASNI Beach associated with increased capacity at the Navy Lodge; (3) changes in predator distribution and abundance associated with trash receptacles, buildings/perch structures, and landscaping; (4) changes in plover habitat quality associated with proximity to buildings and lighting. Adverse effects would be minimized by the proposal to: (1) continue predator management to protect the western snowy plover; (2) continue to monitor, mark, and avoid nests that are initiated on the NASNI Beach; (3) educate construction personnel on the biology and conservation needs of the western snowy plover; (4) incorporate BASH reduction and/or avian anti-perch devices into the project design; (5) direct all construction lighting away from the beach; (6) protect and maintain 14.9 acres of suitable western snowy plover habitat on NASNI.

Disturbance to snowy plovers is likely to occur during the implementation of Phase 1 of the Navy Lodge Expansion. Operation of equipment, demolition of Buildings 1400 and 1401, and construction activities will result in increased human activity adjacent to the beach and an increase to ambient noise levels in areas adjacent to the beach.

An increase in recreational use and beach visitation is likely to result from the Phase 1 Navy Lodge Expansion. The proposed action increases the number of rooms at the Navy Lodge Complex from 190 to 400 (110 percent increase) over the next two years. The projected 400 room capacity of the Navy Lodge after Phase 1 of the expansion project is based on construction of 40 cottage rooms (20 2-bedroom cottages), construction of 260 new hotel rooms (4 buildings of 65 rooms each), and retention of 100 rooms at Buildings 1401A and B. Although empirical figures documenting the extent of beach visitation associated with the Navy Lodge is unavailable, it is likely that the level of human activity associated with the presence of the Navy Lodge will double as a result of the Phase 1 of the Navy Lodge expansion since there will be twice as many rooms available when Phase 1 is complete. Increases in recreational use are likely to disturb western snowy plovers that are attempting to nest or forage on the beach, and may result in incidental take of plovers if disturbance alters feeding, breeding or sheltering activities of these birds. Although possible, we consider it unlikely that the increase in human foot traffic would result in crushing of eggs or chicks because of the intensive monitoring program proposed by the Navy. We expect that nests would be marked as a result of monitoring efforts and that beach visitors would comply with avoidance of marked areas.

Modification of the area adjacent to the NASNI Beach to include 3 or 4 additional buildings, associated trash receptacles and lighting is likely to modify the predator distribution and abundance of the area. At least one burrowing owl (*Athene cunicularia*) pair would be displaced from the upland habitat due to building construction, which could reduce burrowing owl predation on the adjacent beach, but the additional perch structures provided by buildings and shrubs is likely to result in more corvid and American kestrel (*Falco sparverius*) use of this area. If lighting from Lodge structures illuminates the beach, it could discourage plovers from using the beach. Trash receptacles associated with Lodge buildings and with increased human density on the adjacent beach may subsidize an increase in rat and/or western gull use of this area. The ongoing predator management program implemented by the Navy may offset the effects of the increase in predator abundance that is likely to result from additional perch structures and trash receptacles . If predator abundance increases, however, additional predator management effort may be required in the vicinity of the Navy Lodge to support the conservation of snowy plovers on the adjacent beach.

Based on the number of nests recorded on the recreational beach from 2002-2004 (6 nests in 2002, 7 nests in 2003, 8 nests in 2004), and the likelihood that the nests constructed were the result of re-nesting attempts by resident pairs of plovers, we anticipate indirect effects to three (3)pairs of western snowy plovers associated with beach disturbances.

It is possible that the combined effects of airfield hazing (Opinion FWS-SDG-3908.4), nest removal (Opinion FWS-SDG-3908.4), and increased disturbance associated with the Navy Lodge Phase 1 expansion could have greater effects that we anticipate at this time. If visitors disregard signage and staking (resulting in disturbances throughout the beach), if adjacent Navy Lodge structures and activity affect plovers to a greater degree than we anticipate, or if plovers do not utilize areas protected from foot traffic during the breeding season, then plover numbers would likely decline at NASNI. Since the Navy has committed to creating conditions conducive to plover nesting in appropriate habitat adjacent to disturbed portions of the NASNI Beach and the airfield, we are hopeful that proposed conservation measures can be adequately enforced and modified if necessary, and the plover population can be maintained despite the increasing intensity of surrounding uses.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future non-federal (State, tribal, local, or private actions) activities 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 consultation pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended. We anticipate that non-Federal actions, such as the prevalence of contaminants in San Diego Bay waters associated with certain marine activities (e.g., marinas and shipyards), the continued development of nearshore ocean and bay waters for commercial and recreational purposes, and the disturbance of nesting areas by humans

and feral mammals, are expected to cumulatively contribute to adverse effects to the snowy plover. These effects magnify the importance of secure, well-managed sites for the snowy plover.

CONCLUSION

After reviewing the current status of the western snowy plover, the environmental baseline for the action area, effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the western snowy plover. We draw this conclusion for the following reasons:

1. The Navy is committed to western snowy plover conservation on Naval Base Coronado and proposes to continue a comprehensive predator management program, mark and avoid plover nests, and protect at least 14.9 acres on NASNI (as per Opinion FWS-SDG-3908.4) that may provide suitable conditions for 12-13 pairs of breeding snowy plovers. In addition, the Navy has agreed to reevaluate the need for additional conservation measures should the current approach prove ineffective at this level of conservation of the NASNI population.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations issued pursuant to section 4(d) of the Act prohibit take of endangered and threatened species without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing potential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral 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, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2) of the Act, such incidental take is not considered to be a prohibited taking under the Act, provided that such taking is in compliance with this incidental take statement.

The measures described below are nondiscretionary and must be undertaken by the Navy so they become binding conditions of any permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity covered by this incidental take statement. If the Navy (1) fails to adhere to the terms and conditions, (2) fails to require the enforceable terms that are added to the permit, and/or (3) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impacts of incidental take, the Navy must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Based on our discussion in the effects analysis, we anticipate the following take may occur on the airfield and training beaches at NASNI in the form of harm or harassment.

1. We anticipate that all western snowy plovers that frequent the NASNI recreational beach outside of the marked and protected beach segments may be subject to harm due to human disturbances associated with construction noise, recreational use, or beach maintenance. Based on previous nesting activity we anticipate potential harassment to three (3) pairs of western snowy plover associated with this action.

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the impact of incidental take anticipated in this biological opinion on the western snowy plover.

1. The Navy must implement the Proposed Avoidance and Minimization Measures subject to modifications described below, to increase the measures' effectiveness in avoiding and minimizing impacts of incidental take.

2. The Navy shall protect sufficient area from disturbance on NASNI to support a breeding population of 12-13 pairs of snowy plovers (or 20 breeding adults).

3. The Service and Navy have agreed to attempt to conserve the existing plover population on NASNI with measures amenable to Navy management, but to implement additional measures if the approach is ineffective at conserving the plover population. Accordingly, the Navy and Service will evaluate the success of the reasonable and prudent measures provided herein based on the ongoing status of the plover population on NASNI, and develop additional measures if the plover population on NASNI declines. If the plover population on NASNI falls below an estimated 20 breeding adults for two consecutive years, the Navy and the Service will develop additional measures to conserve snowy plovers at NASNI.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Endangered Species Act, the Navy must ensure that their military personnel, including all agents and contractors anticipated herein, comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline the required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure one, the Navy, including all of their agents and contractors, shall implement the Avoidance and Minimization Measures in the "Description of the Proposed Action" above, subject to the following specifications:

a. Stakes that delineate plover nests shall remain in place for 7 days post-hatch or as long as plovers are detected within 15 meters of the staked area during monitoring visits to provide refuge from foot/vehicle traffic to plover chicks on the beach and to protect the nest, in the event of re-use. The Navy shall place a Mammalian Exclosure or Mini Exclosure (ME) over plover nests on NASNI in such instances where an ME would potentially benefit the nest/ nesting pair. This may be necessary to protect nests from gull-billed tern predation, dogs, or other mammalian predators. Placement of an ME may also help reduce the potential for inadvertent destruction from foot traffic. This term and condition modifies the current proposal for maintaining protective stakes for 7 days post-hatch.

b. The Navy shall contact the Service and report any circumstance that necessitates movement of a plover nest. This will be done with submittal of the Navy's weekly reports to the Service. If relocation is necessary, nests moved shall be relocated the shortest distance possible into suitable habitat within the boundaries of NASNI to increase the chances for nest success.

c. The Navy shall implement a comprehensive biological monitoring program on NASNI to ensure identification of: (1) snowy plover nesting locations; (2) the estimated number of adult breeding pairs (breeding adults) and fledglings produced on NASNI, and; (3) all individuals banded on NASNI. Each snowy plover banded or released at NASNI must receive a unique band combination to allows future identification of the individual. Although it may not be possible to band each individual, the Navy should strive to band all plovers on NASNI, including adults and chicks, in a manner that minimizes risks to the birds. In addition, a monitoring report must be developed to include:

(1) evaluation of the effectiveness of the buffer surrounding each nest;
(2) number and location of nests;
(3) estimated number of fledglings produced;
(4) number of relocated nests and success of relocation efforts;
(5) level of observed incidental take NASNI, and when discernible the amount and type of predation events that occur;
(6) evaluation of the success of 14.9 acres of protected habitat;
(7) observations of any captive-reared plovers in the wild; and
(8) interactions between snowy plovers and gull-billed terns (*Sterna nilotica*) and American peregrine falcons (*Falco peregrinus*)
(9) number and location of banded individuals

The Navy shall prepare reports for the Service at a minimum of twice each month. The annual monitoring results shall be submitted to the Service when a draft report for the snowy plover breeding season is received by the Navy.

d. The Navy shall assure that to the extent that Navy scheduling allows, monitors check the beach for plover nests prior to each raking event during the plover breeding season, as determined by the presence and activity of plovers on NASNI. This may not be possible in each instance, but the Navy shall explore means to accomplish this goal and implement it to the maximum extent practicable.

e. The Navy shall assure that all personnel who stay at the Navy Lodge between March 1 and August 31 receive or are shown a map delineating plover protection areas as well as basic information concerning plover status and biology.

f. The Navy shall incorporate anti-perch materials and structures into the design of the Navy Lodge buildings. The contractor or Navy office responsible for building design shall submit a copy of the design specifications, including schematic pictures and list of materials to the Navy's Natural Resources Office (NRO) for approval prior to construction. The Service is available to provide technical assistance regarding materials and designs that would reduce the attractiveness of buildings to avian predators.

g. The Navy shall incorporate design features that reduce the potential for increased predator density into the landscape design for the Navy Lodge. Berm establishment adjacent to beach sand areas should be avoided to reduce predator perches. Vegetation composition of the landscaping should minimize avian predator perches and minimize the cover afforded to mammalian predators such as rats. The Navy shall incorporate the guidelines outlined in the Naval Base Coronado Integrated Natural Resources Management Plan (INRMP)(pages 4-16 to 4-20) into the landscape design for the Navy Lodge Expansion. These guidelines specify that new landscaping should consist of historically appropriate, drought tolerant, and native species. The contractor or Navy office responsible for landscape design shall submit a copy of the design specifications to the NRO for approval prior to installation of landscaping. The Service is available to provide technical assistance regarding materials and designs that would reduce the attractiveness of landscaping to avian and mammalian predators, and to provide technical assistance regarding Appendix E of the INRMP, which identifies a recommended plant selection guide for NBC.

h. The Navy shall assure that all lighting for the Navy Lodge is directed away from the beach sand and shielded to prevent illumination of the beach.

i. The Navy shall clearly mark construction areas with flagging to assure that construction vehicles do not drive on the beach sand areas.

j. The Navy shall designate staging areas for construction equipment and vehicles that are as far from the beach sand as possible.

k. The Navy shall assure that during demolition of buildings 1400 and 1401, no large mounds of debris that may function as predator perches or visual deterrents to plover nesting will be erected adjacent to plover habitat.

2. To implement reasonable and prudent measure two, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

a. To reduce the impact of disturbances on the recreational beach, the Navy shall provide conditions conducive to nesting on NASNI for the approximately 12-13 pairs of plovers that have nested on NASNI since 2002. Based on plover densities at NAB, densities cited in the Birds of North America species account, and the density of plovers that have previously nested on the airfield and in the protected area in front of Building 710, plover nest territories occupy an area ranging from .5 to 1 ha (1.2-2.4 acres/pair). Approximately 14.4-33.6 acres of undisturbed habitat is likely necessary to encourage breeding behavior and nest initiation by the 12-13 pairs of plovers breeding at NASNI. Using the minimum territory size estimate (1.2 acres pair), and the maximum pair estimate (13 pairs), 15.6 acres of undisturbed habitat should be adequate to provide conditions conducive to nesting for the breeding plovers at NASNI, though greater acreage consistent with the lower nesting densities cited above may be needed if the acreage provided does not support 12-13 pairs. The beach area at NASNI, most notably the western end of the beach, is limited in size/width due to unusually high tides, storms, and beach erosion during 2005 and is unlikely to support successful plover nests. The Navy has identified 14.9 acres of beach and adjacent habitat that can be protected from foot traffic and is consistent with Navy management. Although 14.9 acres of habitat is below the amount identified by the Service as necessary to support 12-13 plover pairs (based on estimation of pair numbers and known size of plover territories), this is the amount of habitat identified by the Navy command as mission-compatible, and additional habitat may be available during some years along Zuniga Beach. Accordingly, the Navy shall:

(1) Protect (from foot/vehicle traffic) and symbolically fence (using staking and signage) at least 14.9 acres of appropriate plover habitat (measured above the mean high tide line) on NASNI (including beach and/or upland areas) from disturbance from at least March 1 to August 15. This acreage may include the area west of the pistol range, and the marked area directly in front of Building 710, as well as other areas that may be rehabilitated as plover habitat in the future. Although Zuniga Beach once comprised an area of approximately 15 acres, it is currently very narrow due to sand loss associated with winter storms, and may not

be considered as part of the protected habitat since it is unlikely to support successful plover nests.

(2) Discontinue vehicle use on the NASNI beach except in instances where vehicle use is conducted as part of military training or for health and human safety needs. If lifeguards require vehicle use, they shall be educated about the snowy plover biology and conservation needs on NASNI, and encouraged to designate and use fixed routes to minimize beach disturbance.

(3) Assure that future uses of areas adjacent to those designated for plover nesting are conducive to plover nesting. This may include establishment of height, noise, or lighting guidelines on future projects. It is not considered possible to reduce the height of the current soil/debris mounds adjacent to the pistol range at this time due to the current contract under which the work is being conducted (Tammy Conkle, pers. comm.). This material will, however, be removed on July 17, 2005. This date follows the majority of the plover breeding season.

3. To implement reasonable and prudent measure three, the Navy shall adhere to the following term and condition:

a. The Navy shall meet annually with the Service to discuss the status of the NASNI plover population and the upcoming breeding season to determine if additional measures are necessary to achieve the conservation goal of 12-13 pairs of plovers (20 breeding adults) on NASNI.

The Service believes that no more than the anticipated incidental take for snowy plovers identified above would result from the proposed action. The reasonable and prudent measures, with the implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Navy must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Reporting Requirements

In order to demonstrate compliance with the foregoing Terms and Conditions the Navy, or its designated contact, shall submit an annual report to the Service that describes and summarizes the implementation of the proposed Project and its associated conservation measures.

Disposition of Sick, Injured, or Dead Specimens

The Service's Division of Law Enforcement, San Diego, California (619) 557-5063 is to be notified immediately should any western snowy plovers be found sick, injured, or dead in the Project area. The Service's Carlsbad Fish and Wildlife Office should be notified concurrently at (760) 431-9440, ext. 274, 260, or 243. Written notification to both offices must be made within five calendar days and include the collection date and time, location of the bird(s), and any other pertinent information. Care must be taken in handling sick or injured bird(s) to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. Plover specimens are of particular concern because of the recent observations of sick and dead birds on the San Diego beaches. Timely collection and reporting are necessary to facilitate potential necropsy or contaminants analysis of specimens.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act 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.

a. The Navy should explore the potential for dune restoration of the dune area north/east of the recreational beach. Such restoration may provide additional habitat for snowy plovers that would not be in conflict with recreational beach use.

b. The Navy should experiment with the application of shade cloth or other visual deterrent to the lower segment of the fence that separates the Navy beach from Dog Beach. Providing a visual barrier between the Navy beach and Dog beach may make this segment of Navy beach more attractive to plovers for nesting.

c. The Navy should work with the Service to develop a comprehensive conservation strategy for Snowy plovers on Naval Base Coronado that is consistent with the recovery objectives for the species and mission compatible. This strategy is needed to address the conservation needs of the snowy plover in the face of increasing use intensity on NASNI and surrounding areas. A comprehensive strategy to address snowy plover conservation needs should be included in the next iteration of the Naval Base Coronado Integrated Natural Resources Management Plan.

d. The Navy should explore the potential for augmentation and maintenance of additional areas as plover habitat on NASNI, including: (1) the parking lot where several large debris piles are currently located; (2) Zuniga Beach (via sand deposition); (3) areas south of the NASNI runway; and other areas that are considered mission compatible.

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

REINITIATION NOTICE

This concludes formal consultation on Phase I of the Navy Lodge Expansion Project, NASNI, Naval Base Coronado,. 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 if exceeded; (2) new information reveals effects of the proposed 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 listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

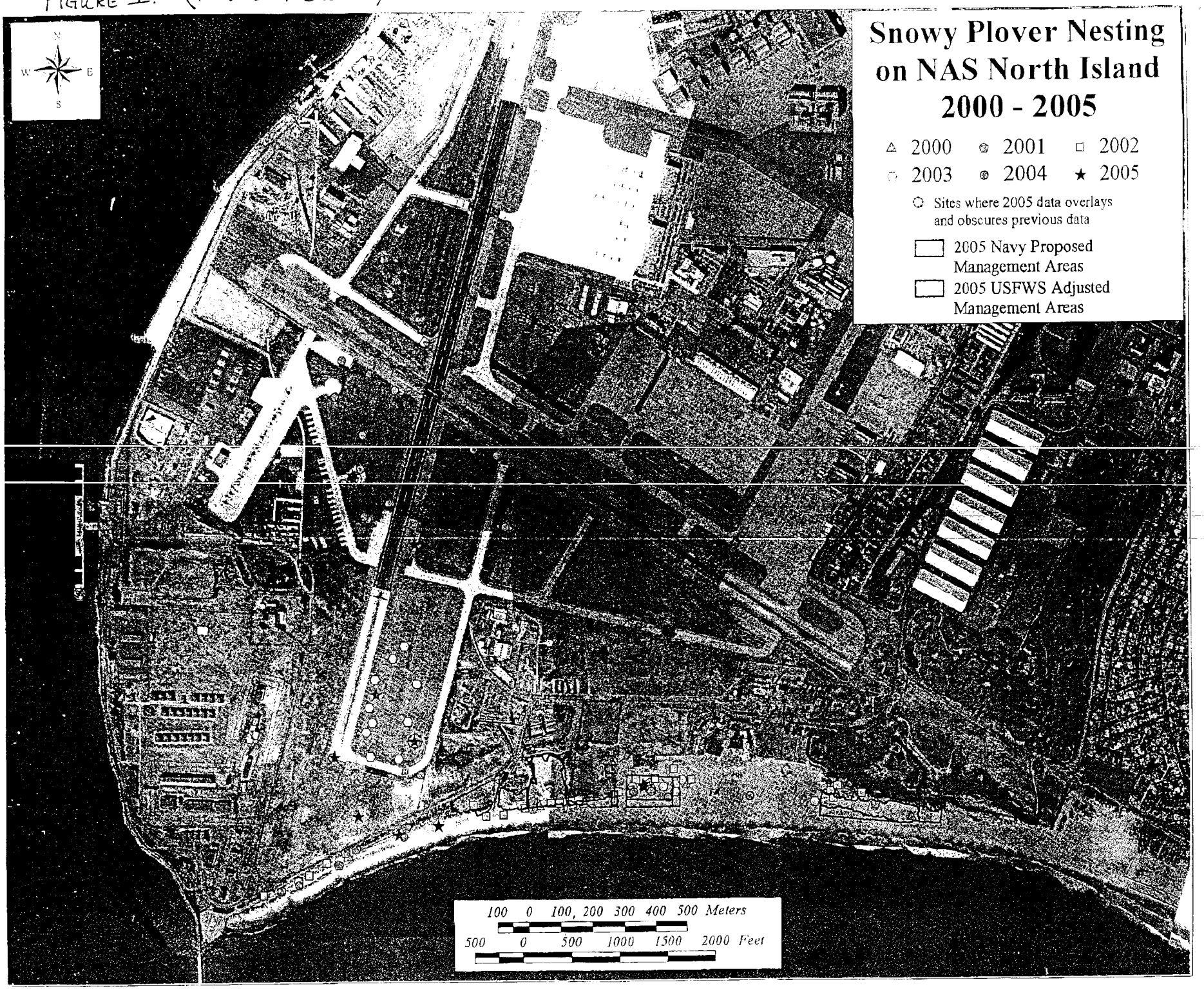
If you have any questions regarding this biological opinion, please contact Sandy Vissman of this office at (760) 431-9440 extension 274.

Sincerely,

for /s/

Therese O'Rourke
Assistant Field Supervisor

FIGURE 1. (FWS-SDG-3908.5)



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

FACSIMILE TRANSMITTAL FORM

Date Sent:	*No. of Pages:*	*Time Sent: (Pacific Time)*
7/21/05	22	11:43

TO: Tammy Conkle — ***Fax No.:*** 619-545-3489

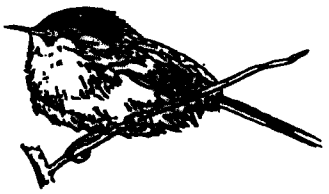
FROM: Sandy Vissman — ***Fax No: (760) 431-5902*** ***Phone No.: (760) 431-9440***

SUBJECT: Navy Lodge Expansion Project

COMMENTS:

If you have any have problems receiving this fax, please call (760) 431-9440, extension 284. Thank you.

California Gnatcatcher



The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.

TAKE PRIDE IN AMERICA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

In Reply Refer To:
FWS-SDG-3908.3

Captain T. Alexander
Commanding Officer
Naval Base Coronado
P.O. Box 357033
San Diego, California 92135-7033

Captain Anthony J. Gonzales
Assistant Chief of Staff for Environment
Commander Navy Region Southwest
140 Sylvester Road
San Diego, California 92106-3521

Attn: Tammy Conkle, Wildlife Biologist

Dear Captain Alexander and Captain Gonzales:

This document transmits the Fish and Wildlife Service's (Service) biological opinion based on our review of the Navy's proposed and ongoing operations and 2005 management strategy for the western snowy plover and California least tern at Naval Air Station, North Island (NASNI) located in San Diego County, California. This biological opinion was prepared in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your October 12, 2004, request for reinitiation of formal consultation on the proposed action was received on October 14, 2004. At issue are the effects of ongoing airfield operations, military training activities, and associated management strategies on the threatened western snowy plover (*Charadrius alexandrinus nivosus*, snowy plover) at NASNI.

This biological opinion is based on information provided in: (1) the Service's 2002, Biological Opinion (1-6-02-F-2645.1) on military training operations and associated management strategies for the least tern and snowy plover at the Naval Amphibious Base (NAB); (2) the Service's 2003, Biological Opinion (1-6-03-F-3452.1) on military training operations and associated management strategies for least terns and snowy plovers at NAB, the Naval Radio Receiving Facility (NRRF), and NASNI; (3) the Service's 2004, Biological Opinion (1-6-03-F-3452.2) on military training operations and associated management strategies for least terns and snowy plovers at NAB, NRRF, and NASNI; (4) a report entitled "The Naval Air Station Wildlife Hazard Assessment" (Wildlife Services 1996); (5) a series of 2004, correspondence concerning the presence of snowy plovers on the airfield (6) information pertaining to hatching/fledging success of birds hatched and raised in captivity (7) site visits conducted by Service staff during spring, 2004; and (8) meetings held between the Service and the Navy on: September 10, 2003; October 2, 2003; December 2, 2003; February 10, 2004; March 24, 2004; March 26, 2004; August 13, 2004; September 2, 2004; September 17, 2004; November 19, 2004; January 20, 2005; January 27, 2005; and February 9, 2005. A complete administrative record of this consultation is on file at the Service's Carlsbad Fish and Wildlife Office.

CONSULTATION HISTORY

The presence of snowy plovers at the NASNI airfield has been documented since 2003, although it is possible, based on plover reproductive data, that nesting in the vicinity of the airfield has been ongoing for a longer time period.

In 2003, the Navy consulted informally under section 7 of the Act with the Service regarding the presence of snowy plover nests within the oval at the south east end of runway 18, and successfully protected these nests.

During spring 2004, extensive construction and repaving was underway on the NASNI airfield which necessitated a staggered four month closure of each runway. The Navy consulted informally with the Service regarding a proposal to soil cement the oval where the plovers had nested in 2003. Due to the timing of the proposed project (March 2004), and the potential adverse effects associated with the proposed soil cement project, the Service recommended that the Navy formally consult on this action. The Navy did not concur with the Service assessment of potential effects to the snowy plover and implemented the soil cement project without undergoing section 7 consultation and receiving incidental take exemption. Up to three plover pairs (likely two pairs) attempted to nest in the area after the soil cement project was completed, and approximately five to seven pairs of plovers nested in other areas on the airfield. Two nests and one adult plover were lost on the airfield in 2004, incidental to airfield operations, five nests were removed from the airfield due to health and human safety concerns and taken to Project Wildlife, and fifteen nests successfully hatched. Based on the experience gained in 2004, and the evidence of potential for adverse effects to and incidental take of snowy plovers, the Navy requested consultation on NASNI airfield operations in 2005.

On December 17, 2004, the Service proposed critical habitat for the western snowy plover (69 FR 75608). The proposed critical habitat designation includes portions of NASNI, including the beach and adjacent back dune/upland area. The Navy may request a conference under section 7 of the Act on any action that may affect a proposed species or proposed critical habitat. A conference is required only when the proposed action is likely to jeopardize the continued existence of a proposed species, or destroy or adversely modify proposed critical habitat. The Navy has not requested conference on the effects of airfield management, ongoing training, and recreational use on NASNI relative to proposed critical habitat of the snowy plover.

DESCRIPTION OF THE PROPOSED ACTION

California Least Tern Management

The Navy proposes to continue management efforts for the endangered California least tern (*Sterna antillarum browni*) at the mitigation site known as the MAT site during the 2005 breeding season. This conservation measure was originally implemented to partially offset the impacts of the LAMPSMK III project (Biological Opinion 1-1-82-F-123) and is most recently addressed under Biological Opinion 1-6-04-F-3452.2. No modifications to the action have been

made at this time, therefore the analysis of effects, no jeopardy finding, and Incidental Take Statement terms and conditions contained in Biological Opinion 1-6-04-F-3452.2 that are pertinent to least tern nesting at the MAT site are still valid and applicable and are incorporated herein by reference. For that reason, the effects of the proposed action on the California least tern will not be discussed further in this document.

Ongoing Airfield Operations

The Navy proposes to continue ongoing airfield operations at NASNI, which include: (1) the control of aircraft and supporting facilities; (2) air and maintenance crew training facilities; (3) aircraft maintenance facilities; (4) weapons loading; and (5) implementation of a Bird/Animal Air Strike Hazard (BASH) Program.

The NASNI airfield consists of two (2) runways and 12 helipads. Runway 11/29 (300 feet (ft) by 7500 ft) and Runway 18/36 (200 ft by 8000 ft). are oriented approximately at right angles to each other and are connected by an extensive taxiway system. Both of these Class B runways are used by fixed wing and rotary wing aircraft. Arrival and departure pads also support helicopter operations.

Support facilities include an aircraft control tower, a fire crash station, and an air terminal facility for handling passengers and cargo. The station holds crew training facilities for SH-60B, SH-60F, MH-60S, and S-3 aircraft. Aircraft maintenance facilities are housed in a series of hangars and associated parking aprons. A primary surface area of 750 feet either side of runway centerline and clear zones of 3000 feet from runway thresholds have been established as required by CFR 14 (Federal Aviation Regulations) Part 77 and NAVFAC P-80 to ensure safety clearances.

The NASNI airfield is a frequently used facility which is open year-round and is home to approximately 121 rotary and 98 fixed wing assets. There were 112,570 air operations during 2004. Runway 18/36 was closed from November 2003 to May 2004 for resurfacing, and runway 11/29 was closed from May to September 2004 for resurfacing. This military construction project impacted training at North Island and depressed traffic counts below normal. In 2003 there were 130,233 air operations at NASNI (approximately 362 per day that NASNI airfield is open). An air operation is a single take-off or a single landing.

The Navy's October 12, 2004, request to reinitiate consultation describes airport operations and maintenance in more detail and is incorporated herein by reference, however, the components of the consultation request include:

(1) Movement and operation of all military aircraft and associated support vehicles on all areas on or adjacent to the airfield;

(2) The use of emergency operational areas, such as the De-Arming Area, and all ordnance support activities; these facilities must be supported and/or manned at all times.

Emergency assets, such as manned Federal Fire Department trucks, must also be supported and/or manned whenever the airfield is active.

(3) Regular landings to support requirements for flight the use of areas that support aircraft maintenance, including the fueling area and compass rose. The compass Rose was used 203 times in 2003 and 126 times in 2004.

(4) Daily airfield sweeping when the airfield is open;

(5) General walk downs to minimize the potential for Foreign Object Debris (FOD) damage;

(6) General equipment maintenance;

(7) Vegetation mowing within and adjacent to the airfield when 25% of the vegetation exceeds eight (8)\ inches when measured from the soil; and

(8) Arresting Gear (Boots) Management. The Federal Fire Department (FFD) responds to calls to maintain the arresting cable wire support mechanisms on the airfield. Nine to 12 calls per day require FFD response. In 2003, FFD responded to 118 such calls, and as of August 2004, had responded to 86 such calls. Responding to calls may necessitate driving over all surfaces of the airfield.

In addition, the Navy proposes to continue to implement a BASH program, and to deter snowy plovers from nesting on the airfield and supporting areas under the auspices of this program. The Navy considers snowy plovers on the airfield a BASH risk, and is also concerned that snowy plovers nesting on the airfield may attract larger predatory avian species that would also be a BASH risk. As part of the BASH Program, the Navy proposes to:

(1) Eliminate attractants to avian species, including snowy plovers. Since snowy plovers appear to be attracted to patches of deteriorating soil stabilization and slight depressions containing sand, the Navy proposes to modify such habitat patches by placement of rocks or other unattractive substrates;

(2) Utilize pyrotechnics to frighten avian species, including snowy plovers, off of the airfield. Previously, the Navy and their contractor, U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) Wildlife Services, had avoided utilizing pyrotechnics in the vicinity of federally listed species, including the snowy plover, to minimize effects to federally endangered and threatened species in accordance with May 2001 correspondence from the Service;

(3) Harass avian species, including western snowy plovers, with vehicles or any other mechanism deemed suitable or effective;

(4) Control vegetation growth to reduce the attractiveness of areas near the airfield to avian species;

(5) Utilize lethal removal to target resident birds that persist on-site despite harassment efforts (not proposed for snowy plovers); and

(6) Remove snowy plover eggs from nests that are established on the airfield and take them to Project Wildlife for captive rearing and release, or (as appropriate) destroy them.

NASNI Beach Activities

NASNI supports recreational and training activities on the NASNI beach. Training activities include: Mobile Inshore Undersea Warfare Training; Swimmer Scout, Escape, and Recovery training; "Around the World" paddle evolutions; Combat Hydrogeographic Reconnaissance; Stealth and Concealment training; research and development exercises; Naval Special Warfare over the beach training; underwater swimmer exercises; and physical training. Recreational use of the beach is focused in the vicinity of the Navy Lodge

Proposed Avoidance and Minimization Measures

Proposed avoidance and minimization measures include:

(1) Continued management of the "MAT" site to support least terns, including site preparation, replacement of chick barriers, inspection repair and replacement of the nest site grid poles, placement of chick shelters throughout the colony, and ongoing intensive management efforts;

(2) Implementation of a comprehensive predator management program at NASNI;

(3) Symbolic fencing of snowy plover nests initiated on the beach with blue stakes surrounding a maximum 30-meter buffer zone;

(4) Maintenance of approximately 4.13 acres of potential snowy plover habitat south of the NASNI Pistol Range. The area would be maintained and further enhanced by removing emergent vegetation;

(5) Avoidance of snowy plover nests during raking on the NASNI beach;

(6) Continuation of previous efforts to symbolically fence a site (exact acreage unknown) in front of Building 710 on the NASNI Recreation Beach to minimize foot traffic and thereby reduce harassment of nesting snowy plovers;

(7) Retention of all kelp and marine vegetation on the beach to maintain arthropod abundance and provide food resources for snowy plovers (any proposals to conduct beach cleaning or remove kelp due to significant storm events will be coordinated with the Carlsbad Fish and Wildlife Office);

(8) Continuation of existing least tern and snowy plover monitoring and banding efforts;

(9)Distribution of educational material about the snowy plover at the Navy Lodge; and

(10) Continuation of cooperative efforts with the Service to relocate American peregrine falcons (*Falco peregrinus anatum*) and gull-billed terns (*Sterna nilotica*) that may occur on Naval Base Coronado.

Proposed Maximum Snowy Plover Population for Management at NASNI

In addition to proposing to continue airfield operations, NASNI beach activities, and the BASH Program, the Navy proposes to limit the size of the snowy plover population at NASNI. The Navy proposes to remove all snowy plover nests/eggs in excess of 15 nests/ 45 eggs that are laid at NASNI. Nests/eggs in excess of 15/45 would be taken into captivity, brought to the Project Wildlife rehab volunteer, hatched, reared, and released.

Action Area

The Action Area for this consultation constitutes the area encompassed by NASNI.

STATUS OF THE SPECIES/CRITICAL HABITAT

Western Snowy Plover

The Pacific coast population of the snowy plover was listed as a threatened species on March 5, 1993 (58 FR 12864).

The initial proposal to designate snowy plover critical habitat was published on March 2, 1995 (60 FR 11768). The final rule designating critical habitat was published on December 7, 1999 (64 FR 68508) and included 28 areas totaling about 18,000 acres and 180 miles of coastline. Of the 28 critical habitat areas, two are designated in Washington, seven in Oregon, and 19 in California. Critical habitat for the snowy plover was designated on NAB ocean beaches on January 6, 2000, but was vacated in 2003. A new proposal for designation of critical habitat was published on December 17, 2004 (69 FR 75608). The new proposal includes the beach and some adjacent upland areas within the action area.

Factors that resulted in the Service's decision to list this species included: poor reproductive success resulting from human disturbances; predation; and inclement weather. These factors combined with permanent or long-term loss of nesting habitat to urban development and the

encroachment of introduced beach grass, led to the decline in active nesting colonies, as well as an overall decline in the breeding and wintering population of the snowy plover along the Pacific coast of the United States. The breeding range of the snowy plover extends along coastal beaches from the southern portion of Washington State to southern Baja California, Mexico. Larger concentrations of breeding birds occur in the south rather than the north, suggesting that the center of the plovers' coastal distribution lies closer to the southern boundary of California (Page and Stenzel 1981). Prior to 1970, snowy plovers bred at 53 locations along coastal California (Page and Stenzel 1981). Presently, breeding occurs at only 20 locations representing a 62 percent decline in breeding sites. The greatest losses of habitat have occurred in southern California, where breeding snowy plovers have been extirpated from parts of San Diego, Ventura, and Santa Barbara counties, most of Orange County, and all of Los Angeles County. In all of these areas, the plovers' absence can be correlated with industrial or residential development and/or heavy recreational use of former beach nesting areas (Page and Stenzel 1981).

In addition to the loss of nesting habitat, the breeding population of snowy plovers in California, Oregon, and Washington experienced a 17 percent decline between 1977 and 1989 (Page et al. 1991). The breeding population in California declined from an estimated 1,565 adults in 1980 (Page and Stenzel 1981) to 1,386 adults in 1989, with a 55 percent decline occurring in north San Diego County and a 41 percent decline at San Diego Bay (Page et al. 1991). Follow-up statewide breeding season snowy plover surveys have been tallied by Point Reyes Bird Observatory since 1991 (Table 1). State-wide estimates are "window surveys". Window surveys are point counts that can be highly influenced by weather conditions, tidal cycles, accessibility of the site, and the number and experience of the people conducting the count. Although these surveys do not provide accurate information regarding the exact number of plovers on a particular site, they are important to evaluating populations and sub-populations of adult snowy plovers over time. Based on such surveys, the current estimate of western snowy plover adults an the west coast of the U.S. is 2578 adults.

Table 1. Western snowy plover numbers detected during window surveys.

Year	1980[1]	1989[2]	1991[3]	1995	2000[3]	2002[3]	2003[3]	2004[3]	2005
Breeding Season Survey Ca. Coast	1565 adults	1386 adults	1371 adults	n/a	976 adults	1387 adults	1444 adults	1904 adults	n/a
Winter Survey Ca. Coast	n/a	n/a	n/a	n/a	2342	n/a	n/a	4192	3426
SD County	n/a	n/a	83 adults	92 adults	144 adults	157 adults	233 adults	250 adults	n/a

[1] Page and Stenzel 1981 [2] Page et al. 1991 [3] L. Stenzel, in litt. 2004

Snowy plovers breed in loose concentrations with the number of adults at coastal breeding areas ranging from 2 to 318 (Page and Stenzel 1981). Sand spits, dune backed beaches, sparsely to unvegetated beach strands, open areas around estuaries, and beaches at river mouths are the preferred coastal nesting areas of the snowy plover (Page and Stenzel 1981, Wilson 1980, Powell

et al. 1997). Other areas utilized by nesting snowy plovers include dredge spoil fill, dry salt evaporation ponds, airfield ovals, and salt pond levees (Widrig 1980, Wilson 1980, US Navy, 2004, Page and Stenzel 1981). Nest sites typically occur in flat, open areas with sandy or saline substrates with little or no vegetation (Widrig 1980, Wilson 1980, Page and Stenzel 1981, Welchell and Keane 1998, Fancher 1998). Although the majority of snowy plovers are site faithful, returning to the same breeding location in subsequent breeding seasons, some dispersal occurs (Warriner et al. 1986, Stenzel et al. 1994). Snowy plovers are sometimes found nesting in similar habitats as the least tern, such as occurs at Batiquitos Lagoon (Welchell and Keane 1998) and Camp Pendleton (Powell et al. 1996) in San Diego County, California.

The breeding season of the snowy plover typically extends from March 1 through September 15. Egg laying in southern California has been documented as early as February 19 (Copper 2002, pers. comm.), but most often begins in mid-March and continues through late-July. Generally, three (3) eggs are laid in a nest that consists of a shallow depression scraped in sandy or saline substrates. Incubation does not begin until the full clutch is laid and continues for 27-33 days with an average of 27 days before eggs are hatched (Warriner et al. 1986). Both sexes incubate the eggs.

Snowy plovers clutches are frequently destroyed by predators, people, or weather, but they renest readily after these losses- up to six times in some locations (Wilson 1980, Warriner et al. 1986, Page et al. 1995). Snowy plovers may also double or triple brood during favorable years. Renesting may occur in the same scrape (rarely), in close proximity to the initial nest, or in a new location distant from the first attempt (Warriner et al. 1986, Powell and Collier 1994, Powell et al. 1997). Nests are rarely reused because weather typically destroys scrapes within days of hatching (Page et al. 1995).

Polygamy has been observed in snowy plovers along coastal California (Warriner et al. 1986). Snowy plover females may abandon chicks as young as 6 days old to find another mate leaving the male to care for the brood (Warriner et al. 1986). Males attend the young for 29-47 days (Warriner et al. 1986) and then may renest with a new partner if sufficient time remains in the season (Stenzel et al. 1994). This results in a serial polygamous breeding system in which males may double clutch and females may triple clutch.

Both unpaired males and pairs defend territories against conspecifics by posturing, chasing, or fighting (Page et al. 1995). On the California coast, unpaired males defend territories for up to 45 days before procuring a mate (Page et al. 1995). Paired birds use territories for courtship, nest sites, and sometimes feeding (Page et al. 1995). On the central California coast, territories were less than 0.5 ha at a salt pan, but probably larger on the beach (Warriner et al. 1986). Nests documented within a symbolically fenced polygon on the NASNI recreational beach occurred at a density of approximately 1 per 1.5 acre (based approximations of 2004 nesting area ((approximately 3.0 acres)). Nests documented on the NAB beach occurred at a maximum density of 1 nest per 7.3 ha (1.8 acre) (Orange 2), when calculated by number of nests per training lane. The density estimate calculated for the Navy training lane Orange 1 may be affected by training activities and by the proximity of California least terns, which nest adjacent

to snowy plovers on this beach. The estimate does, however, fall within the recorded range of densities for this species. In other parts of North America, estimated snowy plover nesting density has ranged from 0.1 ha (Great Salt Lake, based on nearest neighbor distances), to .5 ha on the salt pan, with larger territories on the beach (Warriner, 1986), to a mean of 0.5-1.0 ha (2 Great Plains sites; Boyd 1972, Grover and Knopf 1982). Broods rarely remain within the nesting territory (Warriner et al. 1986), but the male may lead the brood to a brood territory, which can range from 2-3 acres (Fancher, 2003). Birds are able to fly within approximately 31 days of hatching.

Snowy plover adults and young forage on invertebrates along intertidal areas, along beaches in wet sand and surf cast kelp, in foredune areas of dry sand above the high tide, on salt pans, and along the edges of salt marshes and salt ponds. Page et al. (1981) observed snowy plovers moving between salt pans, tidal flats, and beaches indicating these areas function together in providing habitat for the species.

Human disturbances which have a detrimental effect to nesting snowy plovers include unintentional disturbance and destruction of eggs and chicks that may occur during off-road vehicle use, horse-back riding, and beach raking. Intensive beach use by humans has resulted in abandonment of nesting sites, and reductions in nesting density and nesting success, although coupled with positive management, some colonies have increased in size despite concurrent human use of nesting beaches (Service Biological Opinion 1-03-F-3452.1).

Human disturbance can interfere with normal snowy plover behavior. Disturbances to incubating adults can leave nests exposed to extreme temperatures resulting in non-viable eggs or blowing sand which buries the eggs. Snowy plover chicks which are separated from their attending adult as a result of human disturbances or predators may become more susceptible to hypothermia since young chicks are unable to thermoregulate. It has been shown that increased human disturbance forces piping plover chicks (*Charadrius melodius*), an East coast species with habitat requirements very similar to the snowy plover, to expend more energy avoiding disturbances and less time foraging (Fleming et al. 1988). Frequently disturbed piping plover chicks fed less often and at a reduced rate with fewer chicks surviving to 17 days in areas heavily disturbed by humans (Fleming et al. 1988). Proximity of snowy plover nests to segments of infrequently disturbed beach, combined protection of the nest site, may offset the effect of disturbance adjacent to nest sites. For example, plovers continue to successfully nest at NAB (where nest site protection is employed, and nest sites are adjacent to protected beach segments) despite adjacent disturbance associated with training activities. At NAB, the Navy has protected a buffer around nest sites to preclude trampling or vehicular disturbance, and has also protected larger stretches of adjacent beach from training activities. In addition, training activities at NAB are sometimes intermittent, when compared to the daily disturbances associated with many recreational beaches. The combination of nest protection with reasonably close proximity to relatively undisturbed foraging area has allowed plovers to succeed, despite ongoing training close to nesting birds.

Captains Alexander and Gonzales (FWS-SDG-3908.3)

Areas that receive significant off-road vehicle activity support lower densities of plover nests (Page and Stenzel 1981). Powell and Collier (1994) reported a shift in beach usage by snowy plovers from areas of heavy vehicular traffic to more protected sites. Direct mortality to snowy plovers as a result of vehicular activity on beaches has been documented (Persons 1994, Copper 1997). Research has shown a decrease in piping plover chick survivorship with as little as 10 vehicular passes per day (Melvin et al. 1994). Snowy plovers, especially the flightless young, are particularly vulnerable to being run over or trampled since crouching in depressions, such as footprints and tire tracks, appears to be a behavioral characteristic (James et al. 1992).

Coronado, including NASNI, NAB, and Silver Strand State Beach, is a key snowy plover nesting area within San Diego County. In addition, potentially suitable, but currently unmanaged, habitat occurs on the Coronado city beach (owned by the State Lands Commission).

Table 4. NASNI Plover Nests and Pairs. Data Collected by Biologists under Contract with Navy.

	NI Beach				**NI Airfield**				**NI - All Sites**
Year	Max. Act. Nests = pairs	nests/ broods	nests hatching young	Nest Hatching Rate	Max. Act. Nests = pairs	nests/ broods	nests hatching young	Nest Hatching Rate	Max. Act. Nests = pairs
1999	0	0	0	0	0	0	0	0	0
2000	2	4	4	100%	0	0	0	0	2
2001	5	13	12	92%	0	0	0	0	5
2002	12	26	20	77%	0	0	0	0	12
2003	4	12	9	75%	10	10/9	19	0%	13
2004	6	13	10	77%	8	23	15	65%	12

Factors likely to have affected nest distribution: soil cement of airfield (1998-1999) ;beach raking; presence/absence of guard at dog beach; fence at dog beach; lifeguard activity; provision of protected areas; soil cement of ovals (2004)

The goal to achieve the long-term survival and recovery of the Pacific coast snowy plover population, as identified in the *Western Snowy Plover, Pacific Coast Population, Draft Recovery Plan*, includes three criteria: (1) maintain for 10 years an average of 3,000 breeding adults distributed among six recovery units (e.g., Recovery Unit 1 Washington and Oregon, 250 breeding adults; and in California, Recovery Unit 2 Del Norte to Mendocino Counties, California 150 breeding adults; Recovery Unit 3 San Francisco Bay, California 500 breeding adults, Sonoma to Monterey Counties, California 400 breeding adults, San Luis Obispo to Ventura Counties, California 1,200 breeding adults, and Los Angeles to San Diego Counties, California 500 breeding adults); (2) maintain a five-year productivity of at least one fledged chick per male in each recovery unit in the last five (5) years prior to delisting; and (3) establish participation plans among cooperating agencies, landowners, and conservation organizations to assure protection and management of breeding, wintering, and migration areas listed in "Appendix B: Information on Snowy Plover Breeding and Wintering Locations" to maintain the subpopulation sizes and average productivity specified in criteria (1) and (2) above (Service 2001). The draft Western Snowy Plover Recovery Plan includes a management objective of 20 snowy plover adults at NASNI.

ENVIRONMENTAL BASELINE

Regulations implementing the Endangered Species Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area on listed species and/or critical habitat. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions that are contemporaneous with the consultation in progress relative to listed species and/or critical habitat.

Coronado beach has historically been used for nesting by snowy plovers. The first records that indicate snowy plover use of Coronado and Silver Strand beaches include several specimens currently housed at the San Diego Natural History Museum (Phil Unitt, pers. comm.). Western snowy plovers historically used the beaches of Coronado and the Silver Strand during the breeding season as well as during the non-breeding season. The San Diego Natural History Museum has one snowy plover specimen collected from the Strand in the spring of 1918, one specimen collected from Coronado in April 1926, as well as eggs collected at the Strand in 1921 and from Imperial Beach in 1928. The LA County Museum houses 2 western snowy plover skins (one male and one female taken on the same day) collected on May 27, 1899 on "Coronado Beach". While the collection location of these specimens is not precise enough to allow us to determine if they were within the boundaries of NASNI, it is likely, given these records and the habitat affinity of western snowy plovers, that plovers historically nested on NASNI. Snowy plover pairs were also reported by L. E. Stenzel and S. C. Peaslee on the Silver Strand in May 1978, as part of an extensive study of the distribution and ecology of the species through California (Page and Stenzel 1981).

Habitat for snowy plovers remains intact on the NASNI beach, although the level of human, domestic pet and predator disturbances may sometimes preclude nesting. In addition, snowy plovers have historically used areas on/adjacent to the NASNI runway for nesting habitat.

Snowy plovers went largely undetected on NASNI for many years, although chicks observed on the beach were sometimes from unidentified nest sites (Martin Kenney, pers comm.). Based on previous nesting records from the MAT site, and more recent observations of snowy plovers utilizing NASNI, it is possible that snowy plovers were nesting on NASNI with more frequency than documented during the 1980s and 1990s.

Ovals lying between the NASNI runways and taxiways were resurfaced in 1998 and 1999 (Martin Kenney, pers. comm. 2005). No information is available regarding species abundance and distribution on the airfield at that time; however snowy plovers were not documented during Wildlife Hazard Assessment surveys conducted in 1996. Subsequent to the airfield resurfacing project, and concurrent to a hiatus in beach raking on the NASNI beach, two (2) pairs of snowy plovers nested on the NASNI beach in 2000.

Beach raking to beautify the recreational beaches of NASNI was initiated in 2002. Since that time, the extent of beach raking on the NASNI beach is unclear. There are no maps or beach signage available that delineate the area that is raked. Beach rake operators are instructed to avoid snowy plover nest sites that are marked with blue cones.

The NASNI runways were resurfaced in 2004 and are subject to frequent aircraft takeoffs and landings. The substrate and frequency of aircraft passage make nesting directly on the runways unlikely; however, based on the distribution of snowy plovers at NASNI, the median areas adjacent to taxiways and runways have deteriorated and now support small patches of suboptimal, but appropriate nesting habitat for snowy plovers. Small amounts of sand collect in depressions in the stabilized surfaces of this area and the area is relatively free of predators due to implementation of the BASH program. The relatively low level of human/predator disturbance combined with the flat terrain of the area, patches of appropriate substrate, and proximity to ocean beaches, have made the area an attractive nesting area for an estimated 8 plover pairs in recent years.

Lighting was installed at the end of Runway 18/36 in 2004 to improve runway visibility. As part of this project, lights were added to the beach area at the end of Runway 18/36. The beach area where runway lights were installed includes the area at the western end of the NASNI beach identified as potential snowy plover mitigation area in the Naval Base Coronado Integrated Natural Resources Management Plan, and is immediately adjacent to a snowy plover nest site used in 2004.

Although the overall number of snowy plover pairs has remained constant over the last four years, the number of snowy plovers nesting on the airfield appears to have increased concurrently with a decrease in nesting pairs located on the NASNI beach. It is possible that birds have may shifted nesting locales, which could have occurred in response to increased disturbance on the NASNI beach, improved substrate conditions associated with deterioration of the soil cement on the airfield, and decreases in predator abundance on the airfield associated with the BASH program.

The number of snowy plover nests at NASNI increased from 13 nests in 2001 to 26 nests in 2002, 31 nests in 2003, and 36 nests in 2004. The number of snowy plover pairs nesting on NASNI, however, is less than the number of nests constructed each year since the snowy plovers may re-nest after successful and failed nesting efforts (Table 2). An increasing number of nests are an indicator of an increase in the number of birds and/or an increase in the number of nesting attempts. In some instances, a significantly higher number of nests can be produced to compensate for a high nest failure rate. Approximately 12-14 pairs of plovers, based on the number of simultaneous active nests, used NASNI in 2003 and 2004. The distribution of nests has shifted, potentially in response to increasing disturbance on the NASNI beach, decreasing levels of disturbance and predation on the airfield, or a combination of these and other factors.

Table 2. Snowy plover numbers on NASNI. 2000-2004.

Year	Pair Estimate (simultaneous nests)	Fledglings	Productivity-fledglings/pair	Nests on beach (hatching success)	Nests on airfield (hatching success)
2000	2	10	5.0	4 (n.a.)	0 observed
2001	5	7-10	1.4-2.0	13 (.92)	0 observed
2002	12	15	1.2	26 (.77)	0 observed
2003	13	22	1.69	12 (.75)	10 (1.0) 9 addtnl broods
2004	12	6-8	.5-.66	13 (.77)	23 (.65)

The runway oval adjacent to the southeast end of Runway 18/36 was resurfaced with soil cement in 2004 during the snowy plover breeding season. Whereas in the previous year (2003) 10 pairs of snowy plovers had nested in this runway oval, during and after the application of soil cement, only 1 to 3 pairs attempted to nest in this oval; about 5-7 pairs nested elsewhere on the airfield. Four nests were initiated adjacent to the De-Arming Area and all successfully hatched. One nest was initiated adjacent to Compass Rose. The nest was marked, but was run over during routine use of this area. It appears that modifying the portion of the airfield where nests had been constructed may have shifted the nest distribution to other areas of the airfield. It is likely that all plovers that nested in habitat patches scattered across the airfield in 2004 had previously been nesting within a 26-acre area within the oval (approximate density of 1 plover/ 1.04 ha (2.6 acres)).

The NASNI BASH Program was initiated in response to three separate bird/ aircraft collisions two of which involved flocks of gulls, and one of which involved a great blue heron. In 1996, the USDA National Wildlife Research Center completed a Wildlife Hazard Assessment for NASNI, as required under Title 14 Code of Federal Regulations (CFR), Part 139 and OPNAVIST 3750.6Q. The primary threat to aircraft identified in this document was identified as gulls (Genus *Laridae*), great blue herons (*Ardea herodias*), cormorants (Family Phalacrocoracidae), coots (Family Rallidae), ducks (Family Anatidae) and red-tailed hawks (*Buteo jamaicensis*). The large number of gulls observed using the airfield during the Wildlife Hazard Assessment may have precluded the presence of smaller nesting shorebirds.

The BASH program is currently designed to reduce the presence of potential avian hazards on the airfield by eliminating attractants, harassing birds with pyrotechnics, and, as a last resort, removing birds using lethal means. A primary objective of the current BASH program is to reduce the presence of avian species on the airfield, and reduce the number of birds removed by lethal means each year for the life of the program.

Relationship of Snowy Plovers in the Action Area to Rangewide Conservation of the Species

Because habitat availability is a significant limiting factor to the snowy plover, all extant and occupied habitat, including that found on NASNI, is of importance to the survival and recovery of the species. NASNI contains one of only six (6) areas in Recovery Unit 6 that are currently know to support snowy plovers (Bolsa Chica, Camp Pendleton, Batiquitos, NASNI, Silver

Strand, Tijuana National Wildlife Refuge). The snowy plover group that is using NASNI, however, (estimated 12-14 pairs, using maximum observed active nests) is small (approximately 1 %) when compared to rangewide numbers. Snowy plovers on NASNI represent approximately 10 percent of the 2004 estimated number plovers in San Diego County. The draft Western Snowy Plover Recovery Plan identifies a management goal of 20 adult snowy plovers on NASNI, which is likely close to the number of adults currently using the base. Continued management of the existing number of snowy plovers using NASNI is consistent with the recovery goals identified for the species.

EFFECTS OF THE ACTION

Western Snowy Plover

The proposed action is likely to: (1) reduce the availability of nesting habitat in the San Diego Bay area by an undetermined acreage; (2) adversely modify the breeding behavior of approximately 8-10 pairs of snowy plovers in 2005; (3) adversely affect reproductive success and/or snowy plover distribution (and possibly abundance) on NASNI; (4) preclude successful plover nesting on portions of the NASNI beach, but facilitate successful plover nesting in a limited area; (5) result in chick loss on NASNI beach and (6) result in an undetermined number of snowy plover fledglings for release into the San Diego Bay population.

Airfield Operations

Proposed airfield operations, including the BASH program, would eliminate the availability of the airfield for plover nesting due to substrate modification, harassment, and potential nest collection on the airfield. The reduction in actual plover habitat is not measurable, since much of the airfield contains substrate inappropriate for plover nesting. The patches of potential habitat are small and discrete, and are contained within a larger area. Based on the number of simultaneous nests for the past two years, approximately 8-10 pairs of western snowy plovers are using the airfield as nesting habitat, and would be adversely affected

Proposed airfield operations, including the BASH program, would likely result in repeated instances of flushing snowy plover adults that frequent the airfield, which may adversely affect individual adult snowy plovers since short flights are energetically costly for small birds (Nudds and Bryant 2000), and shorebirds unsuccessful in gaining necessary fat reserves have low survival rates (Brown et al. 2000). Removal of nests may result in repeated failed nesting attempts, and an overall reduction in reproductive success of snowy plovers at NASNI. If nest sites have been physically altered to discourage plover nesting, additional energetic expenditure will be required to locate new territories/nest sites. Plovers may attempt to re-nest close to their original nest site, or at more distant locations. If re-nesting attempts occur repeatedly on the airfield, a redistribution and increase in the number of nests on the airfield may occur. Alternatively, if sufficient suitable habitat is available, snowy plovers may attempt to nest or re-nest on the adjacent NASNI or Coronado Beaches following harassment or nest loss on the airfield. It is also possible that snowy plovers will attempt to nest or re-nest farther from NASNI

following harassment or nest collection. If plovers nest/re-nest at a more distant locale, the closest and most likely nesting location is the Silver Strand. Based on this assessment, we anticipate that the proposed program could result in an overall increase in nest attempts (including collected nests) on Naval Base Coronado, and a decrease in nest success.

To successfully deter plovers from nesting on the airfield with minimal impact to snowy plovers would be best achieved by providing appropriate conditions for nesting (i.e., appropriate substrates in flat terrain close to the water with minimal disturbances) as close as possible to the airfield where they have been recently nesting. If appropriate conditions are available for nesting close to the airfield while deterrent efforts are in effect, it is likely that plovers will choose to nest away from the airfield and associated disturbance. Appropriate substrate that could be augmented to attract snowy plovers is available close to the NASNI airfield on the NASNI recreational beaches, adjacent to the pistol range, and at the southern end of the airfield adjacent to Moffet Road. The southwestern end of the NASNI beach, towards Zuniga jetty, has suffered from sand loss associated with winter storms, and is largely unavailable due to tidal inundation (personal observation).

Although the NASNI beach may be of sufficient size to support the snowy plover population that is utilizing NASNI, most of the beach is subject to potential disturbances from recreational use, training, and beach raking (as discussed under beach activities). The area proposed for protection from foot and vehicle disturbance under the proposed management strategy (approximately 7 acres) appears to be insufficient to provide nesting territories for the 12-13 plover pairs currently using NASNI, based on our understanding of plover territory sizes and spacing. If conditions conducive to nesting are not available, plovers may continue to try and nest on the airfield and are likely experience reduced reproductive success.

Beach Activities

All of the NASNI beach areas where plover nests were established in 2002, 2003, and 2004 would be subject to training activities in 2005. Most of the NASNI beach is also available for recreation, and the adjacent lodging facility at the Navy Lodge provides additional access and visitor supply to the beach. Portions of the NASNI beach would be subject to beach raking. The ongoing use of the NASNI beach may result in harassment of western snowy plovers during the nest initiation stage of the breeding cycle. Beach raking may destroy scrapes and discourage nesting, and may affect prey availability (Dugan et al. in litt). Foot and vehicle traffic and presence of dogs on the beach may disturb birds that would otherwise nest on the beach. Once nests are initiated, designation and marking of a protected buffer zone around each nest reduces the potential for crushing of eggs, however chicks may be subject to the adverse effects of foot and/or vehicle traffic post-hatch, as they disperse from the nest soon after hatching. Greater than expected rates of chick loss during periods of human beach use have been observed in studies conducted in central California and suggest that human use of beaches influences snowy plover chick survival (Ruhlen T.D. et al.). The buffer zone protected around each nest would provide some protection for chicks for approximately one-week post-hatch, since males often lead their

chicks to less disturbed sites and may use the buffer as a refuge area for chicks if significant vehicle and foot traffic is occurring in the area.

Foot traffic and recreational use of the western end of the NASNI beach is discouraged, which should encourage snowy plover use of this beach segment, however this portion of the beach has suffered sand loss associated with winter storms and is quite narrow. The narrow beach is backed by a steep berm, subject to tidal inundation, and is used less frequently by snowy plovers than the broader, more central areas of the beach. An additional area that was originally augmented to support snowy plovers in 1996, was again prepared (i.e. cleared of vegetation) in 2004 to partially offset the loss of nesting opportunity in 2004. This (approximate) 4.13-acre area would be cleared again in 2005 and should be subject to less human impact, thereby providing a small off-airfield nesting opportunity for snowy plovers. Another small beach segment in front of the Navy Lodge has been marked with stakes/signs in past years to encourage beach users to avoid the area and thereby provide a reduced disturbance area conducive to snowy plover nest initiation. This area would again be marked to encourage human avoidance of the area. Most of the NASNI beach, however, would remain subject to foot traffic until successful nest initiation and placement of markers to provide a (voluntary) buffer around the nest. For the above reasons, implementation of the proposed action is likely to result in successful plover nesting on only a small portion of the NASNI beach.

Limitation of Snowy Plover Population size on NASNI

The proposal to directly remove nests or eggs in areas outside of the airfield constitutes a take that is prohibited under section 9 of the Act and would likely result in reduced reproductive success of snowy plovers on NASNI. Removal of nests or eggs outside of the airfield boundaries may also contribute to continued nesting attempts within the airfield boundaries, as plovers would likely nest in the area of least disturbance. This proposal does not meet the regulatory definition of incidental take, therefore such take can not be exempted under section 7 of the Act under circumstances where section 7(a) (2) is not violated. Direct take can be authorized under a permit issued by the Service under section 10(a)(1)(a) of the Act, provided specific criteria, pertinent to recovery, are met.

Captive Rearing Effort

If harassment and deterrent efforts are not entirely successful and snowy plovers nest on the airfield, the Navy proposes to remove nests/eggs from the airfield and, ideally, bring them to Project Wildlife for incubation, rearing, and release. Previous efforts to hatch and rear plovers in captivity have met with mixed results. Locally, and at the facility proposed for use during the 2005 season, a hatching rate of 56 percent (n=24/43) was recorded for eggs collected in 2004 (compared to a hatching rate of approximately 75% on NASNI). The low hatching rate may be due in part to the condition of eggs that have been brought into captivity. Eggs have been brought to the facility for a variety of reasons, including incompatibility with military activities and salvage. Some eggs may have been compromised prior to arriving at the facility. Of the eggs brought into captivity, 18 (42 percent) were released. Despite the low hatching rate

observed in 2004, a higher hatching and fledging rate is possible, based on work elsewhere and on similar species (Gary Page, Anne Hecht, pers. comm.). A hatching rate of 82% of the eggs incubated in captivity and a fledging rate of 87% of chicks in captivity has been observed in efforts to raise and release piping plovers along the Missouri River (response to comments, Army Corps EIS). The effort to hatch, rear, and release chicks produced from eggs laid on the airfield will likely result in a small, but measurable reduction in the adverse effects of egg removal.

Overall, the proposed action would adversely affect plover abundance and distribution during 2005 on NASNI, which represents a small portion of the species range. Although the plover numbers found on NASNI are a small percentage of rangewide numbers, the installation currently supports a significant portion of the San Diego Bay population and supports habitat important to survival and recovery of the species. Since loss of habitat is the primary threat to this species, and suitable habitat is at a premium, NASNI remains an important but small segment of the rangewide population. With implementation of the proposed action, fewer plovers are likely to successfully nest at NASNI in 2005, but a smaller population is likely to nest along NASNI beaches, and at least 42 percent of the eggs collected on the airfield are likely to survive and the young released into the wild population during the summer of 2005.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future non-federal (State, tribal, local, or private actions) activities 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 consultation pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended. We anticipate that non-Federal actions, such as the prevalence of contaminants in San Diego Bay waters associated with certain marine activities (e.g., marinas and shipyards), the continued development of nearshore ocean and bay waters for commercial and recreational purposes, and the disturbance of nesting areas by humans and feral mammals, are expected to cumulatively contribute to adverse effects to the snowy plover. These effects magnify the importance of secure, well-managed sites for the snowy plover.

CONCLUSION

After reviewing the current status of the western snowy plover, the environmental baseline for the action area, effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the western snowy plover. We draw this conclusion for the following reasons:

1. Based on the minimum plover population estimated for NASNI, approximately 12-14 pairs of western snowy plovers are likely to be affected by the proposed action. This represents approximately one (1) percent of the rangewide population, based on the best available information.

2. The proposal to harass the plovers within the airfield boundaries may result in modified distribution within the boundaries of NASNI, if sufficient suitable and undisturbed habitat is available for nesting. If plovers nest on NASNI, but outside of the airfield boundaries, nests would benefit from the ongoing predator management program and from conservation measures designed to protect nest sites. If plovers are able to initiate nests on the NASNI beach, it is likely that they would experience reproductive success similar to that which has been observed on the airfield over the last two years.

3. The Navy proposes to continue a comprehensive predator management program and protect a limited area on NASNI that is likely to provide conditions suitable for reproduction for a small number of snowy plovers.

4. With implementation of the proposed action, plover abundance and distribution will be adversely affected at NASNI during 2005 in a manner that will not promote the recovery of the species because it is unlikely that a breeding population on NASNI will be present at levels prescribed in the draft Western Snowy Plover Recovery Plan. However, survival of the species overall is not likely to be significantly affected because at least a few pairs of plovers are likely to successfully breed along NASNI beaches and at least 42 percent of the eggs collected on the airfield are likely to survive and the young released into the wild population during the summer of 2005.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations issued pursuant to section 4(d) of the Act prohibit take of endangered and threatened species without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing potential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral 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, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2) of the Act, such incidental take is not considered to be a prohibited taking under the Act, provided that such taking is in compliance with this incidental take statement.

The measures described below are nondiscretionary and must be undertaken by the Navy so they become binding conditions of any permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity covered by this incidental take statement. If the Navy (1) fails to adhere to the terms and conditions, (2) fails to require the enforceable terms that are added to the permit, and/or (3) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impacts of incidental take, the Navy must report the

progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

Amount or Extent of Take Anticipated

Based on our discussion in the effects analysis, we anticipate the following take may occur on the airfield and training beaches at NASNI in the form of harm or harassment.

(1) We anticipate that all western snowy plovers that frequent the NASNI airfield may be subject to harassment during efforts to prevent nest construction on the airfield. Efforts to deter nesting may result in failed nesting attempts or abandonment of the area. Based on the population estimates for NASNI up to 10 pairs of western snowy plovers could be subject to harassment if these individuals are on the NASNI airfield.

(2) We anticipate that up to 10 snowy plover nests (30 eggs), if laid within the boundaries of the NASNI airfield, would be subject to capture (collection, incubation, captive rearing, and release). We expect the number of nests that occur on the airfield to be minimized by efforts to prevent nesting on the NASNI airfield. Furthermore, we anticipate that at least 42 percent of the eggs collected will survive to be released into the wild population during the summer of 2005.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the impact of incidental take anticipated in this biological opinion on least tern and snowy plover.

1. The Navy must implement the Proposed Avoidance and Minimization Measures subject to modifications described below, to increase the measures' effectiveness in avoiding and minimizing impacts of incidental take.

2. The Navy shall protect sufficient area from disturbance at an off-airfield site(s) to encourage snowy plovers that currently inhabit NASNI to initiate nesting efforts outside of the airfield boundaries. This measure is necessary to reduce the impact of incidental taking by providing alternative nesting habitat off the airfield

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Endangered Species Act, the Navy must ensure that their military personnel, including all agents and contractors anticipated herein, comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline the required reporting/monitoring requirements. These terms and conditions are non-discretionary.

To reduce the impact of harassment from the NASNI airfield, the Navy shall provide conditions conducive to nesting for the approximately 12-14 pairs of plovers that have nested on NASNI since 2002. Based on plover densities at NAB, densities cited in the Birds of North America species account, and the density of plovers that have previously nested on the airfield and in the protected area in front of Building 710, plovers nest territories occupy area ranging from .5 to 1 ha (1.2-2.4 acres/pair). Approximately 14.4-33.6 acres of undisturbed habitat is likely necessary to encourage breeding behavior and nest initiation by the 12-14 pairs of plovers breeding at NASNI. Using the minimum territory size estimate (1.2 acres pair), and the maximum pair estimate (14 pairs), 16.8 acres of undisturbed habitat should be adequate to provide conditions conducive to nesting for the breeding plovers at NASNI. The beach area at NASNI, most notably the western end of the beach, is limited in size/width due to unusually high tides, storms, and beach erosion during 2005 and is unlikely to support successful plover nests. Accordingly, to the Navy shall:

a. protect (from foot/vehicle traffic) and symbolically fence (using staking and signage) at least 16.8 acres of appropriate plover habitat (measured above the mean high tide line) in the vicinity of the airfield (including beach and/or upland areas) from disturbance from at least March 1 to August 15. This acreage may include the area west of the pistol range, and the marked area directly in front of Building 710.. Although Zuniga Beach once comprised an area of approximately 15 acres, it is currently very narrow due to sand loss associated with winter storms, and may not be considered as part of the protected habitat since it is unlikely to support successful plover nests.

Protection of 16.8 acres of plover habitat should allow conditions conducive to nesting for snowy plovers on NASNI at the existing population size, consistent with the management objectives identified in the Draft Western Snowy Plover Recovery Plan. Disturbance minimization should encourage snowy plovers to use areas off of the airfield rather than continue to nest on the airfield and increase the success of BASH efforts to clear the airfield. The Navy shall work with the Service to identify the location of appropriate habitat for protection that meets the conservation needs of the species and minimizes impacts to Navy activities. We recommend protection of a combination of habitat polygons identified on Attachment 1 (that meet or exceed 16.8 acres) as a means of providing adequate nesting habitat while minimizing impacts to recreational use of the beach.

b. The Navy shall discontinue vehicle use on the NASNI beach except in instances where vehicle use is conducted as part of military training or for health and human safety needs. If lifeguards require vehicle use, they shall be educated about the snowy plover biology and conservation needs on NASNI.

c. The Navy shall prohibit dogs from the NASNI beaches from March 1 to August 15 and direct dog owners to use the adjacent, Navy-owned Dog Beach for pet walking.

c. The Navy shall discontinue raking on the NASNI beach from March 1 to May 31 and minimize the frequency and extent of beach raking on the NASNI beach during the remainder of the breeding season. This will allow a window of reduced beach disturbance to improve conditions for snowy plover nest initiation and reduce the impacts of harassment and deterrent from the adjacent airfield. The Navy shall assure that the rake operator is aware of the temporal and geographic limitations on beach raking and mark or map the area designated for raking. The Navy shall assure that the NASNI Natural Resources Office and the Carlsbad Fish and Wildlife Service Office are notified of the raking schedule and the boundaries of the area that is proposed for raking.

d. The Navy shall contact the Service and report the circumstance that necessitates movement of any plover nest. This will be done with submittal of the Navy's weekly reports to the Service. If relocation is necessary, nests moved shall be relocated the shortest distance possible into suitable habitat within the boundaries of NASNI to increase the chances for nest success.

e. The Navy shall implement a comprehensive biological monitoring program that ensures the identification of snowy plover nesting locations and the overall number of adult breeding pairs and fledglings produced on the NASNI beach. The Navy shall prepare reports for the Service at a minimum of twice a month. In addition, the monitoring results shall be submitted to the Service when a draft report for 2005 least tern and snowy plover breeding season is received by the Navy. The biological monitors shall also include in their report: (a) an evaluation of the effectiveness of the 30-meter buffer surrounding each snowy plover nest and the wooden stakes or tongue depressors used to mark least tern nests; (b) when the first adult birds arrive, number and location of nests, number of individual nests, estimated number of fledglings produced, number of relocated nests, success of all relocation efforts, level of incidental take associated with training at NASNI, and when discernible the amount and type of predation events that occur; (c) an evaluation of the success of the 4.13 acre site that was enhanced adjacent to the rifle range in 2005; (d) when possible, any observations of captive-reared plovers or least terns in the wild, especially as relating to the condition and survival of these birds (e.g., data on the interaction of fledglings with wild least terns or snowy plovers, foraging behavior of captive birds compared to wild birds, mortality and cause of death of captive birds when it can be determined, and locations where captive-reared least terns are observed); and (e) the interactions of gull-billed terns and peregrine falcons with least tern and snowy plover nesting colonies.

2. To implement reasonable and prudent measure two, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

Captains Alexander and Gonzales (FWS-SDG-3908.3)

1. To implement reasonable and prudent measure one, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

The Navy shall implement the Avoidance and Minimization Measures in the "Description of the Proposed Action" above, subject to the following modifications:

a. Stakes that delineate plover nests shall remain in place for 7 days post-hatch or as long as plovers are detected within 15 meters of the staked area during monitoring visits to provide refuge from foot/vehicle traffic to plover chicks on the beach and to protect the nest, in the event of re-use. The Navy shall place a Mammalian Exclosure/ Mini Exclosure (ME) over plover nests on NASNI in such instances where an ME would potentially benefit the nest/ nesting pair. This may be necessary to protect nests from gull-billed tern predation, dogs, or other mammalian predators. Placement of an ME may also help reduce the potential for inadvertent destruction from foot traffic. This term and condition modifies the current proposal for maintaining protective stakes for 7 days post-hatch.

b. The Navy shall assure that the future hatching, fledging and release potential of any eggs collected from the NASNI airfield will be conducted in a manner and with sufficient resources and oversight to maximize the likelihood of success. In so doing, the Navy shall assure that Project Wildlife, or other cooperators, as necessary, are supplied with adequate resources to successfully implement this term and condition. Collection of eggs shall occur after the clutch is complete (typically after 3 eggs are laid), except in a circumstance where an incomplete clutch poses an immediate and imminent threat to aircraft safety. Eggs shall be collected and moved in a brooder box, or other suitable means that will maximize potential for success, by a qualified professional contracted by the Navy (Zoological Society of San Diego). Incubation, rearing, and release of fledglings shall follow previously successful protocols (see Page 1989). All fledglings released shall be uniquely banded to allow future identification and assessment of success. Release of fledglings shall occur soon after fledging when fledglings have developed feeding and flight skills necessary for survival. Release of fledglings shall be planned for beach segments near San Diego Bay or Mission Bay in areas that benefit from predator management, or have low documented levels of predation. The Navy shall not preclude the release of chicks on lands administered by NBC if these sites evidence the lowest levels of predation and maximum opportunities for survival for snowy plover chicks. The Navy shall prepare an end of the year report that documents, at a minimum, the locations of nests collected, number of nests/eggs collected, the hatch date of each egg collected, the unique band combination given each captive-reared chick, the approximate fledging date and the release date/location of each fledgling, and suggestions to improve the efficacy of this process if used in future years. This information is necessary to assess the amount of incidental take, and the effectiveness of using this approach to minimize impacts.

The Service believes that no more than the anticipated incidental take for least terns and snowy plovers identified above will result from the proposed action. The reasonable and prudent measures, with the implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Navy must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

If 50 percent of the anticipated take to snowy plover nests is reached, we recommend that the Service and the Navy meet to discuss the potential for reaching the incidental take limits set in this biological opinion. At such a meeting we could identify other appropriate conservation measures that may prevent reaching the incidental take limit, and could begin the process to modify the incidental take statement, if appropriate. Such a meeting would help reduce the potential for disruption to training that could occur should the incidental take limits be reached.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act 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.

a. The Navy should explore the potential for dune restoration of the dune area north/east of the recreational beach. Such restoration may provide additional habitat for snowy plovers that would not be in conflict with recreational beach use.

b. The Navy should experiment with the application of shade cloth or other visual deterrent to the lower segment of the fence that separates the Navy beach from Dog Beach. Providing a visual barrier between the Navy beach and Dog beach may make this segment of Navy beach more attractive to plovers for nesting.

c. The Navy should work with the Service to develop a comprehensive conservation strategy for Snowy plovers on Naval Base Coronado that is consistent with the recovery objectives for the species. This strategy is needed to address the conservation needs of the snowy plover in the face of increasing use intensity on NASNI and surrounding areas. A comprehensive strategy to address snowy plover conservation needs should be included in the next iteration of the Naval Base Coronado Integrated Natural Resources Management Plan.

Captains Alexander and Gonzales (FWS-SDG-3908.3)

REINITIATION NOTICE

This concludes formal consultation on the Military Training Operations on the Silver Strand Naval Facilities. 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 if exceeded; (2) new information reveals effects of the proposed 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 listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this biological opinion, please contact Sandy Vissman of this office at (760) 431-9440 extension 274.

Sincerely,

Therese O'Rourke
Assistant Field Supervisor

Attachment

LITERATURE CITED

Atwood, Jonathan L. and D.E. Minsky. 1983. Least tern foraging ecology at three major California breeding colonies. West. Birds 14(2):57-72.

Atwood, Jonathan L. and P.R. Kelly. 1984. Fish dropped on breeding colonies as indicators of least tern food habits. Wilson Bull. 96(1):34-47.

Atwood, Jonathan L. and B.W. Massey. 1988. Site fidelity of least terns in California. Condor 90(2):3 89-394.

Bailey, Stephen F. 1984. California Least Tern Foraging and Other Off-Colony Activities Around Alameda Naval Air Station during 1984. Unpublished report. Dept. of Ornithology and Mammalogy, California Academy of Sciences, Golden Gate Park, San Francisco, CA.

Brown, S., C. Hickey, and B. Harrington (eds). 2000. The U.S. Shorebird Conservation Plan. Manomet Center for Conservation Science, Manomet Massachussetts.

Brunton, D. 1999. "Optimal" colony size for least terns: an inter-colony study of opposing selective pressures by predators. Condor 101:607-615.

Caffrey, Carolee. 1993. California Least Tern Breeding Survey 1992 Season. A report to the Calif Dept. of Fish and Game. Final report PG 93-11, 35pp.

California Department of Fish and Game. 2001. California least tern breeding pairs and fledgling production-2001 Draft.

California Department of Fish and Game. 2002. California least tern breeding pairs and fledgling production-2002 Draft. Included as Appendix A of this Biological Opinion.

Collins, Charles, K. Bender and D. Rypka. 1979. Report on the Feeding and Nesting Habits of the California Least Tern in Santa Ana River Mouth Area, Orange County. Report to Corps of Engineers, Los Angeles District.

Conkle, Tamara. 2003a. Information provided to Fish and Wildlife Service in the form of electronic messages and telephone conversations during March and April 2003 in response to questions raised by the Service during preparation of the biological opinion on military training operations conducted at NASNI, NAB, and NRRF.

Conkle, Tamara. 2003b. Beach lanes at NAB and NRRF and the Ocean Beach at NASNI-- A determination of acres within the ten beach lanes at NAB, the four beach lanes at NRRF, and ocean beach at NASNI. Prepared by Tierra Data Systems, Escondido, CA for the

U.S. Navy, Southwest Division, Naval Facilities Engineering Command, Natural Resources Team, San Diego, CA.

Copper, E. 1997. The status of the western snowy plover at Naval Amphibious Base, Coronado in 1995. A report for the U.S. Navy, Nay. Fac. Engr. Cmd. San Diego. Feb 1997. 30pp.

Copper, E. 1998. Unpublished information provided to the Service during informal consultation meetings with the Navy concerning military training on NAB ocean beaches.

Copper, E. 2002. Snowy plover summary-San Diego County. Table of snowy plover monitored breeding locations, nest numbers, estimated fledglings produced, estimated adult pairs (incomplete for all sites), and maximum active nest numbers (incomplete for all sites).

Copper, E. 2003. Submittal of report on work done in 2002 under Endangered Species Permit No. PRT-789254. Report summarizing the breeding season results of monitoring of California least terns and western snowy plovers at San Diego Navy sites in 2002 along with the egg-collecting data for 2002. Report submitted to U.S. Fish and Wildlife Service, Carlsbad, California.

Department of the Navy. 1998. Operations, Training and Maintenance Plan, Naval Amphibious Base, Coronado, California: An Implementation Plan to Balance Operations and Training with Natural Resource Protection Requirements. Jan 1998. 103 pp.

Department of the Navy and San Diego Unified Port District. 2000. San Diego Bay Integrated Natural Resources Management Plan.

Department of the Navy. 2002. Naval Base Point Loma Integrated Natural Resources Management Plan.

Department of the Navy. 2002. Naval Base Coronado Integrated Natural Resources Management Plan.

Department of the Navy. 2002. Naval Base San Diego Integrated Natural Resources Management Plan.

Department of the Navy. 2003. Information on military training operations conducted on the SSTC and NASNI. included as part of the Navy's April 4, 2003, letter requesting section 7 consultation pursuant to the Endangered Species Act.

Fancher, J. M. 1992. Population Status and trends of the California least tern. Transactions of the western section of the Wildlife Society. 28:59-66.

Fancher, J. M. 1998. Western snowy plover nesting at Bolsa Chica, Orange County, California 1997. A report of the U.S. Fish and Wildlife Service, Carlsbad Office. Jan. 1998. 21 pp.

Captains Alexander and Gonzales (FWS-SDG-3908.3)

Fancher, J. M., L. Hays, P. Knapp 2002. Western snowy plover nesting at Bolsa Chica, Orange County, California. A report of the U.S. Fish and Wildlife Service, Carlsbad Office. Dec. 2002. 23 pp.

Fleming, S.P., R.D. Chiasson, P.C. Smith, P.J. Austin-Smith, and RP. Bancroft. 1988. Piping plover status in Nova Scotia related to its reproductive and behavioral responses to human disturbance. J. Field Ornithol. 59(4):321-330.

James, R., J. Tutton, and D. Stadtlander. 1992. A survey of the western snowy plover on Camp Pendleton San Diego County, California. Fish and Wildlife Service report for the Marine Corps Base Camp Pendleton, Natural Resources Office. 19pp.

Lafferty, K.D. 2001. Birds at a Southern California beach: seasonality, habitat use, and disturbance by human activity. Biodiversity and Conservation 10: 1949-1962.

Massey, Barbara W. 1974. Breeding biology of the California least tern. Proc. Linn. Soc. N.Y 72:1-24.

Massey, Barbara W. 1988. California Least Tern Field Study 1988 breeding season. A report to the California Dept. of Fish and Game. Final report FG 7660. 22pp.

Massey, Barbara W. and J. L. Atwood. 1979-1985. Application of Ecological Information to Habitat Management for the California Least Tern. Annual report nos. 1-7. U.S. Fish and Wildlife Service, Laguna Niguel, CA.

Massey, Barbara W. and J. L. Atwood 1981. Second-wave nesting of the California least tern: age composition and reproductive success. Auk 98:596-605.

Massey, Barbara W., D.W. Bradley, and J. L. Atwood, 1992. Demography of a California least tern colony including effects of the 1982-1983 El Niflo. Condor 94:976-983.

Melvin, S.C., A. Hecht, and C.R. Griffin. 1994. Piping plover mortalities caused by off-road vehicles on Atlantic coast beaches. Wildl. Soc. Bull. 22:409-414.

Minsky, Dennis. 1984. A Study of the Foraging Ecology of the California Least Tern at Camp Pendleton, Season of 1984. Unpublished Report. U.S. Navy, Navy Facilities Engineering . Command., San Bruno, CA. 3lpp.

Nudds, R.L. and D.M. Bryant. 2000. The energetic cost of short flights in birds. Journal of Experimental Biology 203: 1561-1572.

Page, G.W. and L.E. Stenzel (eds.). 1981 The breeding status of the snowy plover in California. Western Birds 12(1): 1-40.

Captains Alexander and Gonzales (FWS-SDG-3908.3)

Page, G.W. , J.S. and J.C. Warriner, and P.W.C. Paton. 1995. Snowy Plover. In The Birds of North America, No. 154.

Page, G.W., L.E. Stenzel, W.D. Shuford, and C.R. Bruce. 1991. Distribution and abundance of the snowy plover on its western North American breeding grounds. J. Field Ornithol. 62(2): 245-255.

Page, G.W. 2002. Year 2002 Breeding season snowy plover survey of California coast. Table includes statewide breeding snowy plover numbers for 1991, 1995 (incomplete count), 2000, and 2002.

Patton, Robert T. 2002. California least tern breeding survey, 2000 season. California Department of Fish and Game, Habitat Conservation Planning Branch, Species Conservation and Recovery Program Report, 2002-03. Sacramento, CA. 24pp. + app.

Powell, A., and C. Collier. 1994. The status of Western Snowy Plovers (Charadrius alexandrinus nivosus) in San Diego County, 1994. Report to the California Dept. of Fish and Game and U.S. Fish and Wildlife Serv. 23pp.

Powell, A., B. Peterson, J. Terp. 1996. The status of western snowy plovers (Charadrius alexandrinus nivosus) at Camp Pendleton, 1996. A report for the Marine Corps Base, Camp Pendleton. 32pp.

Powell, A., J. Terp, C. Collier and B. Peterson. 1997. The status of Western Snowy Plovers (Charadrius alexandrinus nivosus) in San Diego County, 1997. Report to the California Dept. of Fish and Game and U.S. Fish and Wildlife Serv. 34pp.

Powell, A., J. Terp, C. Collier and B. Peterson. 1998. The status of Western Snowy Plovers (Charadrius alexandrinus nivosus) in San Diego County, 1998. Report to the California Department of Fish and Game and U.S. Fish and Wildlife Serv. 29pp.

Rodgers, J.A. and H.T. Smith. 1995. Set-back distances to protect nesting bird colonies from human disturbance in Florida. Conservation Biology: 9 (1) 89-99.

Ruhlen, T.D., S. Abbott, L.E. Stenzel, and G.W. Page. 2003. Evidence that human disturbance reduces Snowy Plover chick survival. Journal of Field Ornithology: 74(3):300-304.

Tierra Environmental Services. 2002. Focus surveys for the western snowy plover and California least tern in the proposed street end project site. Report in a letter dated July 29, 2002, to Brian Mooney and Associates from Tierra Environmental Services. The report was incorporated as Appendix D of Draft Environmental Impact Report for the Palm and Carnation Avenues Street End Improvement Project prepared for the San Diego Unified Port District.

Captains Alexander and Gonzales (FWS-SDG-3908.3)

Unit, P. 1984. The birds of San Diego County. Memoir 13. San Diego Society of Natural History. 276pp.

U. S. Fish and Wildlife Service. 2001. Western Snowy Plover (Charadrius alexandrinus nivosus) Pacific Coast Population Draft Recovery Plan. Portland, Oregon. xix + 630 pp.

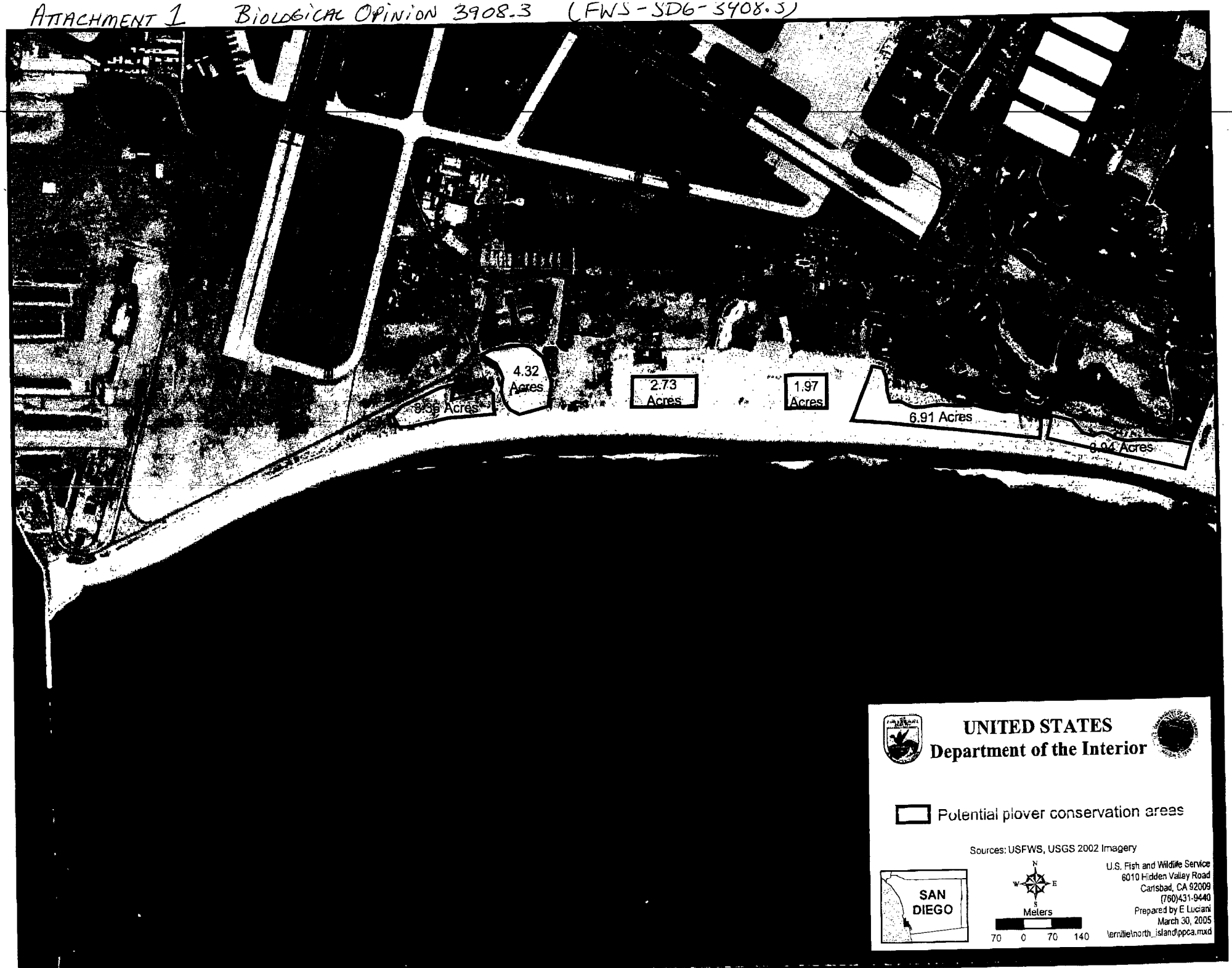
Warriner, J.S., J.C. Warnner, G.W. Page, and L.E. Stenzel. 1986. Mating system and reproductive success of a small population of polygamous snowy plovers. Wilson Bull. 98(1): 15-37.

Welchell, A. and K. Keane. 1998. Western snowy plover breeding survey for Batiquitos Lagoon, San Diego County, 1997 season. A report from Wetland Research Associates and Keane Biological Consulting for the Batiquitos Lagoon Enhancement Project. 17pp.

Widrig, R. 1980. Snowy Plovers at Leadbetter Point. Willapa National Wildlife Refuge. Fish and Wildlife Service, Ilwaco Washington.

Wilson, R.A. 1980. Snowy plover nesting ecology on the Oregon coast. MS Thesis, Oregon State Univ., Corvallis. 41 pp.

ATTACHMENT 1 BIOLOGICAL OPINION 3908.3 (FWS-SD6-3408.3)



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

FACSIMILE TRANSMITTAL FORM

Date Sent: 4/1/05 ***No. of Pages:*** 30 ***Time Sent: (Pacific Time)*** 4:40 pm

TO: Tammy Conkle ***Fax No.:*** 619 545 3489

FROM: Theresa

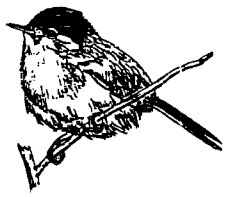
Fax No: (760) 431-9618
Phone No.: (760) 431-9440

SUBJECT: NASNI BO

COMMENTS:

If you have any have problems receiving this fax, please call (760) 431-9440, extension 212. Thank you.

California Gnatcatcher



The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.

TAKE PRIDE IN AMERICA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

AUG 0 9 2004

In Reply Refer To:
FWS-SDG-3452.2

Captain T. Alexander
Commanding Officer
Naval Base Coronado
P.O. Box 357033
San Diego, California 92135-7033

Captain Anthony J. Gonzales
Assistant Chief of Staff for Environment
Commander Navy Region Southwest
937 No. Harbor Drive
San Diego, California 92132-0058

Attn: Tammy Conkle, Wildlife Biologist

Re: Endangered Species Consultation and Draft Biological Opinion on Military Training Operations during 2004 Breeding Season at Naval Amphibious Base, Coronado; Naval Radio Receiving Facility, Imperial Beach; and Naval Air Station, North Island; San Diego County, California

Dear Captain Alexander and Captain Gonzales:

We would like to express our apologies for our recent clerical error concerning Biological Opinion FWS-SDG-3452.2, dated August 3, 2004. The signed opinion delivered to you via Federal Express on August 4, 2004 is an obsolete version of the Opinion that did not reflect our most recent discussions with you or our most recent analyses concerning military training activities on Naval Amphibious Base, Coronado, Naval Radio Receiving Facility Imperial Beach, and Naval Air Station North Island. We have enclosed the correct final version of Biological Opinion FWS-SDG-3452.2 as well as our responses to the thoughtful comments provided by your staff on the Draft of this Opinion. This Opinion, dated August 9, 2004 supersedes the document dated August 3, 2004. Please accept our apologies for any confusion this may have caused. We look forward to continuing to work with you to conserve fish and wildlife while facilitating the military mission.

Sincerely,

Therese O'Rourke
Assistant Field Supervisor

Enclosure

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

AUG 0 9 2004

In Reply Refer To:
FWS-SDG-3452.2

Captain T. Alexander
Commanding Officer
Naval Base Coronado
P.O. Box 357033
San Diego, California 92135-7033

Captain Anthony J. Gonzales
Assistant Chief of Staff for Environment
Commander Navy Region Southwest
937 No. Harbor Drive
San Diego, California 92132-0058

Attn: Tammy Conkle, Wildlife Biologist

Re: Endangered Species Consultation and Draft Biological Opinion on Military Training Operations during 2004 Breeding Season at Naval Amphibious Base, Coronado; Naval Radio Receiving Facility, Imperial Beach; and Naval Air Station, North Island; San Diego County, California

Dear Captain Alexander and Captain Gonzales:

This biological opinion responds to the Navy's request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C.1531 et seq.) for proposed 2004 military training operations and associated management strategies for California least tern (*Sterna antillarum browni*, least tern) and western snowy plover (*Charadrius alexandrinus nivosus*, snowy plover) at Naval Amphibious Base, Coronado (NAB); Naval Radio Receiving Facility, Imperial Beach (NRRF); and Naval Air Station, North Island (NASNI). Your request for formal consultation was dated April 28, 2004. This biological opinion (FWS-SDG-3452.2) addresses the effects of military training operations and associated management strategies for the least tern and snowy plover, but does not address reinitiation of Biological Opinion 1-82-F-123 or airfield maintenance. To re-initiate consultation on Biological Opinion 1-82-F-123 and consult on the effects of airfield maintenance, as requested, additional information regarding proposed actions is necessary to meet the requirements identified in 50 CFR 402.12 and 402.14(c). Collation of additional information and analyses of the effects to listed species would slow the consultation process, so, as discussed in our May 21, 2004 meeting, we have addressed only the effects of military training activities on the NAB, NASNI, and NRRF beaches in this opinion. This will allow expeditious development of incidental take coverage for ongoing training operations on NAB, NASNI, and NRRF beaches. We suggest that our respective staffs convene to identify and discuss the information needed for consultation on airfield maintenance and reinitiation of Biological Opinion 1-82-F-123.

CONSULTATION HISTORY

This biological opinion is based on information provided in: (a) the Service's 1997 Biological Opinion (1-6-97-F-37) on military training operations and associated management strategies for least terns at NAB; (b) the Service's 1999 Biological Opinion (1-6-99-F-28) on military training operations and associated management strategies for least terns and snowy plovers at NAB; (c) the Copper and Patten (2001) draft report on *The Status of the California Least Tern at Navy Bases on San Diego Bay in 1999*; (d) the Service's 2002 Biological Opinion (1-6-02-F-2645.1) on military training operations and associated management strategies for the least tern and snowy plover on NAB; (e) the Service's 2003 Biological Opinion (1-6-03-F-3452.1) on military training operations and associated management strategies for least terns and snowy plovers at NAB, NRRF, and NASNI; (f) continued informal section 7 consultation meetings held between the Service and the Navy on December 2, 2003, February 10, 2004, and March 26, 2004; (g) an April 28, 2004, letter from the Navy to the Service requesting formal section 7 consultation; and (h) information provided at our coordination meetings on May 21, and July 21, 2004. A complete administrative record of this consultation is on file at Carlsbad Fish and Wildlife Office.

The history of management of the least tern and snowy plover nesting colonies at NAB Coronado, NRRF Imperial Beach, and NASNI, is summarized in the Service's Biological Opinion 1-6-03-F-3452.1 and is incorporated herein by reference.

The Service provided the Navy with an informal courtesy draft of the Biological Opinion on May 28, 2004 to allow Navy review of the document prior to finalization. The Service received comments on the draft via e-mail on June 3, 2004. After review of the comments, and incorporation of comments where appropriate, the document was prepared for signature. The Navy requested that the Service postpone finalization of the Biological Opinion until a managerial meeting could be scheduled to discuss terms and conditions of the opinion. Service and Navy managers met on June 14, 2004 to discuss terms and conditions. After this meeting, the Navy requested that the Opinion not be finalized until a draft Opinion had been formally distributed for comments. The Service provided a formal draft of the Opinion on June 23, 2004 and received comments via facsimile on July 12, 2004.

Navy comments primarily concerned the temporal scope of the Opinion, and Terms and Conditions 1.a, 1.b, and 1.i. Based on the Navy's comments, we have modified Terms and Conditions 1.a and 1.i, as discussed further in this Opinion. We have not, however, modified Term and Condition 1.b, which is discussed further in the body of this Opinion. Additional editorial and other minor comments were incorporated where appropriate. An itemized list of responses to the General and Specific Comments found in Enclosure 1 of The July 12, 2004 Navy correspondence are included as an enclosure to this Opinion.

The Service and Navy staffs met again on July 21, 2004 to discuss the Biological Opinion, information pertinent to western snowy plover and least tern management on the Navy beaches, and terms and conditions that would likely appear in the final Opinion.

DESCRIPTION OF THE PROPOSED ACTION

The Navy proposes to continue to conduct military training activities on beaches that support breeding western snowy plovers and California least terns during the 2004 breeding season, and offset the adverse effects of training activities with conservation measures as described below. Beaches provide amphibious training operations for several Navy and Marine Corps installations throughout the region and are utilized by troops and various types of motorized vehicles and watercraft. The Department of Defense has conducted military training activities on these beaches since 1943 and has incorporated various conservation measures to reduce the adverse effects associated with training since 1994. The management strategies for 2004 were developed to support historic and current military training requirements at NAB, NASNI, and NRRF. The Navy has indicated that operational requirements for all military lands may change based on the status of world events and deployed units (e.g., the current military effort being conducted in Iraq).

Proposed Military Training Activities

Silver Strand Training Complex (NAB and NRRF)

The Silver Strand Training Complex (SSTC) includes both NAB and the NRRF. The ocean front training beach of NAB is approximately 2.92 miles (4,705 meters) in length and is divided operationally into 10 lanes, each of which is approximately 500 yards in width. The boat training lanes are identified by number in the water and by color on the beach and are referred to, on the beach, from north to south as Yellow 1 (2.74 acres), Yellow 2 (11.83 acres), Red 1 (16.19 acres), Red 2 (14.59 acres), Green 1 (14.52 acres), Green 2 (15.50 acres), Blue 1 (12.29 acres), Blue 2 (14.73 acres), Orange 1 (13.99 acres), and Orange 2 (11.91 acres). The approximate total acreage of the training beach that comprises the 10 boat lanes at NAB is 128.29 acres (Conkle, pers. comm.). Upon request, military training units are assigned to one or more boat lanes, including the onshore sandy beach front, to conduct various training activities. NAB has designated areas for ocean and bay training activities. A special feature at the NAB ocean beach is a permanent demolition pit used by Naval Special Warfare that is located in the northern end of training beach Blue 1. During the spring and summer for 2004 and 2005, the Navy proposes to continue the training activities described below on:

- six (6) of the ten (10) lanes (Yellow 1, Yellow 2, Red 1, Red 2, Green 2, and Blue 1) (total 73.14 acres of active training lanes, approx. 3000 linear yards beach front);
- the "Alpha Area"; a stretch of beach that is 35 feet landward of the mean tide mark and extends from boat lanes Red 1 to Blue 1. This 35-foot corridor, which the Navy will use to move people and equipment, includes the area between the wave-washed portion of the beach and first sand crest or bench (6 acres);
- two Beach Crossing Lanes (one 50-foot crossing lane between Blue 2 and Orange 1- one 100 foot crossing lane between Orange 2 and Silver Strand State Beach). These lanes are aligned from west to east and are annually designated to facilitate the movement of

military troops, vehicles, and equipment from the wave-washed portion of the ocean beach to a permanent road that has a north/south alignment and parallels Highway 75. In addition, a third crossing lane is located on South Delta Beach. Beach crossing lanes will be marked with green stakes; and

- sand road that has a north/south alignment and parallels Highway 75 located between the back-dunes and Highway 75.

The ocean beach at NRRF lies several miles south of the NAB beach (separated by State Parks lands), is approximately 1.1 miles (1,768 meters) in length and is divided operationally into 4 boating lanes, each of which is approximately 500 yards in width. The boat lanes are identified by color and are referred to from north to south as White 1 and 2 and Purple 1 and 2 (Figure 1). The approximate acreage of the training beach that comprises the 4 boat lanes at NRRF is 49.67 acres (e.g., White 1 = 14.53 acres, White 2 = 13.18 acres, Purple 1 = 11.88 acres, and Purple 2 = 10.08 acres) (Conkle 2003b). During spring and summer 2004, the Navy proposes to continue training activities as described below on all four beach lanes.

The SSTC supports amphibious and clandestine military personnel in three phases (basic, intermediate, and advanced) of the Interdeployment Training Cycle (IDTC). The IDTC training components are outlined in the Fleet Exercise Publications (FXPs) that specify skill, success criteria, and annual training frequency necessary to meet fleet readiness standards. The SSTC supports ninety three FXPs for 13 commands. The FXP's have been subdivided into three general categories that include Warfare Training, Strategic Sealift operations, and physical conditioning (Department of the Navy 2003).

Warfare Training is primarily comprised of clandestine maritime operations and amphibious warfare exercises. Maritime operations is a general category of training in which military personnel swim or are deployed by helicopters or special boat units in the ocean or San Diego bay waters with the objective to proceed to the beach and conduct "over-the-beach" drills. These drills involve scouting, patrolling, stalking, intelligence collection, and conflicts with staged enemy opposition forces. Amphibious warfare exercises consist of training operations conducted by explosive ordnance disposal units on land and in the water whereby military personnel learn to detect, locate, neutralize, and dispose of inert ordnance and improvised explosive devices. The size of groups involved in warfare training exercises ranges from 12-250 people. Currently, operations involving use of land-based explosives are not conducted in the SSTC because there is no authorized location to detonate explosives (Department of the Navy 2003). However, blank ammunition, blank grenade simulators, and low charge detonation cord is used as part of various training operations (Conkle 2003). Approximately 2,550 Warfare Training iterations are currently planned between March 1 and September 1, 2004, and between March 1 and September 1, 2005 (Conkle, pers. Comm. 2004).

Strategic Sealift operations provide the Navy with a deployable system for transporting materials and equipment from ship to shore. FXP's describing these operations are divided into general categories that include Container Offloading and Transfer Systems (COTS) and Offload Bulk

Fuel Systems (OBFS). COTS use a mix of pontoons, water jet propulsion assemblies, and ancillary hardware to transport personnel and equipment from ship to shore. Representative training operations include the use and deployment of an Elevated Causeway System (ELCAS) and the Causeway Pier Insertion/Retraction. OBFS are designed to provide military personnel with the ability to offload large quantities of petroleum and other products from military or commercial offshore vessels. The OBFS have two major elements that include Amphibious Assault Bulk Fuel/Water Systems and Amphibious Bulk Liquid Transfer Systems, which are used to transport fuel and water from ship to shore during assault echelon of a military operation. Strategic Sealift training operations are frequently conducted in conjunction with Beach Master Unit command post training (Department of the Navy 2003). Each operation involves between 6 and 125 people. At least 525 such operations are anticipated between March 1 and September 1, 2004, and March 1 and September 1, 2005 (Tammy Conkle, pers. Comm. 2004).

The Naval Special Warfare Center (NSWC) has FXP physical conditioning requirements associated with the Basic Underwater Demolition/School (BUD/S) Program. Six BUD/S classes a year go through the program, and NSWC conducts over 1200 physical conditioning exercises, involving 12-80 people, including combat runs, swims, and endurance operations (Department of the Navy 2003). Between March 1 and September 1, 2004, it is expected that there would be a minimum of 630 operations involving 40,700 individuals. A similar level of use is anticipated in 2005.

In addition to continuing training on beaches at NASNI and SSTS, the Navy proposes to provide access for military training activities conducted in San Diego Bay by traversing the Least Tern Preserve at South Delta Beach using a single beach crossing lane. This crossing lane would be located on the southern end of South Delta Beach.

Naval Air Station North Island

The training beach at NASNI is approximately 1.56 miles (2,500 meters) in length and includes the entire Pacific Ocean beach from the tip of Zuniga Point to northern city limit boundary of Coronado. This beach area is approximately 66.9 acres (Conkle 2003a). The training beach at NASNI is a separate beach and is not considered part of the SSTC described above.

NASNI supports specific training operations that include Mobile Inshore Undersea Warfare Training, Swimmer Scout, Escape and Recovery Training, "Around the World" Paddle Evolutions, Combat Hydrographic Reconnaissance, Stealth and Concealment training, a variety of research and development exercises (e.g., electromagnetic sensor array), Naval Special Warfare Over the Beach Field Training exercises, underwater swimmer training operations, and physical conditioning, as well as recreational use for military personnel and their families (Department of the Navy 2003). Twenty training evolutions each involving between 6 and 50 people are planned at NASNI for March 1-September 1, 2004 and March 1-September 1, 2005. Training areas on NASNI overlap a recreational beach, however training is focused at Zuniga and Dog Beach as well as the area adjacent to the golf course. Not all training at NASNI is specific

to the beach- the beach is sometimes a transitional area to other operational areas such as the airfield, Heritage Park, etc.

Proposed Conservation Measures

The following measures have been incorporated into the project description by the Navy to avoid and minimize potential adverse effects of military training on beaches during the breeding season to the least tern and the snowy plover.

Silver Strand Training Complex

1. All snowy plover nests would be marked with blue flexi-stakes or cones and a buffer of approximately 30 meters would be placed around each nest within the active training lanes Yellow 1 and 2, Red 1 and 2, Green 2, and Blue 1. No military training operations would be permitted to occur within this delineated buffer or protected areas. Once chicks hatch, markers would be removed within seven days.

2. A modified mini-exclosure based on initial specifications described by Fancher et al. (2002) would be placed over all snowy plover nests made on the Pacific Ocean beach lanes of NAB. The proposed exclosures would be larger than the design specifications in Fancher (2002) to increase the distance from the edge of the structure to the nest and would be anchored more securely than in 2003 to reduce the potential for mammalian incursion. The mini-exclosure would be removed within seven days or when it is biologically practical and minimizes impact to the nesting snowy plovers.

3. Predator control of mammalian and avian predators of the least tern and snowy plover would be performed by Wildlife Services on the Pacific Ocean beaches of NRRF and on beach lanes Orange 1 and Orange 2 at NAB.

4. NAB beach training lanes Green 1, Blue 2, Orange 1, and Orange 2 (excluding the portion of each area designated as a beach crossing lane) would be used as protected nesting habitat for the least tern and snowy plover. The perimeter of these areas would be delineated with blue flexi-stakes or cones and no military training operations would be permitted to occur within these delineated areas.

5. The nesting substrate of the least tern and snowy plover on South Delta Beach, NAB would be enhanced by the placement of new sand in the amount of 2000 cubic yards extracted from the Pacific Ocean beach and transported to this nesting colony site. The sand was delivered by March 15, 2004, and spread on grids C11 to E12 of South Delta Beach. This sand enhanced 1.3 acres of the South Delta Beach least tern preserve.

6. Predator control to manage southern fire ants, field ants, Argentine ants, and pyramid ants found on North and South Delta Beach, NAB would be conducted prior to and during the snowy plover and least tern nesting season.

7. Least tern and snowy plover nests in active training lanes that are located adjacent to protected areas would be relocated as follows: Least tern nests that are within 10 meters of Green 1 or Blue 2 would be relocated to these latter protected nesting areas. Least tern and snowy plover nests found in the Alpha Area that are close to Green 1 would be relocated to Green 1- those that are not close enough to relocate would be marked. Least tern nests and snowy plover nests that are constructed in the beach crossing lanes would be relocated to the closest protected area.

8. Within active military training areas including beach lanes Yellow 1, Yellow 2, Red 1, Red 2, Green 2, and Blue 1 least tern nests would be marked with green tongue depressors or small wooden stakes. Nest outcome would be monitored and recorded.

9. No kelp or other natural marine vegetation that collects on beach tidal areas would be removed from the SSTC ocean beaches.

10. The beach crossing lanes would be positioned to avoid the largest number of current and historic nest sites. Lane alignments would be modified, if necessary and as appropriate, to reduce the number of nests requiring relocation. Beach crossing lanes would be marked with green stakes for their entire length.

11. Site preparation, in accordance with the Service's Biological Opinion on MAT Development Program (1-1-82-F-123) and the California Least Tern MOU, would be performed on North and South Delta Beach on NAB. Continued maintenance of these sites offsets the effects of previous construction projects (Navy's Light Airborne Multipurpose System (LAMPS MKIII) facilities development program) and associated loss of habitat as well as some of the effects of the current proposed action. Site preparation includes grading or mowing to remove annual plant growth, inspection/replacement or reinstallation of chick barriers around the perimeter of the nesting colony, inspection/repair/replacement of nest site grid poles and placement of chick shelters throughout the nesting colony.

12. Biological monitoring of the least tern and the snowy plover during the breeding season would be performed by qualified experts at all nesting sites on NAB and NRRF.

- NAB ocean beach: Monitoring for least terns and snowy plovers would be conducted three-four days a week from March 1 to April 15, five - six days per week from April 15 to August 1, and three to four days per week from August 1- August 31.

- NAB North and South Delta Beach: Monitoring for least terns and snowy plovers would be conducted three days a week from April 15 to April 30, four to five days a week from April 30 to July 31, and three days a week from July 31 to August 31).

- Monitoring at NRRF for snowy plovers would be conducted one to three days a week from March 1 to mid-September and one day per week during the winter.

13. Banding of least terns and snowy plovers adults and chicks will be done in conjunction with monitoring of nests at NAB, and NRRF. Due to the large number of nests that must be monitored, it is possible that not all adults and chicks will be banded.

14. Wooden stakes with mylar flags would be used to discourage nesting in Green 2 and Blue 1, as appropriate when it is determined not to conflict with military training.

15. When necessary, to reduce potential conflict with training requirements, snowy plover nests would be relocated to safe areas (e.g. if major training iterations have been planned for months and a plover lays an egg in the middle of the route).

16. The Navy and the Service would work cooperatively regarding the relocation of American peregrine falcons (*Falco peregrinus anatum*) if they are detected at SSTC. Due to the rarity and overall status of the gull-billed tern, the Navy has not received authorization to capture, relocate, shoot, or otherwise manage this known predator. The Navy and the Service would work cooperatively to address this issue.

Naval Air Station North Island

1. Site preparation, in accordance with the Service's Biological Opinion on MAT Development Program (1-1-82-F-123) and the California Least Tern MOU would be performed on the "MAT" site on NASNI. Continued maintenance of this site offsets the effects of previous construction projects (Navy's Light Airborne Multipurpose System (LAMPS MKIII) facilities development program) and associated loss of habitat, as well as some of the effects of the current proposed action. Site preparation includes grading or mowing to remove annual plant growth, inspection/replacement or reinstallation of chick barriers around the perimeter of the nesting colony, inspection/repair/replacement of nest site grid poles and placement of chick shelters throughout the nesting colony.

2. Biological monitoring of the least tern and the snowy plover during the breeding season would be performed by qualified experts at all nesting sites on NASNI.

- NASNI "MAT" site: Monitoring for least terns would be conducted three days a week from April 15 to April 30, four to five days a week from May 1 to July 31, and three to four days a week from July 31 to August 31.

- NASNI ocean beach: Monitoring for snowy plovers would be conducted two days a week from February 1 to February 29, three days a week from March 1 to mid-September, and one day a week during the winter.

3. Banding of least terns and snowy plovers adults and chicks will be done in conjunction with monitoring of nests at NASNI. Due to the large number of nests that must be monitored, it is possible that not all adults and chicks will be banded.

4. All raking activities would avoid known snowy plover scrapes and/or nests.

5. A site (0.5 acre) on the NASNI beach would be marked with blue stakes and signs to provide a protected area of the beach for snowy plovers. This area would not be raked.

6. Control of mammalian and avian predators of the least tern and snowy plover would be performed by Wildlife Services on the Pacific Ocean beaches of NASNI and on the "MAT" site. In addition, the Bird/Animal Airstrike Hazard Program (BASH) would be conducted on the airfield adjacent to beaches utilized by least terns and snowy plovers.

7. All snowy plover nests would be marked with blue flexi-stakes or cones and a buffer of approximately 30 meters would be placed around each nest located on NASNI beaches. No military training operations would be permitted to occur within this delineated buffer. Stakes would be removed 7 days post-hatch.

8. Snowy plover nests would be relocated if there were conflicts with training operations.

9. The Navy and the Service would work cooperatively regarding the relocation of American peregrine falcons (*Falco peregrinus anatum*) if they are detected at NASNI. Due to the rarity and overall status of the gull-billed tern, the Navy has not received authorization to capture, relocate, shoot, or otherwise manage this known predator. The Navy and the Service would work cooperatively to address this issue.

STATUS OF THE SPECIES/CRITICAL HABITAT

California least tern

The least tern historically nested along sandy beaches close to estuaries and embayments along the coast of California from San Francisco Bay to Baja California, Mexico. Human encroachment along California beaches for recreation, residential, and industrial development severely diminished the availability of suitable nesting habitat. Loss of nesting habitat in conjunction with increased loss of foraging areas, human disturbance, and predation at remaining breeding colonies resulted in a Federal designation of endangered status in 1970 (35 FR 1604).

Upon its designation as endangered, statewide efforts to implement protection for least tern nesting and foraging areas has contributed to a breeding population increase from 623 pairs in 1969 to an estimated 4,700 pairs in 2001. The majority of the least tern population is concentrated in southern California within the Counties of Los Angeles, Orange, and San Diego.

The least tern is the smallest of our U.S. terns, measuring about 9 inches long with a wingspan of about 20 inches. Males and females look alike with a black cap, gray wings with black tips, orange legs, and black-tipped yellow bill. Immature birds have darker plumage and a dark bill with distinctive white heads and dark eye stripe.

Least terns typically arrive in California from Central and South America beginning in mid-April and complete their breeding cycle by the end of August. Sandy beaches close to estuaries and coastal embayments that have limited human disturbance have traditionally served as nesting sites for the least tern. In recent years, many non-beach sandy surfaces in coastal areas have been successfully utilized by least terns for nesting (Massey and Atwood 1979 -1985). The nest of the least tern is a simple scrape or depression in the sand that the birds sometime adorn with small fragments of shell or pebbles. One to 3 eggs are laid, usually 2, and incubated for 20-25 days with a mean time of about 21 days. This is followed by an approximate 3 week period of the adults tending the flightless but quite mobile chicks. Least tern nesting is characterized by two waves of nesting. Most of the initial nesting attempts are made by experienced breeders and are completed by mid-June. A second wave of nesting usually occurs from mid-June to early August which is comprised of re-nests after initial failures and second year birds nesting for the first time (Massey and Atwood 1981). Least terns exhibit a high degree of nest site fidelity from year to year (Atwood and Massey 1988). Factors which can affect colony site fidelity include reproductive failure and the physical attributes of the nest site such as the amount of vegetative encroachment.

Least terns feed exclusively on small fishes captured in shallow, nearshore waters, particularly at or near estuaries and river mouths (Massey 1974, Collins et al. 1979, Atwood and Minsky 1983, Atwood and Kelly 1984, Minsky 1984, Bailey 1984). After their eggs hatch, breeding adults catch and deliver small fish to the flightless young. The young begin to fly at about 20 days of age but continue to be fed and are taught how to feed by their parents for some time after fledging. Reproductive success is, therefore, closely related to the availability of undisturbed nest sites and nearby waters with adequate supplies of appropriately sized fishes.

Conflicting uses of southern California beaches during the least tern nesting season have precluded the use of most natural nesting sites. Because of the lack in availability of large expanses of beach, many colony sites have been restricted to small discrete areas often protected by fencing. Although this species is loosely colonial in nature, least terns have been artificially concentrated within these fenced areas, often adjacent to heavily used public beaches or on tiny man-made islands, since beach front property is at such a premium for human usage. The adults, eggs, and young are thus confined, rendering them susceptible to major problems such as predation and disturbance events with limited options to relocate. Hence, predator control is

considered by many species experts to be one of the most crucial management strategies for reproductive success. Predators of least tern adults, young, or eggs include the red fox, American kestrel, American crow, burrowing owl, loggerhead shrike, common raven, coyote, skunk, opossum, house cats and dogs, and others. The sensitive status of some predatory species requires special consideration and may reduce the predator management options available. For example the gull-billed tern, an extremely rare tern species, has recently posed a localized problem for least terns nesting on beaches around San Diego Bay. The gull-billed tern cannot be shot or relocated, due to its sensitive status, and may affect the long-term potential for least tern colonies in this area. This issue is of particular concern for terns nesting on Navy installations adjacent to San Diego Bay, because reproductive success has declined significantly in recent years, and is in part attributable to gull-billed tern predation.

In Connecticut, Brunton (1999) found that an intermediate colony size (approximately 150 nests) was optimal for least tern nesting success. She found that predation by small mammals, gulls, and crows, was dependent on colony size and that these predators were deterred from colonies with more than 100 nests.

Episodic losses have been attributed to cold, wet weather, extreme heat, dehydration and starvation, unusually high surf or tides, and human disturbance. Human disturbance is a primary problem at several colonies. Additionally, the "El Niño" warm sea current phenomenon can have deleterious long term effects on the entire least tern population. During the El Niño event of 1982-1983, diminished fish populations throughout the southern California bight caused a drastic reduction in least tern breeding success resulting in the lowest annual production of fledged young on record (Massey 1988, Massey et at. 1992). Subsequently, it took 5 years for the population to recover from this event. El Niño conditions were also evident during the 1992 breeding season which also resulted in a much reduced statewide production of fledglings (Caffrey 1993).

Large fluctuations in the number of breeding pairs occurred for San Diego Bay nesting sites over the period between 1978 and 2001. The number of pairs breeding at San Diego Bay nesting sites declined by 49 percent from a high of 291 pairs in 1979 to 148 pairs in 1982. This is in contrast to the statewide population for the same time period which exhibited a slight increase in the number of breeding pairs. Between 1983 and 1991 the population around San Diego Bay fluctuated between a low of 107 breeding pairs in 1984 and a high of 178 pairs both in 1983 and 1990. Meanwhile, the statewide numbers declined during the period 1984 through 1987. The Bay-wide breeding population experienced a substantial increase from 141 pairs in 1991 to 251 pairs in 1992. An increase in the statewide breeding population of terns was evident by 1990 and has since continued to grow. However, the number of fledglings produced statewide during 1994 and 1995 decreased substantially and the implication of reduced recruitment into the breeding population during this period remains uncertain.

Parallel to the statewide trend, tern pairs nesting at San Diego Bay have increased. In 1996, the breeding population of terns in San Diego Bay was estimated at 430 pairs or 14 percent of the

range wide population. In 2001, the breeding population of terns in San Diego Bay was estimated at 871 pairs or approximately 18.3 percent of the range wide population in California. Approximately 88 percent of the total number of breeding pairs that came to San Diego Bay nested at NAB and the NASNI "Mat" site [California Department of Fish and Game (CDFG 2002)]. In 2002, the breeding population in San Diego Bay was estimated at 709 pairs or approximately 19.8 percent of the range-wide population in California. Approximately 85 percent of the total number of breeding pairs that came to San Diego Bay in 2002 and 2003 nested at NAB and the NASNI "Mat" site (CDFG 2003, U.S. Navy 2004).

Concurrent with erratic Bay-wide populations are fluctuations in the number of breeding pairs associated with individual sites and the number of available sites which are occupied by nesting pairs. Declines at one nesting site sometimes are balanced by increases at another nearby site and are most likely a result of inter-colony movement. These shifts appear to be related to heavy predation or human disturbance event(s) which often times result in poor reproductive success. The number of sites available is important to the tern population in allowing inter-colony movement in response to failure at a particular site. Of concern is the apparent trend towards fewer, larger colonies that concentrate the species into fewer areas that may be more vulnerable to predation. Management actions that provide for more, dispersed colonies could be beneficial to the long term recovery population of the species.

In recent times, least terns have nested at 5 to 7 locations around San Diego Bay including NAB and NASNI, as well as Lindberg Field, Western Saltworks, and D Street Fill. The NAB population of least terns (541 breeding pairs in 2000; 664 breeding pairs in 2001; 534 breeding pairs in 2002; 954 breeding pairs in 2003) (Patton 2002 and CDFG 2001, 2002, 2003) is the second largest population in California. Camp Pendleton supports the largest population [1,029 breeding pairs in 2000; 992 breeding pairs in 2001; 584 breeding pairs in 2002; and 1,178 breeding pairs in 2003 (Patton 2002 and CDFG 2001, 2002, 2003)] of least terns in California.

Least terns have nested on the ocean front beach of NAB, and North and South Delta Beaches. Upon completion of an MOU in 1984 (March 12, 1984 *Memorandun of Understanding between the U.S. Fish and Wildlife Service and the U.S. Navy relating to the Description and Management of a Preserve for the California Least Tern on Naval Amphibious Base Coronado*), Delta Beach was officially designated as a least tern nesting site as compensation for the loss of nesting area in association with the construction of the LAMPS MK III project at NASNI (Biological Opinion 1-1-82-F-123). In 1987, the Service and the Navy signed a Memorandum of Understanding (MOU) to establish standards and conditions for Navy in-water construction activities conducted in San Diego Bay to minimize and avoid effects to the least tern. Under specifications of the MOU, the Navy intensified management of least tern colonies on Naval facilities including NAB. Since that time active management measures have included extensive biological monitoring, nest site preparation, and predator control. Nesting by least terns along the ocean front beach of NAB was first recorded during recent times in 1994, when one nest was established within Beach Lane Green 2. This colony has continued to expand in numbers and distribution (Table 1). Management actions of South Delta Beach have included enhancement of

nesting substrate, use of herbicides to control non-native vegetation and control of predatory ant species at South Delta Beach. Least tern use of South Delta Beach (Table 2) and the ocean front beach of NAB has significantly increased (Table 2). Data collected by the Navy and presented in Tables 1 and 2 refers to nest numbers, while most data collected at other sites and presented in this document refers to pairs. It is possible for birds to nest more than once, so the number of nests observed is greater than the number of pairs on-site.

Table 1. Number and Distribution of California Least Tern Nests within Boat Training Lanes from 1993 to 2003 at NAB Ocean Beaches. Monitoring Data Collected by Biologists Under Contract with the Navy.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004 (as of July 11)
Yellow 1	0	0	0	0	0	0	0	0	0	0	0	0
Yellow 2	0	0	0	0	0	0	0	0	0	0	0	0
Red 1	0	0	0	0	0	1	0	0	0	0	9	24
Red 2	0	0	0	8	6	18	28	19	32	30	61	49
Green 1	0	0	13	21	27	68	101	81	101	***116***	***155***	***141***
Green 2	0	1	18	54	46	48	58	54	75	44*	71	35
Blue 1	0	0	0	1	0	0	6	6	7	8*	14	13
Blue 2	0	0	0	0	11	41	57	101	126	***108***	***138***	***110***
Orange 1	0	0	0	0	1	6	15	36	69	***57***	***69***	***74***
Orange 2	0	0	0	0	0	2	13	33	52	***36***	***106***	***103***
Total	**0**	**1**	**31**	**84**	**91**	**184**	**278**	**330**	**463**	**401**	**623**	**549**

* 52 Least tern nests with 56 eggs were found in Green 2 and Blue 1. Fifty eggs from 48 of the 52 nests were collected and taken to Project Wildlife for captive rearing. Four eggs from two nests were relocated (Copper 2003, personal communication).

Bold Italic = lanes that were set aside for avian nesting during the breeding season

Table 2. Count of California Least Tern Nests at All Locations Utilized at NAB and NASNI.
Data Collected by Biologists Under Contract with the Navy.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
NAB Ocean beaches	0	1	31	84	91	182	278	330	462	401	623
Delta Beach South	8	18	1	21	25	80	80	71	81	84	216
Delta Beach North	127	210	177	224	349	337	344	229	271	257	285
NASNI "Mat" Site	52	51	60	53	27	77	102	133	113	83	171
NASNI Rwy 11											3
Total	**187**	**280**	**269**	**382**	**492**	**676**	**804**	**763**	**927**	**825**	**1299**

In the recent past, least terns have not used the ocean beaches of NASNI and NRRF for nesting. However they have used the jetty and beach at Zuniga Point NASNI as a roost site (Copper 2003, pers. comm.).

In 2002, the number of least terns in California was estimated at 3,569 breeding pairs that constructed 4,093 nests and produced an estimated 692 fledglings (CDFG 2002). Given the high number of number of adult breeding least terns in California, the number of fledglings produced per adult breeding pair was only .19, which is extremely low (e.g., 692 average number of fledglings divided by 3,569 average number of breeding pairs). The estimated number of least tern fledglings produced per adult breeding pair at all combined NAB nesting sites in 2002 was lower, at approximately 0.13 (min. 0.09, max. 0.16). At NASNI in 2002, the number of least tern fledglings produced per adult breeding pair was 0.21, which was slightly higher than the 2002 statewide average.

In 2003, the number of least terns in California was estimated at 6,780 breeding pairs that constructed 7677 nests and produced an estimated 2,627 fledglings. The number of fledglings per breeding pair increased over that documented in 2002 and was 0.385, which is still lower than the level believed necessary to maintain or increase the population size. During 2003 the number of fledglings per pair produced at NAB was 0.17, less than half of the state-wide average. The reason for the lower number of fledglings produced by each pair is not known. Conversely, at NASNI, the number of fledglings per pair produced was 0.39, slightly higher than the state-wide average.

Fancher (1992) determined that if the fledgling to pair ratio was near 0.7, the breeding population two years later would not greatly differ from the preceding year. However, if the ratio fell below about 0.7, the breeding population would be expected to decline over time. Out of the past six years, only in 1998 was the fledgling to pair ratio greater than 0.7. In 1998, NASNI and NAB combined had a fledgling to pair ratio 0.93 compared to the statewide average of 0.85. For the past five out of six years (e.g., 1998 to 2003) the number of least tern fledglings produced per

adult breeding pair for the California population has indicated that the tern population may be declining. Despite this indicator, the number of terns recorded in the population has increased during this time period. Whether the low fledgling/pair ratios documented in the past 6 years foretell of an upcoming decline in the population, or whether the monitoring or analytical tools used to predict population growth need re-evaluation, remains to be seen.

A revised California Least Tern Recovery Plan was finalized by the Service in 1985. This recovery plan identified population size, distribution, secure nesting site numbers, and reproductive rates necessary for recovery of the California least tern. The population size has increased dramatically since 1985 and exceeded the numerical goal set in 1985, however the recovery objectives pertaining to reproductive success and secure nesting colonies identified in the 1985 Recovery Plan have not been achieved. Locally, there are too few secure colonies for the species around San Diego Bay (6 are required in the 1985 Recovery Plan), and the mean reproductive rate over the past 5 years is far below the mean of 1.0 young fledged per breeding pair identified in the Recovery Plan. A revision to the 1985 Recovery Plan is in progress.

Western snowy plover

The Pacific coast population of the snowy plover was listed as a threatened species on March 5, 1993 (58 FR 12864). The proposal to designate snowy plover critical habitat was published on March 2, 1995 (60 FR 11768). The final rule designating critical habitat was published on December 7, 1999 (64 FR 68508) and included 28 areas totaling about 18,000 acres and 180 miles of coastline. Of the 28 critical habitat areas, two are designated in Washington, seven in Oregon, and 19 in California. Critical habitat for the snowy plover was designated on NAB ocean beaches on January 6, 2000, but was vacated in 2003. Critical habitat for this species is under review by the Service and a new proposal for designation of critical habitat is anticipated in 2004.

Factors that resulted in the Service's decision to list this species included: poor reproductive success resulting from human disturbances, predation, and inclement weather. These factors combined with permanent or long-term loss of nesting habitat to urban development and the encroachment of introduced beach grass, led to the decline in active nesting colonies, as well as an overall decline in the breeding and wintering population of the snowy plover along the Pacific coast of the United States.

The breeding range of the snowy plover extends along coastal beaches from the southern portion of Washington State to southern Baja California, Mexico. Larger concentrations of breeding birds occur in the south rather than the north, suggesting that the center of the plovers' coastal distribution lies closer to the southern boundary of California (Page and Stenzel 1981). Prior to 1970, snowy plovers bred at 53 locations along coastal California (Page and Stenzel 1981). Presently, breeding occurs at only 20 locations representing a 62 percent decline in breeding sites. The greatest losses of habitat have occurred in southern California, where breeding snowy plovers have vanished from parts of San Diego, Ventura, and Santa Barbara counties, most of

Orange County, and all of Los Angeles County. In all of these areas, the plovers' absence can be correlated with industrial or residential development and/or heavy recreational use of former beach nesting areas (Page and Stenzel 1981).

In addition to the loss of nesting habitat, the breeding population of the snowy plovers in California, Oregon, and Washington experienced a 17 percent decline between 1977 and 1989 (Page et al. 1991). The breeding population in California declined from an estimated 1,565 adults in 1980 (Page and Stenzel 1981) to 1,386 adults in 1989, with a 55 percent decline occurring in north San Diego County and a 41 percent decline at San Diego Bay (Page et al. 1991). Follow-up statewide breeding season snowy plover surveys have been tallied by Point Reyes Bird Observatory in 1991 and 2000, with 1,371 and 976 adults counted during each of those respective years (Page 2002). The 2000 statewide count, however, represented a 38 percent decline in adult snowy plover numbers recorded in 1980.

Snowy plovers breed in loose colonies with the number of adults at coastal breeding areas ranging from 2 to 318 (Page and Stenzel 1981). Sand spits, dune backed beaches, sparsely to unvegetated beach strands, open areas around estuaries, and beaches at river mouths are the preferred coastal nesting areas of the snowy plover (Page and Stenzel 1981, Wilson 1980, Powell et al. 1997). Other areas utilized by nesting snowy plovers include dredge spoil fill, dry salt evaporation ponds, airfield ovals, and salt pond levees (Widrig 1980, Wilson 1980, US Navy, 2004, Page and Stenzel 1981). Nest sites typically occur in flat, open areas with sandy or saline substrates with little or no vegetation (Widrig 1980, Wilson 1980, Page and Stenzel 1981, Welchell and Keane 1998, Fancher 1998). Although the majority of snowy plovers are site faithful, returning to the same breeding location in subsequent breeding seasons, some dispersal occurs (Warriner et al. 1986, Stenzel et al. 1994). Snowy plovers are sometimes found nesting in similar habitats as the least tern, such as occurs at Batiquitos Lagoon (Welchell and Keane 1998) and Camp Pendleton (Powell et al. 1996).

The breeding season of the snowy plover typically extends from March 1 through September 15. Egg laying in southern California has been documented as early as February 19th (Copper 2002, pers. comm.), but most often begins in mid-March and continues through late-July. Generally, 3 eggs are laid in a nest which consists of a shallow depression scraped in sandy or saline substrates. Incubation does not begin until the full clutch is laid and continues for 27-33 days with an average of 27 days before eggs are hatched (Warriner et al. 1986). Both sexes incubate the eggs. Broods rarely remain within the nesting territory (Warriner et al. 1986). Birds are able to fly within approximately 31 days of hatching. Snowy plovers will re-nest after loss of a clutch or brood (Wilson 1980, Warriner et al. 1986). Double brooding and polygamy have been observed in snowy plovers along coastal California (Warriner et al. 1986). Snowy plover females may abandon chicks as young as 6 days old to find another mate leaving the male as the only adult to care for the brood (Warriner et al. 1986). Re-nesting may occur in the same scrape, in close proximity to the initial nest or in a new location distant from the first attempt (Warriner et al. 1986, Powell and Collier 1994, Powell et al. 1997). Females may re-nest 10 days after nest failure (Fancher et al. 2003). Males attend their young for 29-47 days (Warriner et al. 1986).

Snowy plover adults and young forage on invertebrates along intertidal areas, along beaches in wet sand and surf cast kelp, in foredune areas of dry sand above the high tide, on salt pans, and along the edges of salt marshes and salt ponds. Page et al. (1981) observed snowy plovers moving between salt pans, tidal flats, and beaches indicating these areas function together in providing habitat for the species.

Human disturbances which have a detrimental effect to nesting snowy plovers include unintentional disturbance and destruction of eggs and chicks, off-road vehicle use, horse-back riding, and beach raking. Intensive beach use by humans has resulted in abandonment of nesting sites, and reductions in nesting density and nesting success, although coupled with positive management, some colonies have increased in size despite concurrent human use of nesting beaches (Biological Opinion 1-03-F-3452.1).

Human disturbance can interfere with normal snowy plover behavior. Disturbances to incubating adults can leave nests exposed to extreme temperatures resulting in non-viable eggs or blowing sand which buries the eggs. Snowy plover chicks which are separated from their attending adult as a result of human disturbances or predators, may become more susceptible to hypothermia since young chicks are unable to thermoregulate. It has been shown that increased human disturbance forces piping plover chicks (*Charadrius melodius*), an East coast species with habitat requirements very similar to the snowy plover, to expend more energy avoiding disturbances and less time foraging (Fleming et al. 1988). Frequently disturbed piping plover chicks fed less often and at a reduced rate with fewer chicks surviving to 17 days in areas heavily disturbed by humans (Fleming et al. 1988). However, there are levels of disturbance that have been documented to occur within the NAB training areas that appear not to have significantly affected snowy plover nesting efforts. In 2001, five snowy plover nests were established in beach area Red 1. The nests were established on or about May 6, 18, and 23, June 12, and July 3, 2001. In spite of training occurring almost daily in beach lane Red 1 throughout the nesting season, all five nests successfully hatched three eggs each (Copper 2002, pers. comm.). The fate of the fledglings was not determined, but the size of the population increased in 2002, 2003, and 2004 despite training activities concurrent with nesting efforts. Population increases on populated beaches are largely due to management efforts to reduce impacts to nest sites. For example, the U.S. Navy, in southern California, marks a boundary around nest sites to preclude trampling or vehicular disturbance to nests. This conservation measure has resulted in successful hatching of nests in areas where training occurs.

Areas which receive significant off-road vehicle activity support lower densities of plover nests (Page and Stenzel 1981). Powell and Collier (1994) reported a shift in beach usage by snowy plovers from areas of heavy vehicular traffic to more protected sites. Direct mortality to snowy plovers as a result of vehicular activity on beaches has been documented (Persons 1994, Copper 1997). Research has shown a decrease in piping plover chick survivorship with as little as 10 vehicular passes per day (Melvin et al. 1994). Snowy plovers, especially the flightless young, are

particularly vulnerable to being run over or trampled since crouching in depressions, such as footprints and tire tracks, appears to be a behavioral characteristic (James et al. 1992).

NAB Coronado is a key nesting area within San Diego County for the snowy plover. In 1996, a total of 179 snowy plover nests were found at 10 sites within San Diego County with approximately 90 percent of the nests occurring at four locations, including Marine Corps Base Camp Pendleton (81), Batiquitos Lagoon (39), NAB Coronado (26), and Tijuana Slough National Wildlife Refuge (16). At NAB Coronado 23 of the 26 nests were constructed on the ocean front beach (Powell et al. 1996). In 1998, the last comprehensive San Diego County-wide survey of snowy plover nesting sites was made by Powell et al. (1998). This survey recorded 156 snowy plover nests at nine sites within the County, with approximately 90 percent of the nests occurring at same four sites that were dominate in 1996. These sites, along with the total number of nests found at each location, included Marine Corps Base Camp Pendleton (68), NAB Coronado (34), Batiquitos Lagoon (26), and Tijuana Slough National Wildlife Refuge (12).

In 2002, there a total of 323 snowy plover nests were found in San Diego County and 99 of those nests were within the project area [NASNI ocean beach (26), NAB-North Delta Beach (1), NAB-South Delta Beach (2), NAB ocean beach (57), and NRRF ocean beach (13)]. This snowy plover nesting effort produced a total estimate of 36 fledglings for NASNI, NAB, and NRRF. Counts and distributions of snowy plover nests by individual ocean beach lanes at NAB, between 1993 and 2003, are shown in Table 3. Total snowy plover nests at NASNI, NAB, and NRRF, between 1992 and 2003, are provided in Table 4. A summary of the 2002 snowy plover breeding season in San Diego County shows that biological monitors estimated there was a total of 180 snowy plover pairs that produced an estimated 159 fledglings. The estimated snowy plover breeding numbers at NASNI, NAB, and NRRF were 12, 24, and 5 adult pairs respectively, which produced an estimated 15, 18, and 3 fledglings respectively. Thus the fledgling per adult pair ratio at NASNI, NAB, and NRRF for 2002 was 1.3, 0.75, and 0.60.

In 2003, a total of 92 snowy plover nests were within the project area [NASNI ocean beach (31), NAB-North Delta Beach (0), NAB-South Delta Beach (2), NAB ocean beach (59), and NRRF ocean beach (9)]. An estimated 56 plovers fledged in 2003 at NASNI, NAB, and NRRF.

Table 3. Number and Distribution of Western Snowy Plovers within Boat Training Lanes from 1993 to 2004 (to date) at NAB ocean beaches. Nest Counts were made by Biologists Under Contract with the Navy.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004 (as of July 11)
Yellow 1	0	0	0	0	0	0	0	0	0	0	0	0
Yellow 2	0	0	0	0	0	0	0	0	0	0	2	1
Red 1	0	0	2	1	5	1	1	4	5	7	7	10
Red 2	0	1	2	3	5	2	3	3	1	6	5	8
Green 1	1	5	4	4	6	4	4	4	4	***5***	***6***	***1***
Green 2	2	3	4	5	4	4	3	3	1	2	1	3
Blue 1	0	0	1	3	2	1	1	4	2	5	4	4
Blue 2	2	0	2	4	6	5	8	7	8	***14***	***9***	***8***
Orange 1	0	0	0	3	7	5	2	6	7	***10***	***12***	***12***
Orange 2	0	1	1	1	2	5	3	6	6	***8***	***13***	***13***
Total	**5**	**10**	**16**	**24**	**37**	**27**	**25**	**37**	**34**	**57**	**59**	**60**

Bold italics- numbers are nests found in lanes protected from disturbance during the breeding season.

Table 4. Count of Western Snowy Plover Nests at NAB, NRRF, and NASNI. Data Collected by Biologists Under Contract with the Navy.

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
NAB Ocean Beach	3	2	10	16	24	37	27	25	37	34	57	38
Delta Beach South	2	1	0	1	1	5	7	3	5	0	2	2
Delta Beach North	7	4	2	0	2	0	0	2	2	0	1	0
NRRF					2	1	0	0	1	2	13	9
NASNI									4	13	26	31
TOTAL	**12**	**7**	**12**	**17**	**29**	**43**	**34**	**30**	**49**	**49**	**99**	**80**

In 2002, Gary Page of Point Reyes Bird Observatory coordinated a breeding season survey of adult snowy plovers along the entire California coast in which 45 beach areas were inventoried and a total of 1,387 individuals were counted. Only 12 areas of the coast had adult snowy plover counts that exceeded 10 individuals. These areas included Clam Beach (12) and Eel River gravel bars (26) Humboldt County; Point Reyes Beach (25) Marin County; San Francisco Bay (78), Pajaro Dunes (15) Santa Cruz County, Bolsa Chica oil fields (38) Orange County; and White Beach/French Creek/Cockleburr Beach (26), Santa Margarita River mouth (41), Batiquitos Lagoon (13), Zuniga Point NASNI (13), Silver Strand Beach including NAB (38), and Tijuana River mouth (16) San Diego County. These 12 areas comprised approximately 25 percent of all the adult snowy plovers counted statewide. San Diego County had a total count of 157 adult snowy plovers that comprised approximately 11.3 percent of the statewide total count.

In the 2000 breeding season statewide inventory in which 43 beach areas were surveyed, 976 adult snowy plovers were counted. The survey found that only 10 areas of the coast had 10 or more adult snowy plovers with four sites located in San Diego County, including White Beach/French Creek/Cockleburr Beach (13), Santa Margarita River mouth (42), Silver Strand bay shore (10), and Silver Strand Beach that included NAB (54). The total count of adult snowy plovers at all sites surveyed in San Diego County was 144 individuals. The San Diego County count comprised approximately 14.8 percent of the State-wide total count. In comparing adult snowy plover breeding counts in 2000 and 2002 there was a reduction in 16 adult snowy plovers in 2002 at Silver Strand Beach, including NAB. However, this information has to be evaluated in context with the respective number of snowy plover nests for 2000 and 2002, which increased from 37 to 57 nests. While the nest counts on Navy installations in San Diego County are precise, the State-wide estimates are point counts that can be highly influenced by weather conditions, tidal cycles, accessibility of the site, and the number and experience of the people conducting the count. Although these surveys do not provide accurate information regarding the exact number of plovers on a particular site, they are important to evaluating populations and sub-populations of adult snowy plovers over time.

The goal to achieve the long-term survival and recovery of the Pacific coast snowy plover population, as identified in the *Western Snowy Plover, Pacific Coast Population, Draft Recovery Plan*, includes three criteria: (a) maintain for 10 years an average of 3,000 breeding adults distributed among six recovery units (e.g., Recovery Unit 1 Washington and Oregon, 250 breeding adults; and in California, Recovery Unit 2 Del Norte to Mendocino Counties, California 150 breeding adults; Recovery Unit 3 San Francisco Bay, California 500 breeding adults, Sonoma to Monterey Counties, California 400 breeding adults, San Luis Obispo to Ventura Counties, California 1,200 breeding adults, and Los Angeles to San Diego Counties, California 500 breeding adults); (b) maintain a 5-year productivity of at least one fledged chick per male in each recovery unit in the last 5 years prior to delisting; (c) establish participation plans among cooperating agencies, landowners, and conservation organizations to assure protection and management of breeding, wintering, and migration areas listed in "Appendix B: Information on

Snowy Plover Breeding and Wintering Locations" to maintain the subpopulation sizes and average productivity specified in criteria "a" and "b" above (Service 2001).

ENVIRONMENTAL BASELINE

Regulations implementing the Endangered Species Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions that are contemporaneous with the consultation in progress.

The beaches of NASNI, NRRF, and NAB have historically been used for nesting by both western snowy plovers and California least terns. After a lack of observations presumably associated with both the species' status and human use of the areas, snowy plovers are once again nesting at NRRF and NASNI, and least terns and snowy plovers are present once again on NAB. Habitat for both species remains intact on all three beaches, although the level of human, domestic pet, and predator disturbances may sometimes preclude nesting. Navy management of the action area, including beaches of NAB, NRRF, and NASNI, as well as North Delta and South Delta Beaches has resulted in incidental take of individual least terns and snowy plovers, but has undoubtedly contributed to the overall increase in local abundance and distribution of these species.

The first records that indicate least tern and snowy plover use of Coronado and Silver Strand beaches include several specimens currently housed at San Diego Natural History Museum (Phil Unitt, pers. comm.). Least tern specimens include 5 specimens taken from the Silver Strand during the breeding season between 1921 and 1926, and one specimen taken from the "Coronado Strand" in 1918. Western snowy plovers also historically used the beaches of Coronado and the Silver Strand during the breeding season as well as during the non-breeding season. The San Diego Natural History Museum has one Snowy plover specimen collected from the Strand in the Spring of 1918, one specimen collected from Coronado in April 1926, as well as eggs collected from the Strand in 1921 and from Imperial Beach in 1928. The LA County Museum houses 2 western snowy plover skins (one male and one female taken on the same day) collected on May 27, 1899 on "Coronado Beach". While the collection location of these specimens is not precise enough to allow us to determine if they were within the boundaries of NRRF, NAB, or NASNI, it is likely, given these records and the habitat affinities of least terns and western snowy plovers, that these avian species historically nested on NASNI, NAB, and NRRF. Snowy plover pairs were also reported by L. E. Stenzel and S. C. Peaslee on the Silver Strand in May 1978 as part of an extensive study of the distribution and ecology of the species through California (Page and Stenzel 1981).

In 2002, 50 least tern eggs were collected from NAB beaches and incubated and reared by Project Wildlife. Of the 50 lest tern eggs taken to Project Wildlife, 43 eggs hatched and 32 young chicks survived to the fledgling stage. These captive reared fledglings were released on

Delta Beach, NAB in 2002, prior to the onset of migration, with the expectation that social interaction between these captive and wild reared birds would increase the likelihood of survival of the captive reared birds. Fifteen additional young least terns reared by Project Wildlife were released at Delta Beach, including three individuals raised from other collected eggs and 12 from chicks taken into captive rearing due to their poor physical condition (e.g., typically underweight) and/or abnormal behavior. All of the captive reared birds released at Delta Beach were banded with a numbered blue anodized band that was attached to the left leg along with a Service band that was secured to the right leg. None of the captive birds released at Delta Beach were seen after the day of release with two exceptions. One least tern was found injured at NASNI having flown into a restroom and the other released bird was found dead at the Salt Works, which is part of South San Diego Bay National Wildlife Refuge (Copper 2003).

In 2002, biological monitors relocated three least tern nests on the ocean beaches of NAB. Two nests were relocated from the active training beach lane Green 2 to the protected beach lane of Green 1 and one nest was relocated from the beach crossing lane located between beach lanes Blue 2 and Orange 1. One of the relocated nests with two eggs was preyed upon by a Virginia opossum (*Didelphis virginiana*). The second nest with two eggs that was relocated from Green 2 was successful in that both eggs hatched and the chicks were banded. The least tern nest with two eggs that was relocated from the beach crossing lane established between Blue 2 and Orange 1 was successfully moved. Both eggs from this nest hatched after being relocated (Copper 2003).

In 2002, as a conservation measure, the Navy prepared 15 additional acres on South Delta Beach for snowy plover and least tern habitat. The northwestern section of this newly prepared area supported 17 least tern and two snowy plover nests. Four of the 17 tern nests were abandoned and 13 of the nests hatched young. One plover nest in the new area hatched three young. There was no nesting by least terns or snowy plovers at the southern end of the site. No plover foraging was observed along the southern shoreline of South Delta Beach (Copper, pers. comm. 2003).

Snowy plover nesting also occurs on the ocean beach of NASNI and NRRF. Nesting snowy plovers were first documented at NASNI in 1979 by Elizabeth Copper (Unitt 1984). In 2002, 26 nests were documented by biological monitors along the NASNI ocean beach. Some military training was conducted at NASNI beaches in 2002, however, the number of training events and the extent of the beach utilized for training has not been documented by the Navy.

In recent years snowy plover nesting has been documented at NRRF in 1996, 1997, 2000, 2001, 2002, 2003. In 2002, 13 snowy plover nests were found on the ocean beach of this facility. In addition to military training, the southern beach front area of NRRF is also utilized by youth recreational activities sponsored by YMCA Camp Surf (e.g., aquatic skills, arts, crafts, outdoor education). This facility occupies 45 acres of land on the southwestern corner of NRRF and is leased from the Navy under a long term agreement that expires in 2048. Camp Surf currently serves 6,000 to 7,000 youth each year [Integrated Natural Resources Management Plan (INRMP)], Naval Base Coronado 2002). Currently the biological monitors use stakes to mark a small portion of the beach dunes at NRRF where there are active snowy plover nests.

Of the 13 snowy plover nests found at NRRF in 2002, only 5 nests survived to hatch young. Copper (pers. comm. (2002) reported that of the 36 eggs laid, 22 were lost to human disturbance/predators, 13 eggs hatched and one egg was incubated to term but failed to hatch. It was noted by a biological monitor that on April 25, 2002, four of five active snowy plover nests were found empty (e.g., eggs missing). While predation may have been the cause of the missing eggs, there had been persistent human activity in the immediate area of the nests.

Significant project planning was implemented during the past two years with the formulation of INRMP's on San Diego Bay and Naval facilities adjacent to the Bay. The Navy and the San Diego Unified Port District completed an INRMP for San Diego Bay in September 2000. During preparation of the INRMP, the Navy and the Port received technical advise and direction from a Technical Oversight Committee, a Science Advisory and Review Team, and a Naval Installations Oversight Committee. This document provided up-to-date information on the biological resources of San Diego Bay and future management strategies that could be implemented by the Navy and the San Diego Unified Port District, the two major managers and users of the bay. One of the goals addressed by the State and Federal resource agencies, who were members of the Technical Oversight Committee, was for the Navy and the San Diego Unified Port District to seek opportunities to create intertidal and subtidal habitats within San Diego Bay, given that 84 percent and 42 percent of the historical acreage of intertidal (+2 feet to -2 feet Mean Lower Low Water (MLLW) and shallow subtidal habitat (-2.2 feet to -12 feet MLLW), respectively, have been lost to past dredge and fill activities (U.S. Navy and San Diego Unified Port District 2000). The opportunity for creation of new intertidal and shallow subtidal habitat came with the Navy's dredging of a berthing facility for a NIMITZ-class aircraft carrier (CVN) at Naval Air Station North Island (USN P-700A). The project resulted in the dredging of approximately 534,072 cubic yards of sediments that needed an area for disposal. The Navy decided to dispose the majority of this material in San Diego Bay waters that were -12 to -15 feet MLLW immediately adjacent to the NAB Coronado. The disposal operation, which occurred between 2000 and 2002, resulted in the creation of an island surrounded by existing eelgrass. This island is known as the CVN Enhancement Site and is comprised of 6 acres of intertidal habitat and approximately 15 acres of shallow subtidal habitat. The CVN Enhancement Site with its shallow water bathymetry was designed to provide productive foraging habitat for shorebirds, wading birds, and colonial seabirds, such as the least tern.

In May 2002, the Navy released the final INRMP for Naval Base Coronado (NBC). The Sikes Act Improvement Act [16 U.S.C. 670(1) et seq.] of 1997 required the Department of Defense to prepare INRMP's. The NBC INRMP addressed the management of six separate installations under the administration of NBC including NASNI, NAB, NRRF, Naval Outlying Field Imperial Beach (NOLF IB), La Posta Mountain Warfare Training Center, and Survival Evasion Resistance and Escape Training School. NASNI, NAB, and NRRF are key installations that support nesting populations of least terns and snowy plovers and are addressed in this biological opinion. The Service was a member of the 2001 NBC INRMP Working Group that identified issues and strategies for managing the natural resources found on NBC, including measures to

avoid and minimize the take federally listed species, such the least tern and snowy plover, in their management of the installations.

In addition, during 2001 the Service worked with the Navy on the finalization of two other INRMP's that had military installations adjacent to San Diego Bay. These INRMP's, which were released by the Navy in 2002, included the Naval Base Point Loma (July 2002), and Naval Base San Diego (August 2002). Naval Base Point Loma INRMP addressed natural resources at Naval Submarine Base, San Diego (SUBASE), Space and Naval Warfare Systems Center San Diego (SSC), Fleet Combat Training Center (FCTCPAC), Fleet Anti-Submarine Warfare Training Center, Pacific (ASW), Fleet Intelligence Training Center, Pacific (FITCPAC), and Space and Naval Warfare Systems Command (SPAWAR) Headquarters. Naval installations, including the SUBASE, SSC, and FCTCPAC, are located on Point Loma, a prominent land form that delineates the northern edge of the mouth of San Diego Bay. Installations ASW and FITCPAC are located adjacent to San Diego Bay near Harbor Island. The Naval Base San Diego INRMP addressed natural resources at the Naval Station San Diego, Mission Gorge Recreational, Facility and Broadway Complex. Naval Station San Diego and Naval Base Point Loma are major military installation adjacent to San Diego Bay. The Navy's dredging and other in-water activities are reviewed by the Service for potential effects to the least tern foraging success.

Military installations adjacent to San Diego Bay, such as SUBASE, NAB, and Naval Station San Diego (NAVSTA), need to perform maintenance and new construction of facilities that routinely require in-water construction activities. In an effort to address in-water construction activities that could affect the success of least tern foraging, a Memorandum of Understanding (MOU) between the Service and the Navy was developed in October 1987 that established standards and conditions for in-water construction projects that would minimize adverse effects to this species. The MOU defines geographical areas and physical conditions under which in-water Naval construction activities may occur in San Diego Bay without the need to conduct formal section 7 consultation. The MOU was renewed by the Navy and the Service in 1993 and was updated and renewed again in 2004.

Major Navy construction activities on-going within San Diego Bay include a replacement pier and dredging at the Naval Station San Diego. The project includes the demolition of existing piers 10 and 11, construction of a single-deck pile supported replacement pier (120 feet wide x 1,500 feet long), and dredging 763,545 cubic yards of bay sediments, of which 47,966 cubic yards have been determined to be "unsuitable" for ocean disposal due to contaminant levels. The Navy anticipated that project construction may extend for 24 to 30 months in 2002 and 2003. This specific project was addressed in the Navy's draft and final Environmental Impact Statement (EIS) Replacement Pier and Dredging Naval Station San Diego, California, dated October 2000 and June 2001, respectively. This project incorporated measures to avoid effects to the least tern including: (a) the use of silt curtains during dredging and placement and removal of pier pilings to minimize the spread of surface turbidity that could hinder the least tern ability to visually sight potential prey items within the project area; (b) the use of booms to contain surface debris associated with the demolition of piers 10 and 11; (c) a commitment by Navy personnel to schedule pile driving operations to the maximum extent practicable during the non-breeding

season of the least tern (the new pier would require the installation of 800 piles and would last for 24 months); (d) the creation of two additional acres of intertidal habitat at the Navy's CVN Enhancement Site in San Diego Bay adjacent to the NAB (for a total of 8 acres of intertidal habitat at the CVN Enhancement Site); and (e) the placement of fish attractant structures at the northern, southern and western portions of the CVN Enhancement Site. In 2002, two pilings that were removed during the demolition of pier 10 were cleaned and broken into small sections for use as fish attractant structures at specific locations around the perimeter of the CVN Enhancement Site. In January 2003, these piling sections were barged to and laid in place at the CVN Enhancement Site. In addition, approximately 150 pilings from piers10 and11 were used at the site of the "International Reef." This artificial reef structure is one of many that have been constructed along the southern California coast as habitat enhancement features for marine fish. The reef is being constructed in nearshore Pacific Ocean waters off of the City of Imperial Beach. The construction of the pier replacement project at the Naval Station is approximately 80 percent completed.

Other on-going military construction projects occurring in San Diego Bay include the Force Protection Barrier Systems around the perimeter of the docks at SUBASE, the carrier berthing area at NASNI, and NAVSTA. This barrier system is a floating structure held in place with anchors that are employed around the perimeter of docks and berthing areas at each of these Navy facilities. The Southwest Division, Naval Facilities Engineering Command and the Service coordinated on the placement of these structures to avoid project impacts to eelgrass beds and least terns (e.g., timing of project construction during the non-nesting season of the least tern). The Navy reconditioned Pier 4 at the NAVSTA by pouring a new concrete deck. No in-water construction activity is associated with latter project.

The Navy held a meeting on November 19, 2002, to discuss future military construction projects and military training operations to employ within San Diego Bay and the Pacific Ocean. Significant proposed actions that may affect least terns and snowy plovers include: (a) the Navy planned release of a draft EIS in November 2003, for the "Current and Future Training Operations and Maintenance at the Beaches of NAB and NRRF"; and (b) the proposed release of an Environmental Assessment (EA) for the "Naval Lodge Complex Expansion, NASNI" that is immediately adjacent to the Pacific Ocean beach occupied by nesting snowy plovers.

The San Diego Unified Port District is implementing another major construction project in San Diego Bay. The project involves the extension of the west-facing wharf at the National City Terminal, with the installation of 325 piles approximately 1,025 feet to the south and 220 feet to the west from the existing shoreline to match the existing wharf configuration at Berths 24-3 and 24-4, and the removal of 217,500 cubic yards of sediment associated with deeping a portion of Berth 24-1, maintenance dredging of Berths 24-2 through 24-4, and dredging at the new wharf known as Berth 24-5. This project incorporated measures to avoid effects to the least tern, including: (a) the use of a vibratory hammer to significantly reduce the noise generated during pile driving; (b) the replacement of mercury vapor flood lamps with high pressure sodium lamps on 30-foot high poles (light poles 40-49) on National City Terminal that are closest light sources to the D Street Fill, which is utilized by the least tern and snowy plover for nesting; and (c)

appropriate sand material excavated from the intertidal/shallow subtidal habitat being created on D Street Fill will be placed on-site and trucked to the Chula Vista Wildlife Reserve to enhance nesting substrate for the least tern and snowy plover. Wharf construction was initiated in 2002 and was continuing in 2003. Project impacts to intertidal and shallow subtidal habitats are proposed to be offset with a wetland restoration project on Port-owned land on D Street Fill. The final design for the restoration proposal was prepared in 2003 by Merkle and Associates and submitted to the U.S. Army Corps of Engineers for approval.

In June 2000, the Service initiated the process of developing a Comprehensive Conservation Plan (CCP) for the Sweetwater Marsh National Wildlife Refuge (Sweetwater Refuge) and the South San Diego Unit of the San Diego National Wildlife Refuge (SSDB Refuge Unit). Both the Sweetwater Refuge and the SSDB Refuge Unit are located in south San Diego Bay. The Sweetwater Refuge includes approximately 316 acres of salt marsh and upland habitat, while the acquisition boundary for the SSDB Refuge Unit encompasses approximately 3,500 acres of open bay water, salt ponds (formerly Western Salt property and salt ponds leased by Western Salt from the State of California), wetlands, and uplands (primarily former agricultural lands within the floodplain of the Otay River and Nestor Creek). The purpose of the CCP is to provide a clear statement of the desired future conditions for the Sweetwater Refuge and SSDB Refuge Unit through the development of a 15-year management plan. This management plan will include proposals for the management and conservation of fish, wildlife, and plant resources, while also describing opportunities for compatible wildlife dependent recreation. A variety of habitat management actions will be addressed in the CCP, including a proposal to enhance or restore habitat to support threatened and endangered species, including the least tern, snowy plover, and light-footed clapper rail. The Service received public input through a series of workshops. Based on the input received to date, the Service is preparing a draft CCP that will include a range of management alternatives pursuant to the National Environmental Policy Act. The draft CCP/EIS is expected to be released for public review in summer 2003.

EFFECTS OF THE ACTION

California least tern

The Navy proposal to continue training activities on beaches at SSTC and NASNI and utilize the beach crossing lane at South Delta Beach would result in the potential harassment of least terns that might otherwise have nested in these areas on approximately 80 acres of beachfront habitat, as well as potential harm to or loss of nests, eggs, or chicks that also occur on the beaches. The beneficial predator management of the tern colony in beach lanes Orange 1 and Orange 2; the lack of training proposed for Orange 1, Orange 2, Blue 2, and Green 1 (55.15 acres); the deterrents presented by the military to casual recreational use and dog-walking; and the efforts to increase the size of the colony nesting on the Least Tern Preserve (Delta Beaches) are expected to benefit terns in these protected areas and partially offset losses that may occur due to training. However, the limitation on controlling predators to the immediate lane boundaries of Orange 1 & 2 is expected to reduce the effectiveness of the predator management program and reproductive success of terns at NAB at large, including the four beach-nesting lanes.

Since breeding least terns often re-nest at the same sites year after year (Atwood et al. 1988) and the combined total number of nests that occurred in beach lanes Red 1, Red 2, Green 2, and Blue 1 has been relatively large (115 nests in 2001, 82 nests in 2002, 155 nests in 2003), we anticipate that least terns will lay eggs in these four beach lanes in spite of the harassment resulting from military training operations, especially since the deterrent mechanisms employed in previous years (raking and egg collection) are not proposed in 2004. Although nests would be marked with green tongue depressors, the small size of the markers *in lieu* of more obvious indicators increases the potential for damage or destruction of nests, eggs, or chicks during training exercises. An unknown number of nests are likely to succeed in active training lanes since each nest occupies a small point on the beach, not every point is likely to experience foot/vehicle traffic, and nests are often distributed away from the primary path of most training activities in each 500-yard training lane. Even with the relatively high number of tern nests found within the training lanes in 2003 (155 nests), less than 155 square feet of the NAB training beaches actually had a tern nest present, as each nest is less than one square foot. Since the NAB training lanes cover approximately 3,185,978.4 square feet (73.14 acres x 43,560 sf/acre), tern nests occupied less than 0.00005 (155/3,185,978.4) of the training beach acreage.

Navy management of the least tern has contributed to the dramatic increase in tern numbers in California witnessed in the past 8 years. Management actions have varied from year to year but have included avoidance of nests in training areas, and active management to benefit the species (site preparation, predator management) in conserved areas (MAT site, Least Tern Preserve). Concurrent with beneficial management at specified sites, the Navy has attempted to deter terns from nesting on beach areas designated for over-the-beach training with the thought that terns could relocate to these adjacent, managed sites. Efforts to deter terns have included beach raking, nest removal, and most recently, discontinuation of predator management activities in the beach training lanes. The primary assumption on which deterrent activities was based is that military training would be incompatible with tern nesting on the beach. Deterrent activities on the beaches have appeared to be largely ineffective and terns have continued to nest on the training beaches. In 2003, the Navy monitored the losses of nests associated with military training activities. Out of 155 nest initiations, only 6 nests were lost to training activities. This level of nest loss contrasts with approximately 157 (2003 monitoring summary table)- 161 (final predator management report) nests that were lost to predators during the same time period. It is likely that the number of nests lost to training would have been higher had the Navy not relocated 50 nests during the course of the breeding season, however, the relative level of nest loss associated with training in 2003 compared to the much higher losses from predation may indicate that tern colonies may have some level of compatibility with Navy training (at 2003 training levels). Unfortunately, information concerning the frequency, intensity, and duration of training activities conducted in 2003 was not compiled to allow comparison to the use levels expected during the breeding season in 2004 and 2005. Since nests occupy a minute percentage of the training lanes (see preceding paragraph) and are not proposed for avoidance, they would present virtually no impediment to training activities across the beach.

The Navy proposal to move some nests at the periphery of active training areas to adjacent protected areas is likely to result in a net benefit, though some nest losses would occur. Losses may occur if adults abandon nests due to the movement of the eggs, if predators are attracted by the move, or if the eggs are otherwise damaged from the move. Based on the number of nests that were in the areas where moving is proposed and the results of nest moving in previous years, we anticipate that approximately 10 percent of the nests that are moved may be lost.

Protection of least tern and snowy plover nests from military training operations provided in beach lanes Green 1, Blue 2, Orange 1, and Orange 2 is likely to result in higher numbers of birds nesting and higher nest success in these areas. The four beach lanes in which no training activity is proposed during the breeding season encompass about 55 acres of nesting habitat for terns and plovers (Conkle 2003b). The protection of these areas is of primary benefit to terns, since plovers are more uniformly distributed along the beach front. In addition, predator management activities proposed for beach lanes Orange 1 and Orange 2 would benefit birds in these lanes and may have some positive effects on nests initiated outside of Orange 1 and Orange 2. Based on the level of predation observed in previous years, adequate predator management is a necessary component of successful least tern management. Since terns continue to nest on the training beaches despite previous efforts to deter them, we expect terns to nest in the lanes for which no predator management is currently proposed. The proposal to exclude predator management activities from training lanes Yellow 1, Yellow 2, Red 1, Red 2, Green 1, Green 2, Blue 1, and Blue 2 could result in a local "sink" for terns, with reduced productivity occurring over most of the beach due to likely higher rates of predation. A lack of predator management along most of the beach front could also affect predation levels on the bay, as predators could move easily from the ocean side to the bay side of the Strand.

Due to the rarity of the gull-billed tern, the Service has not authorized the Navy or Wildlife Services to target this predatory species under their predator management programs. The proximity of breeding gull-billed terns to SSTC and NASNI is likely to have an adverse effect on terns and plovers this breeding season, as occurred in 2003, when apparently heavy gull-billed tern predation was documented (Conkle, pers. comm. 2003). As of July 2004, approximately 39 gull-billed tern nests produced offspring in south San Diego Bay. These terns prey on a variety of small vertebrates, including baby birds. The presence of gull-billed terns, and the likelihood that they will locate and concentrate their foraging in the vicinity of SSTC and NASNI, may be exacerbated by the few and highly visible local concentrations of terns. Least terns attempt to mob gull-billed terns but when this strategy fails, many chicks can be lost since high nesting densities are readily detectable and gull-billed terns apparently exploit least tern colonies as an abundant food source. Significant gull-billed tern predation has already occurred part-way through the 2004 breeding season. To date, monitors have witnessed gull-billed terns taking or attempting to take 40 California least tern chicks from colonies surrounding San Diego Bay and significant additional loss to this species is suspected. Gull-billed tern predation has contributed to the very low reproductive success seen to date at NAB.

Since the late 1990s, a significant number of terns have nested on both the bayside Delta Beach Least Tern preserve sites and on the ocean beaches at NAB. Efforts to deter terns from nesting

on ocean-side beaches have been largely unsuccessful, with 52-57% of the terns at NAB nesting on the beaches since 2000 despite beach raking conducted during the breeding season (2001), removal of eggs laid within specified areas (2002, 2003), and discontinuation of predator control activities (2003). The most recent effort to deter terns from nesting on the beach entailed discontinuation of predator management activities on the NAB beaches in 2003. This effort was undertaken as an experiment, to see if discontinuation of predator control would deter terns and change distribution patterns, as previous deterrent efforts were costly and had been unsuccessful (Martin Kenny, pers. Comm.. 2004). Until the 2003 breeding season, predator management activities had been conducted in all areas where least terns were found on Navy-managed lands. The experiment in modification of predator management is considered a failure by retired FWS personnel involved in the project (Martin Kenny 2004, pers. comm.). Significant levels of predation occurred due to the unconstrained presence of non-native mammals on the beaches- approximately 139 least tern nests failed due to skunk, possum, cat, or other unidentified mammalian predation between May 23 and July 7, 2003 (2003 Predator Management Report).

Table 5:

Naval Amphibious Base: Predation on Ocean Beaches 2003

Date	Number of Nests	Nesting Species	Lane/Unit	Predator Species
April 19	1	WSP	Blue 1	Skunk
April 21	1	WSP	Blue 1	Skunk
April 23			**Blue 1**	**Skunk Removed**
May 23-31	87	CLT	Blue/Orange 1, 2	Skunk/ Possum
May 28	1	WSP	Blue 2 / Orange 1	Skunk
May 29,30			**Blue 1- Orange 2**	**Possum Removed**
May 31			**Blue 2- Orange 1**	**Skunk Removed**
June 3	1	CLT	Blue 2	Unknown
June 7	3	CLT	Blue 1	Skunk/Cat
June 9	9	CLT	Green 2	Skunk/Cat
June 11	2	CLT	Green 1	Skunk/Cat
June 13	6	CLT	Green 1	Skunk/Cat
June 13	1	CLT	Red 2	Skunk/Cat
June 14	2	CLT	Green 1	Skunk/Cat
June 16	4	CLT	Green 1	Skunk/Cat
June 16	1	CLT	Red 2	Skunk/Cat
June 19			**Green 2 (demopit)**	**Cat removed**
June 23	1	CLT	Red 2	Skunk/Cat
June 26	10	CLT	Blue 2	Skunk/Cat
June 26	1	WSP	Blue 2	Skunk/Cat
June 27	5	CLT	Blue 2	Skunk
June 27	*2*	*CLT*	*Orange 1*	*Gull-billed tern*
June 28	1	CLT	Orange 1	Skunk
June 28	2	CLT	Orange 2	Skunk
June 28	1	WSP	Orange 1	Skunk
June 30	3	CLT	Green 1	Unknown
June 30	*5*	*CLT*	*Orange 2*	*Gull-billed tern*
July 1	1	CLT	Red 1	Unknown

July 1	*3*	*CLT*		*?*	*Gull-billed tern*
July 3				**Blue 1**	**Skunk removed**
July 4	*1*	*CLT*		*Red 1*	*Gull-billed tern*
July 5	*1*	*CLT*		*Green 1*	*Gull-billed tern*
July 5	1	CLT		Green 1	Raven
July 5	2	CLT		Blue 2	Unknown Mammal
July 5	1	CLT		Orange 1	Unknown Mammal
July 7	1	CLT		Red 2	Unknown Mammal
July 7	1	CLT		Blue 2	Unknown Mammal
July 11	1	CLT		Green 1	Unknown
July 14	*1*	*CLT*		*Orange 1*	*Gull-billed tern*
July 15	*1*	*CLT*		*Green 1*	*Gull-billed tern*
July 18	1	WSP		Blue 2	Western Gull
July 18					**W. Gull removed**
July 30	*1*	*CLT*		*Green 1*	*Gull-billed tern*
Total Nests Preyed Upon on NAB Ocean Beaches:			**6 WSP, 161 CLT**		
Total Known or Suspected Lost to Gull-billed Terns:			**0 WSP, 15 CLT**		
Total Known or Suspected Lost to Mammals:			**5 WSP, 139 CLT**		

* Table based on data contained in Eidson and Carillo (2003): 2003 Final Predator Management Report

Despite the significant losses to predators during this season, the distribution of terns on Navy ocean-side and bay-side beaches remains the same to date in 2004 as it was in 2003 (Table 6). It appears that allowing the significant mammalian predation reduced the overall productivity of the tern colony, but did not change the distribution of the nesting birds. We anticipate that the current proposal to continue restricting predator management activities on the beaches at NAB is likely to contribute to low reproductive success in the CLT colony without resulting in changes in local distribution on the beaches.

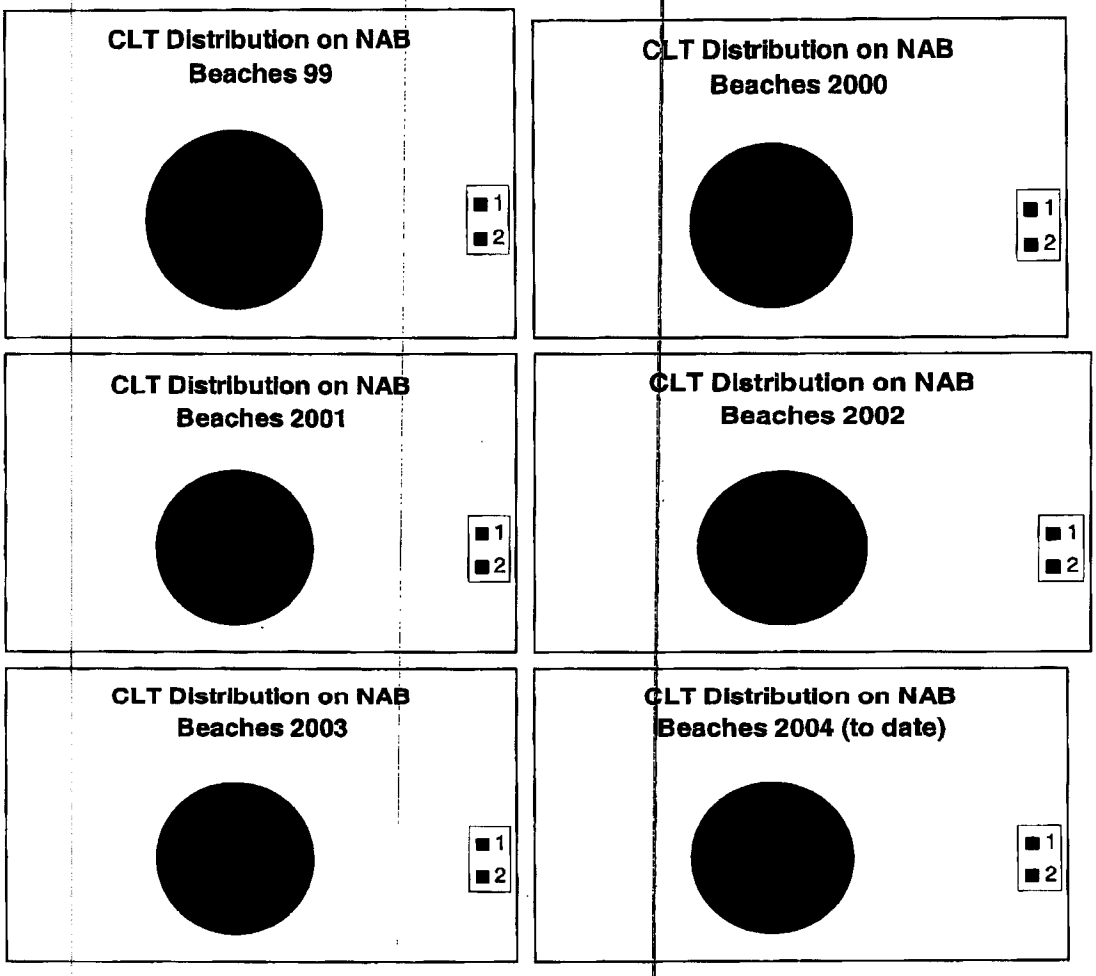
Table 6. Distribution of Least Terns at NAB: Bayside vs. Beachside

Year	Bayside Nests (%)	Beachside Nests (%)	Total Nests
1999	424 (60)	278 (40)	702
2000	300 (48)	330 (52)	630
2001	352 (43)	462 (57)	814
2002	341 (46)	401 (54)	742
2003	501 (45)	623 (55)	1124
2004 (as of July 11)	455 (45)	549 (55)	1004

Likewise, the distribution of nests on the ocean-side beaches at NAB has changed little in recent years. Since 2000, approximately 25 percent of the least terns nesting on SSTC ocean beaches each year have nested in lanes proposed for training in 2004 (Yellow 1 & 2, Red 1 & 2, Green 2, Blue 1), and 75 percent of the least terns nesting on SSTC ocean beaches have nested in lanes

proposed for protection (Green 1, Blue 2, Orange 1 & 2): In 2000, 76 percent of the least terns that nested on NAB and SSTC ocean beaches nested in areas now proposed for conservation; in 2001, 75 percent nested in areas now proposed for conservation; in 2002, 79 percent nested in areas now proposed for conservation; and in 2003, 75 percent in areas now proposed for conservation. Based on the recent least tern distribution and use of beaches at NAB and NRRF, approximately 25 percent of the least terns that nest on the beach are likely to nest within the beach lanes proposed for training during the breeding season and would be exposed to higher risk of harassment, injury, or fatality associated with training activities. The distribution of nests between training lanes and lanes protected during the breeding season has changed little in recent years.

Figure 1: Distribution of Least Terns on NAB Beaches, 1999-2004



1= the percentage of beach nests found within lanes currently designated for training (Yellow 1,2; Red 1,2; Green 2; Blue 1)
2= the percentage of beach nests found within lanes currently protected from human disturbances during the breeding season (Green 1, Blue 2, Orange 1 & 2).

Western snowy plover

The actions proposed on the beaches at SSTC and NASNI are likely to result in the protection of many plover nests from foot and vehicle traffic due to the establishment of 30-meter buffer zones around each documented plover nest, but may adversely affect snowy plover chicks that venture outside the protection of the area marked by blue stakes. Chicks are precocial and may disperse soon after hatching. Since males often lead their chicks to less disturbed sites, the 30-meter buffer zone surrounding each nest may provide a refuge area for chicks if significant vehicle and foot traffic are occurring in the area. When male snowy plovers lead chicks from the staked area, however, they are likely to be exposed to foot and vehicle traffic associated with training.

If snowy plover nests are successfully established in beach lanes Yellow 1, Yellow 2, Red 1, Red 2, Green 2 and Blue 1, we anticipate that snowy plover chicks may be killed or injured during military training operations. Snowy plover adults and chicks have been observed using tire tracks and human footprints for loafing at Marine Corps Base Camp Pendleton and NAB (Powell and Collier 1994). This behavior increases their chances of being run over by vehicles or stepped on by troops, particularly when training operations are being conducted in a confined area. A defense mechanism of snowy plover chicks, particularly flightless young, is to remain immobile, which renders them vulnerable to being run over or stepped upon by military vehicles and troops.

The proposed 30-meter buffer areas may also provide advance protection to re-nesting females since re-nesting occurs throughout the breeding season and may occur within the same territory or scrape. Females may re-nest in the same scrape, an entirely new location, or anywhere in between. Re-nesting can occur 2 days to 14 days post-hatch (Warriner et al. 1986).

Based on 2003 nest numbers in Yellow 1 & 2, Red 1 & 2, Green 2, and Blue 1, we anticipate that approximately 19 snowy plover nests would be within beach lanes designated for military training at NAB and 9 snowy plover nests could be within beach lanes at NRRF. In 2002, military training occurred on only 2 lanes (Green 2 and Blue 1), and snowy plover reproductive success was estimated at 0.86 fledgling per breeding pair, based on an estimated 18 fledglings and 21 breeding pairs. In 2003, military training occurred on 4 lanes (Red 1 & 2, Green 2, and Blue 1) yet overall reproductive success remained high with an estimated 1.55 fledgling to breeding pair ratio, based on 31 estimated fledglings and 20 estimated pairs. At NRRF in 2003, where training occurred in all training lanes, reproductive success was slightly lower than at NAB, with an estimated 1 fledgling per breeding pair (5 estimated fledglings and 5 estimated breeding pairs. In 2004, we assume similar levels of nesting will occur.

The number of snowy plover nests at NASNI increased from 13 nests in 2001 to 26 nests in 2002, and an estimated 31 nests in 2003. The estimated 31 nests in 2003 were produced by approximately 13 breeding pairs that fledged an estimated 22 chicks for a fledgling to breeding pair ratio of 1.69. Not all of the nests produced at NASNI in 2003 were constructed on beaches--a minimum of 10 were constructed away from the beach on suitable substrate. All of the NASNI beach areas where nests were established in 2002 and 2003 would be subject to training activities in 2004. Since maintenance activity on the airfield has resulted in the modification of some areas

previously used for nesting, the fledgling per breeding pair ratio could change in 2004. However, if military training operations are similar to what was conducted in 2002 and 2003, approximately the same number of adult snowy plover pairs utilize NASNI beaches for breeding, and predation levels remain similar to what was experienced last year, the fledgling per breeding pair ratio could be similar to what was achieved in 2002 and 2003.

In 2002, the ocean beaches at NASNI, NAB, and NRRF had 26, 57, and 13 western snowy plover nests, respectively, for a combined total of 96 nests. In 2003, the ocean beaches at NASNI, NAB, and NRRF had 31, 59, and 5 western snowy plover nests for a combined total of 95 nests. Based on snowy plover nest numbers in 2003 at NAB, NASNI, and NRRF and where military training is proposed for 2004, we anticipate that approximately 59 snowy plover nests would be initiated in active training areas. To estimate the number of pairs present, the Navy has used as an estimator the maximum number of nests present at the same time. This provides an accurate number for the minimum number of pairs present, but may underestimate the number of pairs and result in an overestimate of productivity (measured as fledglings per pair). Based on this information, a combined total of 38 western snowy plover pairs used NASNI (13), NAB (20) and NRRF (5). If we assume that 50 percent of the snowy plover breeding pairs at NASNI, NAB, and NRRF may be subject to take in the form of harassment associated with training operations, 19 pairs may be subject to harassment associated with training. An additional but unknown number of fledglings likely would be killed or injured after they disperse from protected nest sites.

Proposed predator management at North and South Delta Beach is expected to benefit birds using those areas, however, few plovers have nested recently at these sites, possibly due to high numbers of least terns. Predator management proposed on Orange 1 & 2 and at NRRF is expected to benefit plovers that nest in these lanes, however, less than half of the 64 nests found within SSTC were located within Orange 1 & 2 and at NRRF. The absence of predator management proposed for the remaining beach lanes at NAB is likely to expose western snowy plovers to additional reproductive failure in these areas and may expose plover nesting in protected areas to additional predation as well. Under existing conditions, predators may move between areas where predator management is conducted and "safe zones" in the training lanes where it is not conducted. Although snowy plover eggs would be protected at NAB ocean beaches by the placement of modified mini-exclosures over each nest, these exclosures are not effective when precocial chicks leave the immediate vicinity of the nest. Six predation incidents occurred in 2003 that may have been avoided by more comprehensive predator management. In addition, it is likely that gull-billed terns, a rare species that is expanding its range into San Diego Bay and beyond, will once again exert heavy predation pressure on plover and tern chicks and suppress productivity of both species this season. Since gull-billed terns are considered a sensitive species due to their rarity, the Navy does not currently have authorization to remove or otherwise control this species on the beaches at issues.

The Navy manages North and South Delta beaches to meet requirements outlined in Opinion 1-1-82-F-123 and the associated March 12, 1984 *Memorandum of Understanding between the U.S. fish and Wildlife Service and the U.S. Navy relating to the Description and Management of a*

Preserve for the California least tern on Naval Amphibious Base Coronado. In addition, the Navy manages North and South Delta beaches as part of the effort to promote the survival and recovery of the tern population in San Diego Bay as outlined in the 2004 *Memorandum of Understanding Between the U.S. Fish and Wildlife Service and the U.S. Navy Concerning Conservation of the Endangered California Least Tern in San Diego Bay.* To minimize the effects of nesting habitat loss to least terns and snowy plovers, the Navy has continued to improve nesting substrate on the bay side nesting colonies by transporting, placing and spreading 2,000 cubic yards of ocean beach sand to improve 1.3 acres of South Delta Beach in 2004. This improvement adds to the augmentation of previous years as described in Biological Opinion 1-6-03 F-3452.1. However, losses of snowy plover nesting productivity on the ocean beach would be difficult to offset on South Delta Beach, given that between 1992 and 2003, the maximum number of snowy plover nests established on North and South Delta Beach in any one year was nine in 1992.

It should be expected that if nest numbers in 2004 are similar to those in 2003, there may be a need to relocate nests to safer places within active military training areas or to protected nesting areas adjacent to active military training areas. Although no nests required relocation in 2003, we anticipate that up to a combined total of 6 nests may need to be relocated from the beaches of NASNI, NAB, and NRRF.

Summary

The prevailing conservation strategy among responsible agencies of confining least tern nesting to relatively small, fixed, high density colony sites, instead of allowing more dispersed natural nesting patterns over larger spaces, renders the species more vulnerable to predation, especially if certain predators (e.g., gull-billed tern) can not be managed. As a result, least tern colonies often suffer higher mortality rates than western snowy plovers, which nest at lower densities over larger areas, and thereby tend to be less detectable. Since gull-billed tern predation along the NAB and Delta beaches has become a major source of least tern nesting mortality in the last several years, management prospects for least terns around San Diego Bay appear bleak without attempting alternative strategies. Effective efforts to manage other controllable predators could either increase the number of fledglings or be compensated for by increasing prey availability for gull-billed terns. Alternatively, allowing more least tern nesting opportunities over larger areas on the ocean beaches could increase productivity by reducing the predictability of nesting sites from year to year. Whether the Silver Strand provides a large enough nesting landscape to support less predictable/detectable nesting opportunities can only be determined through an adaptive management approach. A combination of these approaches may optimize the likelihood of success.

To be consistent with Navy training operations, any expansion of least tern nesting opportunities into training areas should not impinge on the type, frequency, or number of training activities. Any training-related losses of nests and chicks could simulate predation losses expected under more natural conditions, and if not too severe, may allow the co-existence of conservation and military priorities. Unless new approaches like this are experimentally applied by land managers,

the prospects for recovery of least terns around San Diego Bay appear problematic, given the lack of ability to control predators that are otherwise protected by Federal law.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future non-federal (State, tribal, local, or private actions) activities 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 consultation pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended. We anticipate that non-Federal actions, such as the prevalence of contaminants in San Diego Bay waters associated with certain marine activities (e.g., marinas and shipyards), the continued development of nearshore ocean and bay waters for commercial and recreational purposes, and the disturbance of nesting areas by humans and feral mammals, are expected to cumulatively contribute to adverse effects to the least tern and snowy plover.

CONCLUSION

After reviewing the current status of the least tern and the snowy plover, environmental baseline for the action area, effects of the project, and cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of these species. Critical habitat for the least tern has not been designated and critical habitat for the snowy plover was vacated on the beaches at issue; therefore, none would be affected. We draw these conclusions for the following reasons:

1. The reduction in suitability of 73.14 acres of ocean front least tern and snowy plover nesting habitat in beach lanes Yellow 1, Yellow 2, Red 1, Red 2, Green 2 and Blue 1 at NAB, 6.03 acres of ocean front least tern and snowy plover habitat with incorporation of Alpha Area at NAB, 49.67 acres of ocean front snowy plover nesting habitat in beach lanes White 1, White 2, Purple 1, and Purple 2 at NRRF, and 66.9 acres at NASNI (total acreage= 195.74 acres) is being offset in a manner that includes the following measures: (a) protection from training-related disturbance in Orange 1, Orange 2, Blue 2, and Green 1; (b) the relocation of any least tern nests within 10 meters of the protected ocean front nesting areas; (c) the grading and site preparation of South Delta Beach; (d) the enhancement of 1.3 acres of least tern and snowy plover nesting substrate by the placement of 2,000 cubic yards of beach sand on South Delta Beach; (e) the use of mini-exclosures on all snowy plover nests with eggs established on NAB ocean beach; and (f) control of ants that can prey upon eggs and chicks of snowy plovers and least terns at Delta Beaches and the MAT site. These measures should improve the habitat quality in protected areas and offset the reduction in suitability of areas that would receive continued training use. In addition, although approximately 195.74 acres would be reduced in suitability, a sizable number if birds is likely to continue to nest within these training lanes.

2. Snowy plover nests would be protected from foot and vehicle traffic. All snowy plover nests established in beach lanes Yellow 1, Yellow 2, Red 1, Red 2, Green 2 and Blue 1 that have been

designated for military training would be marked with a blue stake and a 30-meter buffer protected area would be established around each nest. This technique has proven relatively successful in the past in minimizing the potential for snowy plover nest loss associated with foot and vehicle traffic.

3. Least tern nests may be afforded some protection from markers intended for monitoring purposes. All least tern nests established in beach lanes Yellow 1, Yellow 2, Red 1, Red 2, Green 2, and Blue 1 would be marked with green tongue depressors in an effort to provide a visual cue to military troops concerning the presence of nests. Though these markers may be relatively inconspicuous, they likely will provide some measure of protection.

4. The Navy would ensure that military training operations do not result in the intentional removal kelp or other natural marine vegetation. The wrackline of these wave-deposited plants and associated invertebrates is an important food resource for snowy plovers.

5. The Navy would implement predator management activities to enhance the reproductive success of least tern and snowy plover nesting sites including North Delta Beach, South Delta Beach, NRRF, Orange 1 and 2, NASNI ocean beaches and "Mat" site. However, based on data collected in 2003, the lack of predator control proposed on most of the ocean beach at NAB could result in reduced productivity for least terns and snowy plovers. In addition, the presence of gull-billed terns may adversely affect the least tern and snowy plover colonies because the Navy currently is unable to manage gull-billed terns due to their rarity.

6. The Navy would prepare least tern and snowy plover nesting colony sites that include the "MAT" site on NASNI, and North and South Delta Beach on NAB, thereby promoting successful nesting at these established sites.

7. The Navy would employ biological monitors to document least tern and snowy plover nest locations, breeding numbers, reproductive success, and predator problems at NAB, NRRF, and NASNI, which would maximize nest site productivity.

8. The Navy would construct two beach crossing lanes (e.g., a 50-foot lane between Blue 2 and Orange 1 and 100-foot lane between Orange 2 and the State Beach) to designate a pathway for the movement of troops, vehicles, and equipment from Highway 75 to the Pacific Ocean, thereby minimizing the potential for take associated with such activities. A separate 50-foot wide beach crossing lane would be established on South Delta Beach to provide a designated pathway for military operations proposed in San Diego Bay. These beach crossing lanes would be positioned to avoid the largest number of current and historic nest sites.

9. The number of terns and plovers on NRRF, NAB, and NASNI beaches has increased in recent years under similar management.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations issued pursuant to section 4(d) of the Act prohibit take of endangered and threatened species without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing potential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral 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, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2) of the Act, such incidental take is not considered to be a prohibited taking under the Act, provided that such taking is in compliance with this incidental take statement.
The measures described below are nondiscretionary and must be undertaken by the Navy so they become binding conditions of any permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity covered by this incidental take statement. If the Navy (1) fails to adhere to the terms and conditions, (2) fails to require the enforceable terms that are added to the permit, and/or (3) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impacts of incidental take, the Navy must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

Amount or Extent of Take Anticipated

Based on our discussion in the effects analysis, we anticipate the following take may occur on the training beaches at NASNI, NAB, and NRRF in the form of harm or harassment. The anticipated level of take does not include that which may occur on NASNI airfield, the MAT site, or other areas on-base.

California least tern

1. We anticipate that approximately 25 percent of the least terns nests constructed on the ocean beaches at NAB are likely to occur within training lanes, and therefore would be subject to potential disturbance or destruction. Based on the number of nests constructed in active training lanes in 2003, 155 nests could be constructed in active training lanes and would have some probability of harm or destruction due to training activities. In 2000, 2001, 2002, and 2003, the number of nests constructed in Yellow 1 and 2, Red 1 and 2, Green 2, and Blue 2 comprised 21-25 percent of all nests constructed on the NAB beaches. Based on numbers and distribution as of July 11, 2004, this distribution pattern has continued despite previous attempts to deter terns from areas designated for training activities- 121 of 549 nests constructed on the beach to date in 2004 (22%) are located within training lanes. Chicks that are produced in the nests located within training lanes

may also be subject to injury or death from crushing. The low level of nest loss associated with training activities in 2003 (6 of 155 nests) leads us to conclude that while nest loss may occur and must be anticipated, the high level of incidental take exempted in this opinion is not likely to occur given the low density and peripheral placement of tern nests. We expect that the level of take in 2004 may be higher than the level observed in 2003 due to increased training tempo.

2. Based on the nest abundance and distribution in 2003 (155 nests in training lanes), we anticipate that approximately 310 adult least terns that attempt to nest in training lanes could be harassed as a result of military training activities.

3. Based on nest abundance and distribution in 2002 and 2003, we anticipate that up to 28 nests that meet the criteria described in the proposed action could require relocation to adjacent protected areas. If the eggs are found within beach lanes Red 1, Red 2, Green 2, Blue 1, Alpha Area, or designated beach crossing lanes, least tern eggs in 28 nests are authorized for relocation to adjacent protected areas by Ms. Elizabeth Copper and sub-permitted biological monitors or biologists that have been approved and permitted by the Service. We anticipate a success rate of 90 percent for nests that are relocated.

Western snowy plover:

1. We anticipate up to five nests (5) or fifteen (15) snowy plover eggs and/or chicks may be taken in the form of death, injury, or harassment associated with the proposed Naval training operations and activities associated with biological monitoring.

2. We anticipate up to nineteen pairs (38) adult snowy plovers may be taken in the form of harassment as a result of military training activities.

3. Based on past abundance and distribution, we anticipate that up to six (6) nests or eighteen (18) snowy plover eggs may be relocated by Ms. Elizabeth Copper and sub-permitted biological monitors or biologists approved and permitted by the Service if the eggs are found within beach lanes Yellow 1, Yellow 2, Red 1, Red 2, Green 2, Blue 1, Alpha Area, the footprint of any of the two beach crossing lanes located on the ocean front of NAB, or the one beach crossing lane located at South Delta Beach.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the impact of incidental take anticipated in this biological opinion on least tern and snowy plover.

1. Unavoidable project impacts will be offset by the implementation of the Conservation Measures, subject to modifications described below, to increase the measures' effectiveness in avoiding and minimizing impacts of incidental take.

2. Management and protection will be provided at the NASNI, NAB, and NRRF least tern and snowy plover nesting colonies.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Endangered Species Act, the Navy must ensure that their military personnel, including all agents and contractors anticipated herein, comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline the required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure one, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

   The Navy shall implement the Conservation Measures in the "Description of the Proposed Action" above, subject to the following modifications:

   a. Conservation Measure SSTC 1: Stakes that delineate plover nests shall remain in place for 7 days post-hatch or as long as plovers are detected within 15 meters of the staked area during monitoring visits to provide refuge from foot/vehicle traffic to plover chicks on the beach and to protect the nest, in the event of re-use. This term and condition modifies the current proposal for maintaining protective stakes for 7 days post-hatch.

   b. Conservation Measure SSTC 3: At NAB and NRRF, the Navy shall manage predators to protect all areas where snowy plovers are found on ocean and bayside beaches. This term and condition modifies the current proposal whereby predator management would not be conducted on beach lanes Yellow 1, Yellow 2, Red 1, Red 2, Green 1, Green 2, Blue 1, and Blue 2. This term and condition is prudent, given the high levels of predation observed in 2003 and the distribution of plovers on these beaches. This term and condition is reasonable, given that additional predator management: (1) would be conducted in a manner that avoids conflict with military training activities; and (2) would not increase the cost of the predator management program in 2004 (Turman, pers. comm. 2004).

   c. Conservation Measure SSTC 6: In addition to NAB, the Navy shall have the biological monitors for the NASNI "MAT" site, and the ocean beach areas of NASNI and NRRF, determine if predatory ants are a problem to least terns and snowy plovers at these nesting locations. If it is determined that predation to chicks or eggs from ants is occurring, the Navy and Service shall meet to discuss potential remedies.

d. Conservation Measure SSTC 7: If nests are moved as directed in Conservation Measure 7, the Navy shall move nests to the closest protected area. Nests shall be moved in a manner that maximizes the potential for success and shall be protected during the move. All least tern nests relocated shall be documented as part of the weekly report submitted to the Carlsbad Fish and Wildlife Office. The report shall include the following information: (a) date the nest was moved, (b) number of eggs moved, (c) location of the moved nest, and (d) distance the nest was moved. An interim report shall be submitted to the Service by June 30, 2004, which provides information concerning the outcome/success of relocation efforts.

e. Conservation Measure SSTC 9: The Navy shall prohibit the intentional removal of kelp, other marine vegetation, or small pieces of driftwood from the Pacific Ocean beaches at NAB or NRRF.

f. Conservation Measure SSTC 15: The Navy shall contact the Service and report the circumstance that necessitates movement of any plover nest (as an alternative to the protection identified in Conservation Measure SSTC 1). This will be done with submittal of the Navy's weekly reports to the Service. If relocation is necessary, nests moved shall be relocated the shortest distance possible into suitable habitat within the boundaries of NAB to increase the chances for nest success.

g. Conservation Measure NASNI 4: To assure that raking avoids scrapes, the Navy shall mark the area where raking would/would not be conducted, and mark plover nest scrapes that are constructed in the area in which raking would be conducted. Based on the proposed action, only a small portion of the NASNI beach is proposed for raking, however no indication is given on how this area would be marked. Plover scrapes that are detected within the area proposed for raking need to be marked to assure that they are avoided, as proposed.

h. Conservation Measure NASNI 7: Stakes that delineate plover nests shall remain in place for 7 days post hatch or as long as plovers are observed within 15 meters of the staked area to provide refuge from foot/vehicle traffic to plover chicks on the beach and to provide protection to the nest, in the event of re-use.

i. Conservation Measure NASNI 8: The Navy shall contact the Service and report the circumstance that necessitates movement of any plover nest. This will be done with submittal of the Navy's weekly reports to the Service. If relocation is necessary, nests moved shall be relocated the shortest distance possible into suitable habitat within the boundaries of NAB to increase the chances for nest success.

2. To implement reasonable and prudent measure two, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

2.1 The Navy shall ensure that biological monitors look for and document the location of least tern or snowy plover nests and eggs prior to military training exercises commencing in beach lanes Red 1, Red 2, Green 2, and Blue 1 at NAB, and the ocean beach of NASNI and NRRF. This monitoring effort shall be repeated once the military training event has concluded.

2.2 The Navy shall ensure effective communication and coordination between the biological monitors, Natural Resources Compliance Program Manager, and the Naval Beach Group 1 Scheduling Officer. The Natural Resources Compliance Program Manager shall instruct the military troops who schedule training operations that: (1) blue flexi-stakes or cones denote boundaries of nests or protected nesting areas for least terns and snowy plovers; (2) the presence of tongue depressors within beach lanes Yellow 1, Yellow 2, Red 1, Red 2, Green 2, and Blue 1 mark the location of least tern nests; (3) movement of troops and vehicles at NAB are restricted to beach training lanes Red 1, Red 2, Green 2, Blue 1, Alpha Area, and the designated beach crossing lanes, and (4) take of least terns and snowy plovers at NASNI, NAB, and NRRF shall be avoided to the extent consistent with effective training. For many training operations (e.g., physical fitness drills--630 operations in a six month period), avoidance of nests may be compatible without confounding training operations.

2.3 A line of 3-foot tall blue markers approximately 10 to 15 feet apart shall be laid 35 feet landward from the mean high tide line at Green 1 to delineate the boundaries of the corridor that military troops, large vehicles, and heavy equipment can use when operating in the Alpha Area of the ocean training beach at NAB.

2.4 The ingress/egress road that parallels Highway 75 shall be signed every 500 feet to inform military troops of the need to avoid areas marked that designate nesting locations of snowy plovers or least terns on the beach.

2.5 The Navy shall replace the missing sign in the beach dune area at NRRF with a sign including the following information: "Endangered and Threatened Species Nesting Occurs on these Beaches from 15 March to 15 September Each Year/Individuals Disturbing Birds, Nests and/or Eggs are Subject to Fines and Imprisonment under Provisions of the Endangered Species Act of 1973."

2.6 Monitors and permitted biologists shall deter tern nesting by covering scrapes that they can ascertain are definitely tern scrapes and not plover scrapes in Yellow 1 and 2, Red 1 and 2, Green 2, and Blue 1.

2.7 The Navy shall implement a comprehensive biological monitoring program that ensures the identification of least tern and snowy plover nesting locations and the overall number of adult breeding pairs and fledglings produced at the NAB nesting colonies, including North Delta Beach, South Delta Beach, and the ocean beach; NASNI "MAT" site

and ocean beach; and NRRF. The Navy shall prepare reports for the Service at a minimum of twice a month. In addition, the monitoring results shall be submitted to the Service when a draft report for 2004 least tern and snowy plover breeding season is received by the Navy. The biological monitors shall also include in their report: (a) an evaluation of the effectiveness of the 30-meter buffer surrounding each snowy plover nest and the wooden stakes or tongue depressors used to mark least tern nests; (b) when the first adult birds arrive, number and location of nests, number of individual nests, estimated number of fledglings produced, number of relocated nests, success of all relocation efforts, level of incidental take associated with training at NAB, NASNI, and NRRF, and when discernible the amount and type of predation events that occur; (c) an evaluation of the success of the 15-acre site that was graded and re-contoured in 2002, the area enhanced by 4,560 cubic yards of sand in 2003, and the area enhanced with 2000 cubic yards of sand in 2004 at South Delta Beach, along with other conservation measures being implemented by the Navy; (d) when possible, any observations of captive-reared fledglings in the wild, especially as relating to the condition and survival of these birds (e.g., data on the interaction of fledglings with wild least terns, foraging behavior of captive birds compared to wild birds, mortality and cause of death of captive birds when it can be determined, and locations where captive-reared least terns are observed); and (e) the interactions of gull-billed terns and peregrine falcons with least tern and snowy plover nesting colonies.

2.8 The Navy shall send written information to military personnel and their families in military housing adjacent to NAB ocean beaches advising them of the nesting season and the presence of least terns and snowy plovers. The Navy will also distribute educational materials at NAB and NASNI Morale, Welfare and Recreation facilities to inform users of the presence of least terns and snowy plovers, and how to avoid disturbing nests.

2.9 The Navy shall assure that the fence that separates NASNI from "Dog Beach" in Coronado prevents ingress of dogs or unauthorized pedestrians onto the NASNI beach to improve the potential for nesting plovers at the southeastern end of the NASNI beach.

2.10 The Navy shall prohibit recreational (non- training-related) foot traffic at the northwestern end of the NASNI beach (approaching Zuniga) during the breeding season, and shall post signs to this effect.

The Service believes that no more than the anticipated incidental take for least terns and snowy plovers identified above will result from the proposed action. The reasonable and prudent measures, with the implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Navy must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

If 50 percent of the anticipated take to least terns or snowy plovers is reached, we recommend that the Service and the Navy meet to discuss the potential for reaching the incidental take limits set in

this biological opinion. Such a meeting would help reduce the potential for disruption to training that could occur should the incidental take limits be reached.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act 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.

1. During site preparation on North and South Delta Beach and prior to grading or herbicide use, the locations of two sensitive plants; coastal woolly-heads (*Nemacaulis denudata*) and Nuttall's lotus (*Lotus nuttallianus*), should be marked to ensure that potential impacts to these two rare species are minimized to the greatest extent practicable. During site preparation at NASNI, potential impacts to Nuttall's lotus also should be minimized.

2. To promote alternative tern and plover nesting habitat outside the beach lanes used for training and NRRF, the Navy should begin a program of ice plant eradication to restore natural dune plant communities.

3. The Navy should remove ice plant from the back dune areas of Orange 1, Orange 2, Blue 2, and Green 1 to facilitate nesting in these areas, which are protected from human disturbances.

4. The Navy should maximize training evolutions on training beaches between February 15 and April 15 each season in order to encourage terns to nest outside of these training areas.

5. The Navy should work cooperatively with the Service and other wildlife agencies and land owners in San Diego to develop a regional, coordinated conservation strategy or the California least tern and the western snowy plover. Conservation goals for number of colonies to be protected over time, population levels, productivity targets, and other management parameters needed for recovery planning in and around San Diego Bay.

REINITIATION NOTICE

This concludes formal consultation on the Military Training Operations on the Silver Strand Naval Facilities. 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 if exceeded; (2) new information reveals effects of the proposed 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 listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may

be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this biological opinion, please contact Sandy Vissman of this office at (760) 431-9440 extension 274.

Sincerely,

Therese O'Rourke
Assistant Field Supervisor

Enclosure

LITERATURE CITED

Atwood, Jonathan L. and D.E. Minsky. 1983. Least tern foraging ecology at three major California breeding colonies. West. Birds 14(2):57-72.

Atwood, Jonathan L. and P.R. Kelly. 1984. Fish dropped on breeding colonies as indicators of least tern food habits. Wilson Bull. 96(1):34-47.

Atwood, Jonathan L. and B.W. Massey. 1988. Site fidelity of least terns in California. Condor 90(2):389-394.

Bailey, Stephen F. 1984. California Least Tern Foraging and Other Off-Colony Activities Around Alameda Naval Air Station during 1984. Unpublished report. Dept. of Ornithology and Mammalogy, California Academy of Sciences, Golden Gate Park, San Francisco, CA.

Brunton, D. 1999. "Optimal" colony size for least terns: an inter-colony study of opposing selective pressures by predators. Condor 101:607-615.

Caffrey, Carolee. 1993. California Least Tern Breeding Survey 1992 Season. A report to the Calif Dept. of Fish and Game. Final report PG 93-11, 35pp.

California Department of Fish and Game. 2001. California least tern breeding pairs and fledgling production-2001 Draft.

California Department of Fish and Game. 2002. California least tern breeding pairs and fledgling production-2002 Draft. Included as Appendix A of this Biological Opinion.

Collins, Charles, K. Bender and D. Rypka. 1979. Report on the Feeding and Nesting Habits of the California Least Tern in Santa Ana River Mouth Area, Orange County. Report to Corps of Engineers, Los Angeles District.

Conkle, Tamara. 2003a. Information provided to Fish and Wildlife Service in the form of electronic messages and telephone conversations during March and April 2003 in response to questions raised by the Service during preparation of the biological opinion on military training operations conducted at NASNI, NAB, and NRRF.

Conkle, Tamara. 2003b. Beach lanes at NAB and NRRF and the Ocean Beach at NASNI-- A determination of acres within the ten beach lanes at NAB, the four beach lanes at NRRF, and ocean beach at NASNI. Prepared by Tierra Data Systems, Escondido, CA for the U.S. Navy, Southwest Division, Naval Facilities Engineering Command, Natural Resources Team, San Diego, CA.

Copper, E. 1997. The status of the western snowy plover at Naval Amphibious Base, Coronado in 1995. A report for the U.S. Navy, Nay. Fac. Engr. Cmd. San Diego. Feb 1997. 30pp.

Copper, E. 1998. Unpublished information provided to the Service during informal consultation meetings with the Navy concerning military training on NAB ocean beaches.

Copper, E. 2002. Snowy plover summary-San Diego County. Table of snowy plover monitored breeding locations, nest numbers, estimated fledglings produced, estimated adult pairs (incomplete for all sites), and maximum active nest numbers (incomplete for all sites).

Copper, E. 2003. Submittal of report on work done in 2002 under Endangered Species Permit No. PRT-789254. Report summarizing the breeding season results of monitoring of California least terns and western snowy plovers at San Diego Navy sites in 2002 along with the egg-collecting data for 2002. Report submitted to U.S. Fish and Wildlife Service, Carlsbad, California.

Department of the Navy. 1998. Operations, Training and Maintenance Plan, Naval Amphibious Base, Coronado, California: An Implementation Plan to Balance Operations and Training with Natural Resource Protection Requirements. Jan 1998. 103 pp.

Department of the Navy and San Diego Unified Port District. 2000. San Diego Bay Integrated Natural Resources Management Plan.

Department of the Navy. 2002. Naval Base Point Loma Integrated Natural Resources Management Plan.

Department of the Navy. 2002. Naval Base Coronado Integrated Natural Resources Management Plan.

Department of the Navy. 2002. Naval Base San Diego Integrated Natural Resources Management Plan.

Department of the Navy. 2003. Information on military training operations conducted on the SSTC and NASNI. included as part of the Navy's April 4, 2003, letter requesting section 7 consultation pursuant to the Endangered Species Act.

Fancher, J. M. 1992. Population Status and trends of the California least tern. Transactions of the western section of the Wildlife Society. 28:59-66.

Fancher, J. M. 1998. Western snowy plover nesting at Bolsa Chica, Orange County, California 1997. A report of the U.S. Fish and Wildlife Service, Carlsbad Office. Jan. 1998. 21 pp.

Fancher, J. M., L. Hays, P. Knapp 2002. Western snowy plover nesting at Bolsa Chica, Orange County, California. A report of the U.S. Fish and Wildlife Service, Carlsbad Office. Dec. 2002. 23 pp.

Fleming, S.P., R.D. Chiasson, P.C. Smith, P.J. Austin-Smith, and RP. Bancroft. 1988. Piping plover status in Nova Scotia related to its reproductive and behavioral responses to human disturbance. J. Field Ornithol. 59(4):321-330.

James, R., J. Tutton, and D. Stadtlander. 1992. A survey of the western snowy plover on Camp Pendleton San Diego County, California. Fish and Wildlife Service report for the Marine Corps Base Camp Pendleton, Natural Resources Office. 19pp.

Massey, Barbara W. 1974. Breeding biology of the California least tern. Proc. Linn. Soc. N.Y 72:1-24.

Massey, Barbara W. 1988. California Least Tern Field Study 1988 breeding season. A report to the California Dept. of Fish and Game. Final report FG 7660. 22pp.

Massey, Barbara W. and J. L. Atwood. 1979-1985. Application of Ecological Information to Habitat Management for the California Least Tern. Annual report nos. 1-7. U.S. Fish and Wildlife Service, Laguna Niguel, CA.

Massey, Barbara W. and J. L. Atwood 1981. Second-wave nesting of the California least tern: age composition and reproductive success. Auk 98:596-605.

Massey, Barbara W., D.W. Bradley, and J. L. Atwood, 1992. Demography of a California least tern colony including effects of the 1982-1983 El Niño. Condor 94:976-983.

Melvin, S.C., A. Hecht, and C.R. Griffin. 1994. Piping plover mortalities caused by off-road vehicles on Atlantic coast beaches. Wildl. Soc. Bull. 22:409-414.

Minsky, Dennis. 1984. A Study of the Foraging Ecology of the California Least Tern at Camp Pendleton, Season of 1984. Unpublished Report. U.S. Navy, Navy Facilities Engineering . Command., San Bruno, CA. 31pp.

Page, G.W. and L.E. Stenzel (eds.). 1981 The breeding status of the snowy plover in California. Western Birds 12(1): 1-40.

Page, G.W., L.E. Stenzel, W.D. Shuford, and C.R. Bruce. 1991. Distribution and abundance of the snowy plover on its western North American breeding grounds. J. Field Ornithol. 62(2): 245-255.

Page, G.W. 2002. Year 2002 Breeding season snowy plover survey of California coast. Table includes statewide breeding snowy plover numbers for 1991, 1995 (incomplete count), 2000, and 2002.

Patton, Robert T. 2002. California least tern breeding survey, 2000 season. California Department of Fish and Game, Habitat Conservation Planning Branch, Species Conservation and Recovery Program Report, 2002-03. Sacramento, CA. 24pp. + app.

Powell, A., and C. Collier. 1994. The status of Western Snowy Plovers (Charadrius alexandrinus nivosus) in San Diego County, 1994. Report to the California Dept. of Fish and Game and U.S. Fish and Wildlife Serv. 23pp.

Powell, A., B. Peterson, J. Terp. 1996. The status of western snowy plovers (Charadrius alexandrinus nivosus) at Camp Pendleton, 1996. A report for the Marine Corps Base, Camp Pendleton. 32pp.

Powell, A., J. Terp, C. Collier and B. Peterson. 1997. The status of Western Snowy Plovers (Charadrius alexandrinus nivosus) in San Diego County, 1997. Report to the California Dept. of Fish and Game and U.S. Fish and Wildlife Serv. 34pp.

Powell, A., J. Terp, C. Collier and B. Peterson. 1998. The status of Western Snowy Plovers (Charadrius alexandrinus nivosus) in San Diego County, 1998. Report to the California Department of Fish and Game and U.S. Fish and Wildlife Serv. 29pp.

Tierra Environmental Services. 2002. Focus surveys for the western snowy plover and California least tern in the proposed street end project site. Report in a letter dated July 29, 2002, to Brian Mooney and Associates from Tierra Environmental Services. The report was incorporated as Appendix D of Draft Environmental Impact Report for the Palm and Carnation Avenues Street End Improvement Project prepared for the San Diego Unified Port District.

Unit, P. 1984. The birds of San Diego County. Memoir 13. San Diego Society of Natural History. 276pp.

U. S. Fish and Wildlife Service. 2001. Western Snowy Plover (Charadrius alexandrinus nivosus) Pacific Coast Population Draft Recovery Plan. Portland, Oregon. xix + 630 pp.

Warriner, J.S., J.C. Warnner, G.W. Page, and L.E. Stenzel. 1986. Mating system and reproductive success of a small population of polygamous snowy plovers. Wilson Bull. 98(1): 15-37.

Welchell, A. and K. Keane. 1998. Western snowy plover breeding survey for Batiquitos Lagoon, San Diego County, 1997 season. A report from Wetland Research Associates and Keane Biological Consulting for the Batiquitos Lagoon Enhancement Project. 17pp.

Widrig, R. 1980. Snowy Plovers at Leadbetter Point. Willapa National Wildlife Refuge. Fish and Wildlife Service, Ilwaco Washington.

Wilson, R.A. 1980. Snowy plover nesting ecology on the Oregon coast. MS Thesis, Oregon State Univ., Corvallis. 41 pp.

Enclosure

RESPONSE TO COMMENTS ON DRAFT BIOLOGICAL OPINION

We appreciate the comments that you have provided on the draft Biological Opinion FWS-SDG-3452.2 distributed to you on June 23, 2004. We received your comments on July 12, 2004. We have incorporated, where appropriate, comments from your staff regarding the draft in the final Opinion. You will notice that where necessary for policy, legal, or biological reasons, not all of your comments and recommendations have been incorporated in our final opinion. The list below follows the same format provided in the June 25, 2004, comments included as Enclosure 1 to your July 12, 2004, correspondence to the Service. The itemized list below outlines how each of the comments were addressed.

Specific Comments

Page 1, Sentence 4:
We have deleted this sentence as requested; however, the Service and the Navy did discuss this issue on May 21, 2004, and Service staff recollects Navy concurrence that to address the immediate need of incidental take authorization on NAB, NRRF, and NASNI beaches, we would defer consultation on the other more lengthy issues until completion of an opinion addressing training needs on the beaches.

Page 2, Paragraph 3, Last Sentence:
We have rephrased this sentence in response to your comment; however, the Navy did request that the Service refrain from signing the Opinion until a managerial meeting could be held to discuss terms and conditions. This request postponed finalization of the Opinion.

Page 3, Paragraph Header:
We have changed the paragraph header in response to your request.

Page 3, Paragraph 1, Sentence 1:
We have modified this sentence in response to your comment.

Page 3, Paragraph 1, Sentence 7:
We have modified this sentence in response to your comment.

Page 3, Fourth bullet:
We have modified this bullet in response to your comment.

Page 4:
We have modified acronym as suggested.

Page 5:
We have clarified this section as suggested.

Page 7, Number 16 and Page 8, Number 9.
We do address the gull-billed tern issue elsewhere in this Opinion, however this section refers to conservation measures proposed and no conservation measures specific to gull-billed terns were included in the April 28, 2004, letter because the Navy was not given the authorization to address gull-billed terns. In response to this comment, however, we added language in the sections that you have suggested that adds a conservation measure of commitment to address the gull-billed tern issue. Please refer to the Status of the Species and Effects of the Action for further discussion about gull-billed terns.

Page 8, Number 6:
We have changed this acronym in response to your comment.

Page 10, Paragrah 3:
We could not locate the typographical error to which you refer.

Page 12, First Sentence:
In response to your comment, the date of the 1984 MOU and Opinion number were included. In response to this comment we removed the sentence referring to luring birds away from operational beaches.

Page 12, Tables 1 and 2:
A short statement concerning nest numbers/pair data was added in response to the comment.

Page 13:
We have added a short discussion of the California Least Tern Recovery Plan to the Opinion. The 1985 Recovery Plan identifies reproductive success, secure breeding colony, and population size criteria to achieve recovery. Based on the extremely low reproductive success and the insufficient number of secure breeding colonies, the California least tern has not achieved recovery by the standards set in the 1985 plan despite the high population size recorded in 2003. A revision of this recovery plan is in progress.

Page 15. Sentence 2:
We added reference to southern California in response to your comment.

Page 15. Paragraph 2, last Section:
The references that you have provided are noted, however, we have not rewritten this section as suggested but left the section general. We have, however, taken into account the information that you have provided and have modified the two Terms and Conditions that rely on information concerning nest site re-use.

Page 15-Page 18:
Comment noted, and this section has been revised where possible (that said, additional updating is still necessary).

Page 16:
In response to this comment, the Table title was changed to include 2004 information, to date.

Page 17:
The lack of precision associated with window surveys is already stated.

Page 18, Paragraph 3:
We appreciate your comments on the draft Western Snowy Plover Recovery Plan and will make sure that they are taken into account by the lead field office developing this plan.

Page 19, 20:
Comment noted. We would like to add to this section at a later date.

Page 24, Paragraph 3, Last Sentence and Page 25, first Sentence:
We have reviewed the tern distribution as of July 11, 2004, and compared this to the tern distribution in 2003. Based on our assessment, it appears that the distribution of terns has changed little, if at all. In 2003 and in 2004 (after a year without predator management) approximately 55 percent of the terns nesting at NAB are nesting on the ocean beaches, and approximately 45 percent of the terns nesting at NAB are nesting on the bayside beaches. It appears that the lack of predator management conducted in 2003 and 2004 did not redistribute the birds, but did adversely affect reproductive success. This is discussed in the Effects section of the BO.

Table 3. Distribution of Least Terns at NAB: Bayside vs. Beachside

Year	Bayside Nests (%)	Beachside Nests (%)	Total Nests
1999	424 (60)	278 (40)	702
2000	300 (48)	330 (52)	630
2001	352 (43)	462 (57)	814
2002	341 (46)	401 (54)	742
2003	501 (45)	623 (55)	1124
2004 (as of July 11)	455 (45)	549 (55)	1004

Page 25, Paragraph 1:
Based on the comment, it sounds as though the marking technique for individual nests is too visible from the water and can create an inflated impression of constraints. Perhaps we should re-examine the techniques used to mark individual nests and differentiate these from the techniques used to mark larger protected areas. The area of the beach physically constrained due to the presence of plovers is extremely small and outside of the "conservation lanes" there is no area that would be constrained by least tern presence. If visual marking techniques create a misconception concerning constraints, we should explore alternatives. More importantly, the beach is remaining open for training use

during the breeding season with very little constraint despite the presence of two federally listed ground nesting species to allow our troops to effectively train.

Page 25, paragraph 2:
We used information provided by the Navy in a tabular summary of the breeding season and the 2003 final predator management report to obtain the number of nests preyed upon. Further review prompted by your comment has revealed that the two reports do not agree in the number of nests reported, which is not unusual when multiple research/management groups are working on the same species. Based on the monitoring tabular summary, 157 CLT nests were lost to predators on NAB beaches. Based on the predator management report, 161 CLT nests were lost to predators on NAB beaches. Based on the predator management report, 139 CLT nests were lost to skunks, cats, possums, or unidentified mammals on NAB ocean beaches in 2003. Some predators were removed in response to multiple predation events on CLT, or in response to predation on one or more WSP nests. It is likely that many of these events could have been avoided if predator removal occurred as a preventive measure rather than as a response to predation. Since the CLT relative distribution between the beachside and bayside beaches did not change from 2003 to mid-2004, it appears that the lack of predator management adversely affected the tern reproductive success without accomplishing the Navy's goal of deterring terns from using the oceanside beaches.

Page 26, Paragraph 1:
We have reviewed the tern distribution as of July 11, 2004, and compared this to the tern distribution in 2003. Based on our assessment, it appears that the distribution of terns has changed little since 2002 and 2003. As seen in 2003, approximately 55 percent of the terns nesting at NAB are nesting on the ocean beaches, and approximately 45 percent of the terns nesting at NAB are nesting on the bayside beaches. It appears that the lack of predator management conducted in 2003 did not redistribute the birds, but did adversely affect reproductive success. This is discussed in the Effects section of the BO.

Table 3. Distribution of Least Terns at NAB: Bayside vs. Beachside

Year	Bayside Nests (%)	Beachside Nests (%)	Total Nests
1999	424 (60)	278 (40)	702
2000	300 (48)	330 (52)	630
2001	352 (43)	462 (57)	814
2002	341 (46)	401 (54)	742
2003	501 (45)	623 (55)	1124
2004 (as of July 11)	455 (45)	549 (55)	1004

Likewise, the distribution of nests on the ocean-side beaches at NAB has changed little in recent years. Since 2000, approximately 25 percent of the least terns nesting on SSTC ocean beaches each year have nested in lanes proposed for training in 2004 (Yellow 1 & 2, Red 1 & 2, Green 2, Blue 1), and 75 percent of the least terns nesting on SSTC ocean

beaches have nested in lanes proposed for protection (Green 1, Blue 2, Orange 1 & 2). In 2000, 76 percent of the least terns that nested on NAB and SSTC ocean beaches nested in areas now proposed for conservation; in 2001, 75 percent nested in areas now proposed for conservation; in 2002, 79 percent nested in areas now proposed for conservation; in 2003, 75 percent in areas now proposed for conservation, and once again in 2004, to date, approximately 75 percent of the birds nesting on the beach nested in areas now proposed for conservation.

Page 26, paragraph 2:
We added language to modify our typographical error as recommended.

Page 26, Paragraph 2, Sentence 3:
Though this issue warrants further discussion, we have modified the terms and conditions associated with plover staking to take into account the information that you have provided. We do know that in some instances plovers reuse nests, or nest very close to previously used nests. We need to further compile and evaluate such data.

Page 27, Paragraph 4.
Although there have been 24 nests so far this season, we need to know a pair estimate associated with this number of nests to incorporate the information into this section.

Page 28, Paragraph 3:
This is mentioned in this section.

Page 28, Paragraph 4:
We added language to address this issue.

Page 29, Paragraph 4:
We would like to work with you to minimize impacts to training while allowing for continued persistence of these listed species.

Page 30, Number 3:
The language in the Opinion recognizes that the markers are not intended to afford protection.

Page 31, Number 9:
Your comment is noted, however, we did not modify language in the opinion. We would like to examine this further with you after the 2004 breeding season data are available. How much of the increase in nest numbers observed in 2003 was due to renesting associated with failed nest attempts?

Page 33, T&C 1.a and Page 35, T&C 1.i:
In response to your comments, we have modified these terms and conditions.

Page 34, T&C 1.b:
We do not agree with your comment pertaining to predator control and consistency with the proposed action. Predator management is consistent with the proposed action and is already part of the proposed action. This term and condition allows for more effective predator control activities that would likely benefit terns and plovers on both the oceanside and bayside beaches of NAB. The training lanes are not discrete beaches, but are one long stretch of beach and the bayside Delta beaches are in close proximity to the ocean. Both mammalian and avian predators can move freely (although mammals need to cross one road) between the different areas. The term and condition represents a minor change as defined under 50 CFR 402 and would help reduce the impacts of incidental take associated with military training by offsetting some of the training-related losses with successful nests that might otherwise have been lost to predators. Predator control has been conducted on NAB oceanside beaches since 1994. The breeding season 2003 represented a one-year hiatus from predator management that based on our analysis, did not result in modified tern distribution, but did result in significant nest losses to mammalian predators. Navy data indicate that between 157 and 161 least tern nests were lost to predators on NAB ocean beaches in 2003 yet the relative distribution of least terns did not change when comparing the bayside to the oceanside, or when comparing the number of nests in training lanes vs. conservation lanes.

It is our opinion that predator management is necessary to minimize the impacts of incidental take associated with training activities. We recognize the significant contributions of Navy management in the improved status of the California least tern and want to work with the Navy to identify mechanisms to reduce constraints to training; however, we do not share a vision of allowing nest losses that are not attributable to training needs. To intentionally attempt to restrict the range of endangered species in the face of existing limitations on available habitat and to allow otherwise avoidable nest losses is not within the spirit or the intent of the Endangered Species Act. Our intent through the consultation process is to (1) facilitate the necessary Federal actions, (2) permit unavoidable incidental take, and (3) minimize the impacts of incidental take on the listed species. We would like to continue to work with you to accomplish these goals: We envision continued long-term conservation of some portion of the NAB beach to offset reduced habitat suitability associated with beach training, and we envision that beach training may also be compatible at some level, with continued presence of least terns and western snowy plovers.

Page 34, T&C 1.e:
In response to your comment, we have removed this term and condition, as it is already addressed in term and condition 2.2(4).

Page 34, T&C 1.g:
In response to your comment, we added language to the term and condition that indicates this reporting would be done as part of the weekly reporting effort.

Page 35, T&C 1.h:
This term and condition is necessary to better identify and clarify the area in which raking would/would not take place, and to allow for the avoidance of scrapes within areas where raking would take place. The proposed action contains a provision that indicates the Navy would avoid scrapes, however, no mechanism for seeing and thereby avoiding scrapes is identified. The comment provided indicates that the area where raking is not taking place is currently marked. Does this refer to the 0.5 acre circle of stakes that delineate the small area that is protected from foot traffic on the NASNI beach? If so, we recommend that a much larger area should remain unraked to assure that prey resources for plovers remain available on the NASNI beach. In response to the comment, we have modified the language pertaining to marking to recognize that the area where raking is not to take place could be marked rather that the area where raking would not take place. We would like to work with you further to identify and map the area of the beach proposed for raking.

Page 36, T&C 2.5:
We have retained the language in this term and condition. The sign addressed in this term and condition may be installed in addition to signs required to legally address trespass issues.

Page 37, T&C 2.9:
In response to your comment, we have modified the language of this term and condition but assured that it still reflects the need for exclusion of dogs (that may overflow from Dog Beach) at this end of the NASNI beach. During a site visit conducted in March 2004, Service staff noted that this fence appeared to have a space at the base of the fence that would allow dogs to get under the fence. We have not revisited the site since March 2004 to verify this observation. If there is no way for dogs to get under or around the fence in its current condition, then the Navy may already be implementing this term and condition.

Page 37, T&C 2.10:
We do not completely understand the comment, but have retained the requirement for signage at the northwestern end of the NASNI beach. Safety may also be an issue in this area, but this term and condition is intended to reduce the impacts of incidental take by reducing foot traffic on the beach in an area where birds attempt to nest.

HORSE TRAIL

MOU FOR INTER-AGENCY TRAIL COORDINATION

MEMORANDUM OF UNDERSTANDING BETWEEN: UNITED STATES BORDER PATROL, THE UNITED STATES FISH AND WILDLIFE SERVICE, CALIFORNIA STATE DEPARTMENT OF PARKS AND RECREATION, SAN DIEGO COUNTY PARKS AND RECREATION DEPARTMENT, CITY OF SAN DIEGO, STATE PARK MOUNTED ASSISTANCE UNIT (MAU), THE TIJUANA RIVER VALLEY EQUESTRIAN ASSOCIATION (TRVEA) AND CITIZENS AGAINST RECREATIONAL EVICTION (CARE), UNITED STATES NAVY, "additional Groups or Organizations as may be Approved."

RECITALS

A. The signatory public agencies and citizen organizations to this memorandum of understanding desire to establish a framework for the coordinated planning, alignment, design and development of trails within the Tijuana River Valley.

B. The signatory public agencies and citizen organizations to this memorandum of understanding have found that the development of regional and local trails helps to achieve a higher quality of life for the residents of San Diego County by providing recreational opportunities, promoting alternative non-motorized transportation corridors, preserving and providing open space areas, creating links between parks and other recreational areas, and providing other benefits.

C. The signatory public agencies and citizen organizations desire to establish a committee to be known as the Tijuana River National Estuarine Research Reserve Management Authority (also known as TRNERRMA) Trails Subcommittee (hereafter the "Committee") to provide a clearinghouse for information relating to trails and for coordination of trail planning, design and development by the various signatory public agencies. This memorandum of understanding establishes a framework for the creation and responsibilities of the Committee.

D. This memorandum of understanding does not establish a contract between any of the signatory public agencies or citizen organizations nor shall this memorandum be construed to be an agreement for the joint exercise of powers or creating a joint powers agency under the provisions of Government Code Section 6500 et seq. Each signatory public agency shall retain full regulatory authority with respect to the subject matter of this memorandum of understanding and full discretionary authority with respect to the provision of trails within their respective jurisdictions.

Therefore, in furtherance of the goals set forth in the Recitals the signatory public agencies set forth their mutual understanding as follows:

THE COMMITTEE

1. The chief administrative officer (e.g. City Manager, Chief Executive Officer, Executive Director, etc.) of each signatory public agency or citizen group will appoint a member (and an alternate) of the agency staff to serve as a member of the Committee. The Committee shall be established as soon as three members are appointed.

2. The purpose of the Committee will be to do all of the following:

a. Coordinate recreational trail links and associated facilities between and within the Tijuana River Valley. Develop recommendations for trail features (i.e. bicycling, hiking, equestrian uses, staging areas, paving, fencing, furniture, landscaping, signage, interpretive centers, handicap accessibility and other features). Develop plans for regional trail routes which connect regional recreational areas, open space areas, historic areas, educational institutions, culturally significant areas and transportation staging areas and other significant areas in the Tijuana River Valley.

b. Research and pursue various mechanisms to plan, acquire, develop, maintain and patrol trails and associated open space corridors.

c. Pursue financial and other support from the public agencies (including agencies of the state and federal government), community service groups, educational institutions, businesses and individuals to supplement funding by the respective signatory public agencies.

d. Generate volunteer support.

e. Encourage and assist in the development of integrated processing procedures for the preservation of open space corridors and trails through the planning processes of each of the signatory public agencies.

(f) Draft proposed ordinances, plans and other implementation documents for consideration by the signatory public agencies. Attached herein and labeled "Appendix A" is a Trail Use Policy. This Policy represents the concensus of the Committee at the time of MOU signing and will serve as the foundation document for future trail management decisions.

g. Pursue applications for grant funding to support construction, operation, and maintenance (including cowbird trapping) of regional trails.

(h) Pursue the formation of a formal joint powers authority or joint exercise of powers agreement and make

a recommendation to the signatory public agencies regarding the desirability of such an authority agreement.

The Committee has no legislative or administrative authority and shall act solely in an advisory capacity to the chief administrative officer of each signatory public agency or to the appropriate planning, parks and recreation or other similar department of each signatory public agency as may be determined appropriate by each agency.

3. The Committee shall commence meeting as soon as three members have been appointed. The Committee shall conduct meetings not less frequently than once every three months at such times and places as the committee may designate. The Committee may establish by-laws which are not inconsistent with this memorandum of understanding. Meetings of the committee shall be open to the public in accordance with all applicable State and local laws. A simple majority of the members shall constitute a quorum for the transaction of any business of the Committee. Formal actions of the Committee shall require an affirmative vote by a majority of the quorum.

PLANNING ACTIVITIES

4. Trail planning activities by the various signatory public agencies should be coordinated with the goal of establishing a regional public trail network within the Tijuana River Valley. Particular emphasis should be placed on establishing connections between trail systems within the boundaries of the various signatory agencies and on avoiding conflicts in trail types, uses and designs where such conflict would inconvenience or endanger the public. Trail use and the creation of any new or alternative trail routes shall avoid impacts to designated critical habitat for the least Bell's Vireo, proposed critical habitat for the Southwestern willow fly catcher and habitats utilized by the California least tern, Western snowy plover and any other listed species to the greatest extent practicable. Where feasible and consistent with public safety, easements for major utility and transportation facilities (other than streets) should be made available for joint use as trails. Each signatory agency should consider the trail planning activities of the other signatory agencies in developing trail routes within their respective jurisdictions.

5. Each signatory public agency agrees to refer applicable proposals for major land developments to the Committee for comment regarding trail program implementation as a part of the development review process.

6. The signatory public agencies agree to coordinate regional trails planning with land use regulations while maintaining local land use control.

FUNDING

7. The signatory public agencies will each bear their own costs of implementing this memorandum of understanding. Expenses for copying, document preparation, mailing or other similar common costs should be shared equally among the signatory agencies, or rotated between the agencies on a regular basis.

8. The Committee should pursue grant or other funding to support its activities.

MISCELLANEOUS

9. This memorandum shall become effective upon the execution by any three of the public agencies which are listed in the title hereof. Any public agency listed in the title hereof may become a signatory public agency at any time or may withdraw as a signatory public agency at any time.

10. Each signatory agency shall be solely responsible for its own acts or omissions taken with respect to activities within its jurisdiction with respect to the subject matter of this memorandum. No signatory agency shall be liable with respect to any comments or requests whether implemented or not, pertaining to trail activities of any other public agency. Where trails of one public agency adjoin or abut the trails or property of another public agency, liability to third persons with respect to personal injury or property damage shall be determined according to ordinary principles of law without regard to this memorandum.

In witness whereof the signatory parties have executed this memorandum of understanding as of the dates set forth below:

AGENCY	BY	DATE
U.S. BORDER PATROL	[signature]	3/28/96
U.S. FISH & WILDLIFE	Gail C. Kobetich	3.25.96
STATES PARKS/REC.	[signature]	4.4.96
COUNTY PARKS/REC.		
CITY OF SAN DIEGO	[signature]	5-1-96
STATE PARKS MAU	[signature]	3/28/96
TRVEA	[signature]	3/28/96
CARE	[signature]	3/28/96
U. S. NAVY	[signature] CAPT, CEC, USN, SCE	9/17/97

Refuge — Rebecca Young, Irvin Fernandez

IBWC — Dionne

TRVBMC

APPENDIX A
(With Trail Map)

Trail Use Policy for the Tijuana River Valley

Preamble

The Tijuana River National Estuarine Research Reserve Management Authority (TRNERRMA) has always recognized the unique and fragile ecology of the entire Tijuana River Valley (TJRV). TRNERRMA's highest priority goal as stated in its own Management Plan is "the protection of the estuarine environment and resources of the Tijuana River National Estuarine Sanctuary consistent with the policies of land-owning and land use regulating agencies." TRNERRMA additionally recognizes that it must also provide recreational access appropriate to the nature of the land and consistent with stated ecological values. Due to the increasingly popular use of the recreational trails in the Tijuana River National Estuarine Sanctuary and the uplands of the TJRV, it has become necessary for TRNERRMA to adopt a specific policy regarding trail use. This action will insure continued compatibility for both of the above stated goals. TRNERRMA has therefore created a Trails Subcommittee hereafter known as the Committee, to create the policies and procedures necessary for an effective recreational trail system within it's jurisdiction. The Committee shall be composed of selected resource managers from within TRNERRMA, associated non-member agencies having jurisdiction over some aspect of the TJRV, and representatives of any recognized equestrian or hiking organization utilizing the trails within the Valley.

TRNERRMA is concerned both with the safety of all TJRV visitors and the enjoyment of their open space experience. The purpose for which people legitimately use open space areas varies depending on individual or group needs. Visitors may come to observe nature in a protected environment, experience tranquility, exercise in a non-urban setting, or any combination of these. The means by which visitors use trails also varies -- be it on horseback or a bicycle, hiking, running, or in a wheelchair. Motorized vehicles, except electric wheelchairs and those associated with public safety will be prohibited.

The combination of trail conditions, level of use, and the mix of uses may lead to conflicts. Conflicts result in negative environmental impacts, unpleasant user experiences, or unsafe situations. Conflicts are related to several factors, including:

The relative speeds of different users.
Existing trail conditions, such as poor line-of-sight, narrowness, steep slopes and wide-open stretches of trail that might encourage excessive speed.
A lack of knowledge of, or disregard for, trail use etiquette and regulations by all types of users.
A high concentration of use in certain areas.
Existence of threatened or endangered species near trails.

This set of policies is intended as a guide in establishing trail use designations throughout the areas of TRNERRMA which will promote safe and enjoyable experiences for all who use TRNERRMA lands. These policies are not intended to restrict who may use the TRNERRMA trails, but they may restrict how or under what conditions the trails are to be used.

POLICIES

1.0 The Committee will endeavor to provide a variety of satisfying trail use opportunities on open space preserves throughout the District. More specifically, the Committee will endeavor to:

1.1 Provide multiple use on individual trails where such use is consistent with the balance of these policies.

1.2 Protect the opportunity for tranquil nature study and observation, especially in those areas identified as providing a unique wilderness experience.

2.0 The Committee will designate appropriate use(s) for each trail. Uses will be allowed that are consistent with Committee's objectives for sound resource management and safe and compatible use. More specifically, the Committee will:

2.1 Allow trail use appropriate to the nature of the land and consistent with the protection of the natural, scenic, and aesthetic values of open space.

2.2 Within budgetary and staffing constraints, make reasonable efforts to provide safe conditions for trail users.

2.3 Evaluate trail user needs, concerns, quality of experience, impacts, and the compatibility of various uses. Those uses creating the least conflict among trail users and the least environmental impact will be given greatest preference in trail use planning.

2.4 Ensure that all TRNERRMA trails will be accessible to hiking. When consistent with this policy, if a non-hiking use adversely impacts user safety, the use may be restricted or redirected. The intention is not to restrict access by any individual, but rather to limit incompatible uses and means of travel.

2.4 Maintain bilingual signs at all trailheads and as necessary along trail routes.

2.5 Ensure that trailheads are inaccessible to unauthorized motorized vehicles of any type. Authorized vehicle is defined as one operated by local, State or Federal law enforcement personnel already in hot pursuit or responding to a known medical emergency.

3.0 The Committee will adopt qualitative and quantitative trail use guidelines to aid TRNERRMA in determining appropriate trail use designations in the implementation of these policies.

4.0 Specific trail use designations will be established and reviewed periodically through the Committee, and will be subject to public notification. Trail use designations may change if use patterns develop that are in conflict with these policies.

4.1 In extreme cases where there is not sufficient time to notify TRNERRMA the Committee may make an interim decision to limit use while providing an evaluation process and timeline for final determination of the designated use.

5.0 The Committee will endeavor to provide trail access for a variety of physical capabilities and user needs (including persons with physical limitations) in a manner consistent with resource protection goals, budgetary constraints, and state and federal regulations.

6.0 The Committee will carry out management programs necessary for the implementation of these trail use policies. The designation of appropriate trail use as a method of minimizing trail use conflicts and environmental impacts will require a significant increase in trail use measures such as education, physical improvements to trails and enforcement of trail use regulations. More specifically the Committee will:

6.1 Support trail use actions with a strong educational program. The Committee recognizes that education in proper trail etiquette and low impact use is a key measure towards the reduction of negative trail use impacts. The educational program shall be designed to apply to individual riders, equestrian clubs and rental stables.

6.2 Monitor trail use conditions on a regular basis. The purpose of a monitoring program will be to evaluate current conditions and to determine whether or not trail management programs, including maintenance, reconstruction, education and use regulations, are effective in addressing user conflicts and environmental impacts, and to recommend changes if necessary.

6.3 Include implementation costs in determining the feasibility of trail use designations and regulations.

7.0 The Committee will work with other agencies, interest groups and private landowners in an effort to promote an interconnecting trail system throughout the region. The Committee recognizes that connections should be compatible with other jurisdiction designations and land owner objectives as well as these policies and trail use guidelines.

8.0 The Committee recognizes that existing trail use characteristics such as the types of use, conflicts, and impacts may change over time so that certain policies may no longer be appropriate or a new policy may be required. Hence, these policies will be subject to review and revision as deemed necessary by the Committee and approved by TRNERRMA.

9.0 The Committee recognizes the need to coordinate closely with the United States Fish and Wildlife Service, Division of Ecological Services, Carlsbad, CA, in all matters pertaining to trails and any actual or potential impact to wooded riparian wetland habitat, caused by use, construction, or maintenance of any trail within the Committee's jurisdiction.

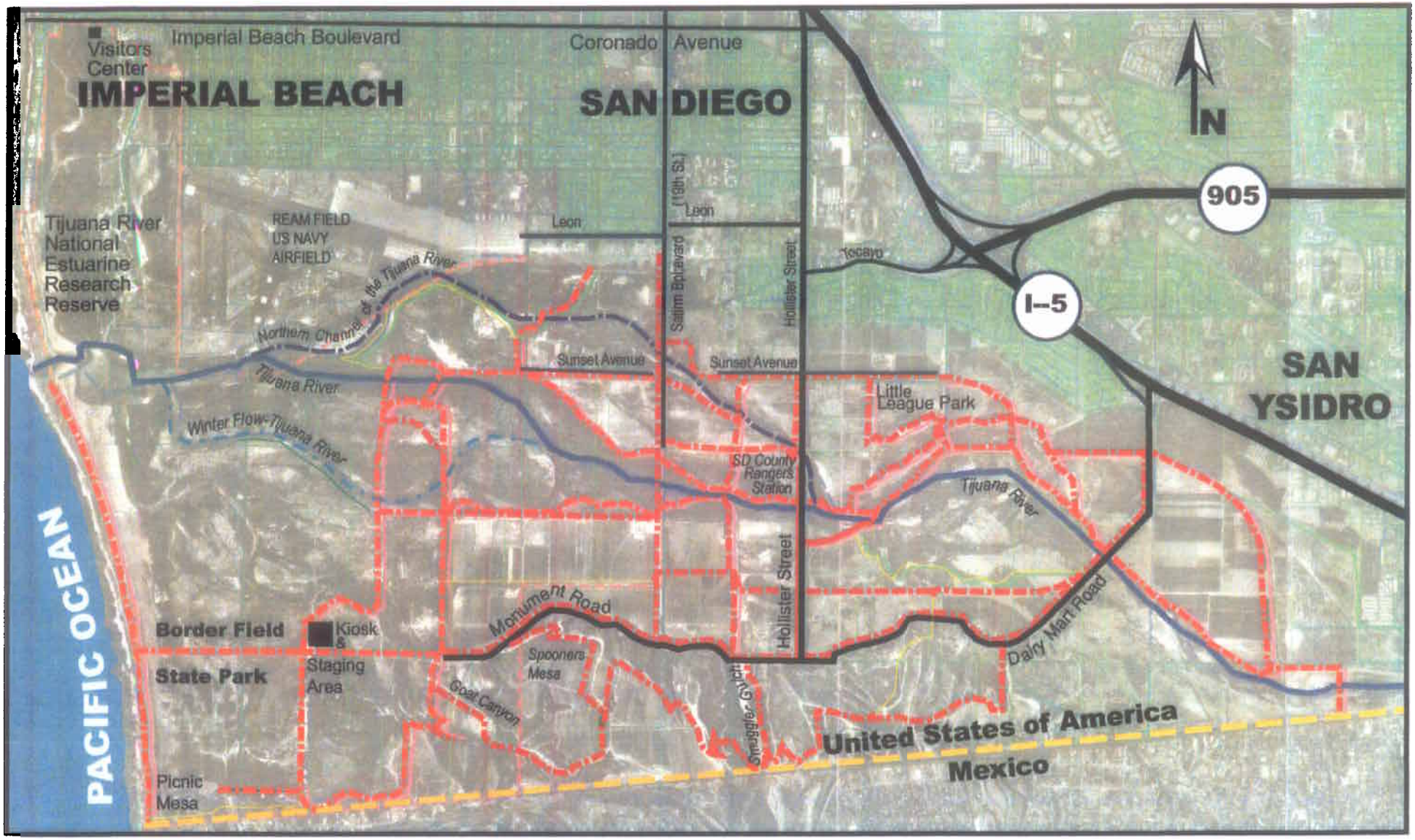
9.1 Any removal of riparian vegetation for trail maintenance or safety reasons must be first approved by the Service and will be offset by revegetation as specified by the Service.

9.2 The potential increase in brown-headed cowbirds associated with horse trail use will be offset by the implementation of an annual cowbird trapping program as specified by the Service.

9.3 All trail traffic on the beach areas north and south of the Tijuana River mouth will be restricted (by signage or other appropriate measures) to the hard packed sand areas created by the ocean's wave action, between March 1 and September 15 of each year. This seasonal closure will insure the maximum safety of the California least tern and western snowy plover, nesting on sandy beach habitat during the above mentioned dates.

9.4 The Committee recognizes that the Service may temporarily or permanently recommend closure of any section of trail that clearly poses a serious threat to any threatened or endangered species of plant or animal or its habitat, located within the jurisdiction of the Committee.

9.5 The Committee recognizes the importance of restoring the tidal prism, water circulation and estuarine habitats including coastal salt marsh, dune and maritime succulent shrub within the Tijuana River Estuarine Research Reserve. It is understood that long term restoration may in some instances eliminate a segment of a trail system. When this occurs, the Committee, in close coordination with the Service and California State Department of Parks and Recreation, will in a timely manner, seek and formally designate mutually approved alternative trail routes.



Tijuana River Valley Trails System

Approved Trails

Tijuana River

Map Graphics by Carolyn Powers

For current trail conditions, you may contact:

- http://www.ci.imperial-beach.ca.us/trv.htm
- California State Parks staff /Tijuana River National Estuarine Research Reserve Visitors Center at (619) 575-3613
- San Diego County Department of Parks & Recreation Rangers Station at (619) 428-2946

Approved Trails determined by the Round Table Trails Sub Committee under authority of the Tijuana River National Estuarine Research Reserve Management Authority. Participating committee members included: San Diego County Department of Parks & Recreation, California State Parks & Recreation, US Fish & Wildlife, State Coastal Conservancy, State Coastal Commission, US Navy, Citizens Against Recreational Eviction and Tijuana River Valley Equestrian Association.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011

In Reply Refer To:
FWS-SDG-4452

APR 20 2007

Captain Anthony T. Gaiani
Commanding Officer
Naval Base Coronado
P.O. Box 357033
San Diego, California 92135-7033

Attn: Kimberly O'Connor, Botanist, Navy Region Southwest

Subject: Biological Opinion on Land Withdrawal, Facilities Construction, and Operations at Naval Special Warfare, La Posta Mountain Training Facility, Campo California

Dear Captain Gaiani:

This document transmits the Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed land withdrawal, facilities construction, and Naval Special Warfare operations at Naval Special Warfare, La Posta Mountain Training Facility, Campo California located in San Diego County, California. This biological opinion was prepared in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your December 8, 2005, request for formal consultation on the proposed action was received on December 16, 2005. Modifications to the project description were received on July 27, 2006. At issue are the effects of the action on the endangered Quino checkerspot butterfly (*Euphydryas editha quino*, Quino). This biological opinion is based on information provided in: (1) Biological Assessment of Land Withdrawal and Operations at Naval Special Warfare La Posta Mountain Warfare Training Facility, Campo California (BA); (2) Quino Checkerspot Butterfly Recovery Plan; (3) e-mail correspondence that amended proposed action; (4) site visits conducted by Service staff on June 23, 2005 and June 5, 2006; (5) meetings held between the Service and the Navy on: November 10, 2005; February 6, 2006; March 6, 2006; and March 22, 2007; (6) Environmental Assessment of Land Withdrawal and Operations at Naval Special Warfare, La Posta Mountain Warfare Training Facility; and pertinent literature contained in our files. A complete administrative record of this consultation is on file at the Service's Carlsbad Fish and Wildlife Office.

CONSULTATION HISTORY

The Navy has conducted operations at La Posta Mountain Warfare Training Facility (La Posta MWTF) since 1985. The land is currently administered by the Bureau of Land Management (BLM). This consultation represents the first evaluation of the effects of ongoing military operations to the Quino checkerspot butterfly. The Navy contacted the Service regarding the proposed action in spring 2005. The Service advised the Navy that Quino checkerspot butterfly surveys in all portions of the installation that support potential habitat would be necessary to adequately evaluate the effects of the action (Fernandez, pers. comm.). Surveys throughout the installation were recommended because potential Quino habitat overlaps with training areas on the installation, and no previous evaluation of the extent of Quino occupancy had been conducted. The Navy elected to forego the recommended surveys, but completed a habitat assessment and conducted surveys within the immediate vicinity of existing and proposed facilities. These surveys confirmed the presence of Quino checkerspot butterflies in areas proposed for disturbance, but did not provide information regarding butterfly distribution or abundance in other portions of the installation that are subject to various levels of use. The Navy and Service conducted a site visit to La Posta MWTF on June 23, 2005. The Navy compiled data from the Quino surveys and habitat assessment into the BA and requested formal consultation on the effects of this action on December 8, 2005.

The Navy and Service met to discuss the proposed action on November 10, 2005, February 6, 2006, and March 6, 2006.

On May 12, 2006, the Navy informally notified the Service that construction of some facilities that are part of the proposed action had begun prior to completion of consultation, and that surface disturbance had occurred in areas where Quino checkerspot butterfly host plants had been documented. This premature action could have violated sections 7(d) and 9 of the Endangered Species Act as discussed below.

In accordance with section 7(d), Federal agencies and any applicants are prohibited from making irreversible or irretrievable commitments of resources with respect to the agency's proposed action that have the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives, which would avoid the agency's proposed action violating section 7(a)(2). In this case, as discussed in the Conclusion section of the biological opinion below, the Service has determined that the proposed action is not likely to jeopardize the continued existence of the Quino checkerspot butterfly. For that reason, no reasonable and prudent alternatives are warranted, therefore, the premature start of construction activities, fortunately, did not violate section 7(d). However, to ensure compliance with section 7(d) for future Navy actions that require formal consultation the Service recommends that the Navy improve communications between Navy Natural Resource personnel, Navy Planning personnel, and Navy Range Management personnel to avoid any further similar incidents.

The premature destruction of Quino checkerspot butterfly host plants may have resulted in the unauthorized incidental take of butterfly eggs and/or larvae, however the presence or absence of larvae and/or eggs were not determined prior to construction. The Service does not have the authority to authorize such take after-the-fact except under the circumstances of an emergency situation as provided for under the implementing regulations for section 7 at 50 CFR 402.05.

Unfortunately, the premature start of construction activities for the proposed action considered herein does not qualify as an emergency situation. Therefore, the liability for any unauthorized take rests with the Navy. However, the Service retains prosecutorial discretion in instances where violations of the Act have occurred. In this case, the Navy has incorporated measures into their proposed action that allow for minimization of impacts to the Quino checkerspot butterfly. On that basis, the Service has elected to exercise its prosecutorial discretion on this matter.

During the June 5, 2006 site visit, the Navy provided additional information regarding the abundance and distribution of host plants present on Parcel C within the footprint of potential construction. Installation managers also indicated that construction activities outlined in the BA (i.e. the proposed action) did not accurately reflect the potential facilities proposed for construction. Navy personnel and the Navy's contractor (EDAW, primary author of the BA) agreed to refine the parameters of the proposed action to allow adequate evaluation of impacts in the Biological Opinion.

On July 27, 2006 the Service received a revision of the action described in the BA. The revised project description reflects a high degree of uncertainty regarding the exact locations and size of proposed structures within Parcel C.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The U.S. Department of Navy (Navy) proposes to conduct training and expand training facilities on lands on and within the vicinity of the existing *Microwave Space Relay Station* in Campo, California. The Navy proposes to expand their jurisdiction and use areas around this site for military training activities. Specifically, the Navy proposes to:

(1) Transfer administrative jurisdiction of 1,079 acres (437 hectares) currently used for training from *Microwave Space Relay Station non-exclusive use* to *Mountain Warfare Training Facility* (MWTF) *exclusive use*;

(2) Withdraw an additional 2,318 acres (938 hectares) of land from Bureau of Land Management (BLM) jurisdiction to Navy jurisdiction and use this land for Naval Special Warfare exclusive use training;

(3) Obtain right-of way (ROW) and conduct mountain warfare training activities on 2,169 acres (878 hectares) of public land under BLM jurisdiction;

(4) Upgrade and expand existing facilities, including expansion of the current Close Quarters Combat (CQC) house to create a "Simunition™" house, expansion of existing small arms ranges, installation of a sniper range backstop, construction of additional small arms ranges, relocation of trails, construction of firebreaks, road widening, culvert installation, and extension of the existing security fence at the main gated entrance;

(5) Add new training areas, including Multistructure Training Complex (MTC) that may consist of; four Close Quarters Combat compounds, reactive steel ranges, electrical distribution poles, and a leach area for the septic systems. If funding is not available to construct the Close Quarters Combat Structures (Military Construction [MILCON] Project), the Navy plans to construct a sniper range with multiple firing positions and targets within the footprint identified for the MTC as an alternative to the four Close Quarters Combat Structures. If the alternative range is constructed, the Navy intends to use alternative funding or internal resources for construction.

(6) Continue training activities, which include; reconnaissance and intelligence gathering, survival training, land navigation, patrolling operations, communications exercises, sniper live fire exercises, small arms live fire exercises (without tracers), building entry and clearing (use of explosives), and obstacles breaching and forcible entry (use of explosives).

(7) Implement conservation measures to minimize the impacts of proposed construction and training activities on the Quino checkerspot butterfly.

A brief description of each component of the proposed action is provided below. A more detailed description of the proposed action may be found in the Biological Assessment of Land Withdrawal and Operations at Naval Special Warfare La Posta Mountain Warfare Training Facility, Campo California.

Change administrative jurisdiction of Microwave Space Relay Station (1,079 acres) to exclusive use for the Mountain Warfare Training Facility (MWTF)

The Navy proposes to modify language in the public withdrawal law Public Land Order 3457 of September 30, 1964 to re-designate the use of the Microwave Space Relay Station and recognize its current use as a mountain warfare training facility. This component of the proposed action would change approximately 1079 acres (437 hectares) from the current withdrawal designation, "non-exclusive use", to "exclusive use" designation for use only by the U.S. Navy. Withdrawal would result in some limitations on public uses: public access would be allowed pursuant to existing easements or rights, including current grazing rights. Additional public access may be allowed on a case-by-case basis (i.e. hunting and horseback riding) when it does not conflict with the training mission. The Navy would retain administrative jurisdiction regarding third party uses including grazing and public access, and the BLM would retain residual jurisdiction in regards to mineral leasing.

Withdraw 2,318 acres (938 hectares) from Bureau of Land Management (BLM) jurisdiction to Navy jurisdiction for Naval Special Warfare exclusive use training

The Navy proposes to withdraw additional lands adjacent to the existing Microwave Space Relay Station from BLM jurisdiction, for exclusive use as a mountain warfare training facility. Withdrawal would result in some limitations on public uses: public access would be allowed pursuant to existing easements or rights, including current grazing rights. Additional public access may be allowed on a case-by-case basis (i.e. hunting and horseback riding) when it does not conflict with the training mission. The

Navy would retain administrative jurisdiction regarding third party uses including grazing and public access, and the BLM would retain residual jurisdiction in regards to mineral leasing.

Obtain right-of way (ROW) and conduct mountain warfare training activities on 2,169 acres (878 hectares) of public land under BLM jurisdiction

The Navy proposes to obtain right of way authorization to conduct mountain warfare training activities on BLM land adjacent to parcels proposed for withdrawal. Administration of these lands would be retained by BLM, and Navy use would be compatible and coordinated with other public uses. Any future proposed improvements would require review and authorization by BLM.

Upgrade and expand existing facilities

Expand existing Close Quarters Combat (CQC) house
The DON proposes to expand the existing CQC house on Range 113 from 725 m^2 (7,800 ft^2) to 1,394 m^2 (17,800 ft^2). This would result in 929 m^2 (10,000 ft^2) of new surface disturbance.

Expand existing small arms ranges
The DON is proposing to improve sections of Range 115 by incorporating a horizontal ricochet reduction platform, commonly called and eyebrow, which can be installed over the tops of targets. The proposed eyebrow would measure 213 meters (700) feet) in length with a depth (distance from front edge to back wall) of 9.1 meters (30 feet). The area of new disturbance is expected to be 360 ft by 30 ft (10,800 ft^2, 1003 m^2). Construction of the eyebrow would create a baffled range and drop the surface danger zone by fifty percent.

Install sniper range backstop
The Navy proposes to improve Range 112 by adding four sniper bullet traps, each measuring 2.4 meters (8 feet) by 2.4 meters (8 feet), built into the hillside directly above Range 115. The total surface disturbance associated with construction of sniper bullet traps would be 23.04 m^2 (256 ft^2). The basic construction would be three walls and a roof made from railroad ties. In the center would be a swinging steel plate to provide immediate feedback upon contact.

Construct sniper tower
A 15.2 meter (50 ft) tall sniper tower with a 1200 ft2 platform is proposed for construction south of the existing sniper platform. The total surface disturbance associated with construction of the proposed sniper platform would be 1200 ft2. A 15.2 m (50 ft) by 30.4 m (100ft) paved parking area leading to the sniper platform at Range 112 is also proposed. The proposed paved parking area would result in 462.08 m^2 (5000 ft^2) surface disturbance.

Relocate trails
The Navy proposes to relocate trails, but has not determined which trails are proposed for relocation.

Construct firebreaks
The Navy proposes to construct firebreaks, but has not determined locations for firebreak construction.

Improve existing road
The Navy proposes to widen and straighten an existing dirt roadway and install two drainage culverts outside the MTC in Parcel C. The road providing access to this area is currently eroded and becomes impassable during the rainy season. The existing dirt road (approximately 8 ft wide) is proposed to be graded, widened to 7.3 meters (24 feet), and maintained. Widening would occur from the most northern point of the MTC construction footprint to the southern section where the dirt road intersects with an existing 7.3-meter-wide (24-foot-wide) dirt road. Widening will continue eastward to the southern intersecting road that leads to the existing withdrawal gate. Improvements to the existing road would entail 1.4 acres (60,984 ft^2) of new ground disturbance. No paving of the roadway would occur and the surface would remain permeable. Along the proposed widened road, two culverts would be installed near the existing withdrawal gate site to help minimize and control erosion. The culverts would consist of 70-centimeter (24-inch) pipe, each with a length of 15.24 meters (50 feet). The disturbance associated with culvert installation would extend beyond the width of the roadway approximately 13 ft on each side of the road and result in additional surface disturbance.

Extend the existing security fence at the main gated entrance
At the MWTF main entrance gate, the Proposed Action includes the expansion of the existing security gate and fence to 152.4 meters (500 linear feet) to either side of the entrance. The total surface disturbance associated with the expansion of the existing security gate is approximately 1,114.84 m^2 (12,000 ft^2), assuming a construction disturbance width of 3.66 m (12 ft).

Construct new ranges and facilities

Multistructure Training Complex
The Proposed Action includes construction of a "Multistructure Training Complex" (MTC) for special warfare missions. A detailed layout of each structure is currently unavailable, however the proposal includes four potential Close Quarter Combat (CQC) compounds, reactive steel ranges, restroom facilities, and a leach area for the septic systems. The MTC would be constructed within an area of approximately 59.5 acres (20 hectares) referred to as the "MTC Footprint" within Parcel C. Development would include the construction of several buildings made of concrete and/or ballistic steel with reconfigurable interior walls and points of entry for the purpose of small unit urban tactics training, method of entry training, surveillance, decline shooting, and other NSW

skill requirements. Undeveloped observation/firing positions would be located throughout the valley in locations that have not yet been identified, and would be incorporated into training utilizing MTC structures. One facility may contain a multilevel structure totaling approximately 1,449 m^2 (15,600 ft^2). Each proposed structure's footprint covers approximately 121 m by 182 m (400 ft by 600 ft) of ground area. Each facility would be spaced approximately 80-400 ft apart from other buildings and provide different scenarios incorporating force entries points, and no fire/ firing areas using appropriate bullet traps. Adjacent to several structures parking and turnout areas are proposed. The precise configurations of each facility would vary, but all direct development would be restricted to the MTC footprint of section C and the adjacent access road.

Support components within the southern portion of the MTC footprint would include electrical distribution system; a well and a 5,000 gallon water storage tank to provide potable water; a septic tank and leach field to support a restroom; a 20 ft x 20 ft restroom; and a portable electric generator storage building to supply power when required. Solar power will provide electrical services to the well and restroom facility as required. MTC structures may be supplied water and electricity by underground connections if needed.

A detailed layout of proposed structures is unavailable at this time however, entire MTC footprint (59.5 acres) may be disturbed as a result of the proposed action and is likely to be subject to frequent foot and vehicle traffic.

Continue training activities

Reconnaissance and intelligence gathering, survival training, land navigation
This type of training typically involves 2-4 people, who are dropped off by a vehicle from existing roadways.

Patrolling operations
Regular security patrols over the entire Proposed Action area would occur on a routine basis utilizing all-terrain vehicles on existing roads and trails.

Communications exercises
Communication exercises would consist of 20 personnel in pairs of (2) who would go into the field to conduct communication practice between each other and a base camp. The pairs will sit in separate locations and observe a target and report on observations. A communications suite inside a van will be set up at a high location, typically the HELO pad to monitor communications.

Sniper live fire exercises (without tracers)
Sniper live fire exercises are currently performed throughout the existing withdrawal and are proposed for the additional withdrawn property. No tracers are currently allowed, and none are proposed for future use. Sniper firing points are located throughout the facility at varied locations. Firing positions will change based on exercise parameters. Firing

positions will be located on and around the 60 acres slated for future construction (Parcel C) to allow for firing into, over, around and through structures.

Small arms live fire exercises (without tracers)
Small arms are currently fired at the existing ranges. No tracers are allowed, and none are proposed for future use. Small arms live fire will be conducted throughout the facility but must comply with strict safety parameters. Small arms live fire is proposed both inside and outside the constructed scenario sites within a 60 acre area of Parcel C.

Building entry and clearing (use of explosives)
Building entry is currently conducted at the CQC facility and will be conducted at the future 60 acre multi-scenario site. Both mechanical and surgical explosive (< 1 lb) building entry techniques are utilized. A team of 4 to 8 personnel will stage outside of a target structure. The doors, windows or walls will be breached as needed and the team will enter and move tactically throughout the building clearing it of occupants both friendly and not.

Obstacles breaching and forcible entry (use of explosives)
Obstacle breaching and forcible entry is currently conducted at the CQC facility and will be conducted at the future 60 acre multi-scenario site. Both mechanical and surgical explosive (< 1 lb) building entry techniques are utilized. A team of 4 to 8 personnel will stage outside of a target structure. The doors, windows or walls will be breached as needed and the team will enter and move tactically throughout the building clearing it of occupants both friendly and not.

Implement Conservation Measures to Minimize Impacts to Quino Checkerspot Butterfly

1. Clearly delineate construction sites by flagging, survey lath, or wooden stakes.

2. Contain sediment runoff within the limits of construction through the use of siltation fences, straw bales, sand bags, or silt ponds.

3. Minimize production of dust by using biologically sound chemical treatments.

4. Implement a habitat enhancement program to compensate for the loss of occupied Quino habitat associated with facilities construction.

The Navy would determine the location and extent of enhancement areas via consultation with the Fish and Wildlife Service and submit a Quino Checkerspot Butterfly Habitat Enhancement Plan that outlines location(s) of the enhancement area(s) and management strategies. The Navy would submit the Quino Checkerspot Butterfly Habitat Enhancement Plan prior to implementation of enhancement activities. The program would focus on control of invasive nonnative plants and augmentation of host plant populations.

5. Avoid direct impacts to Quino during construction by:

(1) Conducting surveys for host plants during the spring preceding construction.

Surveys would occur within the construction footprint and a 10 m (32.8 ft) buffer around the limits of construction by a qualified biologist;

(2) Examining any host plants detected within the construction footprint for larvae during the active season, and moving larvae detected to a pre-selected area at least 10 m (32.8 ft) from the edge of the construction limits.

6. Direct impacts to Quino associated with foot traffic would be addressed by monitoring and adaptive management.

(2) Surveys would be conducted following USFWS guidelines within all unsurveyed exclusive use parcels of the La Posta MWTF (approximately 2500 acres [1,012 hectares]). Surveys would be conducted in phases over a two-year period beginning in 2006 to accommodate funding constraints. Initial surveys would include areas surrounding locations where Quino were detected and would focus primarily on hilltops. Areas frequently used for training would be second in priority for surveys followed by areas used only occasionally and those completely unused.

(3) If Quino are detected during focused surveys in areas used for training, the Navy would re-initiate consultation with the Service. If appropriate, a monitoring program would be established for Quino checkerspot butterfly and habitat at La Posta MWTF. The habitat monitoring program would be designed to detect any significant changes in Quino habitat that could lead to decline of populations at La Posta MWTF. The Quino population monitoring component of the program would detect changes in the population size and distribution. Because populations are known to fluctuate from year to year, changes in the local population would be compared to populations throughout the region.

(4) Appropriate management activities would be implemented if training were determined to be the cause of negative impacts to the Quino checkerspot butterfly at the La Posta MWTF.

In summary, the area that the Navy proposes to withdraw and/or reserve for Navy training is comprised of the Existing Withdrawal parcel and Parcels C, E, and G (lands under application of withdrawal), and Parcels A, B, D, F, and H (proposed for ROW access), a total of 5,554 acres (2,248 hectares). The area proposed for new facilities construction/expansion includes approximately 61.85 acres (25.03 hectares) of non-excluded Quino Checkerspot Butterfly Habitat within Parcel C and the existing withdrawal parcel. The area proposed for foot traffic associated with dispersed training includes approximately 2,152.0 acres (870.9 hectares) of non-excluded Quino checkerspot butterfly habitat.

Table 1. Habitat disturbance associated with proposed action.

Action	*Parcel*	*Acres (hectares) Quino Habitat*	*Impacts to Quino*
Road widening	C	1.4 (.5666) [60,984 ft^2]	Habitat Loss, Potential Larvae Mortality
Extend security fence	EW	.28 (.11) [12,000 ft^2]	Habitat Loss, Potential Larvae Mortality
Expand CQC House	EW	.22 (.08) [10,000 ft^2]	Habitat Loss, Potential Larvae Mortality
Install Eyebrow	EW	.25 (.10) [10,800 ft^2]	Habitat Loss, Potential Larvae Mortality
Install sniper backstop	EW	.01 (0) [256 ft^2]	Habitat Loss, Potential Larvae Mortality
Install sniper tower	EW	.02 (0) [1200 ft^2]	Habitat Loss, Potential Larvae Mortality
Paved parking area adjacent to tower	EW	.11 (.04) [5000 ft^2]	Habitat Loss, Potential Larvae Mortality
Construct firebreaks	TBD	To Be Determined	Potential Larvae Mortality (depending on location)
Relocate trails	TBD	To Be Determined	Potential Larvae Mortality (depending on location)
Construct MTC	C	59.5 (24.08)	Habitat Loss, Potential Larvae Mortality
Frequent Use: foot traffic, vehicle traffic	C,E,G,EW	1247.3 (504.8)	Potential Habitat Degradation, Potential Larval Mortality
Occasional Use	C,E, EW	904.7 (366.1)	Potential Larval Mortality
Total Anticipated Construction Disturbance	**C,EW**	**61.78 (25.00)**	**Habitat Modification, larval mortality**
Total Anticipated Foot Traffic Disturbance	C,E, EW,G	**2152.0 (870.9)**	**Potential Habitat Modification, larval mortality**

STATUS OF THE SPECIES

Description

The quino checkerspot is a small member of the brush-footed butterfly family (Nymphalidae). It is about 4 cm (1.5 inch) in wing span. The dorsal (top) sides of the wings have a red, black, and cream colored checkered pattern; the ventral (bottom) sides are dominated by a checkered red and cream pattern. The abdomen of the Quino checkerspot butterfly has red stripes across the top. After their second molt, Quino checkerspot butterfly larvae can be recognized by the characteristic dark-black coloration and row of 8 to 9 orange tubercles (fleshy/hairy extensions) on their back. Before their first molt, larvae have a predominantly yellow coloration, and before their second molt they are grey with black markings (G. Pratt, pers. comm. 1999). Pupae are mottled black on a pale blue-gray background, and extremely cryptic.

Lifecycle

The life cycle of the Quino checkerspot butterfly typically includes one generation of adults per year, with a 4 to 6 week flight period beginning from late January to early March and continuing as late as early May, depending on weather conditions (Emmel and Emmel 1973, U.S. Fish and Wildlife Service 2003). Adult butterflies live from 10 to 14 days; however, adult emergence from pupae is staggered. If sufficient rain falls in late summer or early fall, a rare second generation of reduced numbers may occur (Mattoni *et al.* 1997). Females usually mate on the day they emerge from pupae, and lay egg masses of 120-180 eggs which hatch in 7-10 days. Females may lay multiple egg masses. In the closely related Bay checkerspot butterfly (*Euphydryas editha editha*), female nectar feeding resulted in increased egg production. Total egg production ranged from 400-800 eggs per female (Murphy et al. 1983).

Emergent larvae undergo two or three obligate molts prior to pupation. The periods between molts (shedding skin) are called instars. During the first two instars, larvae cannot move more than a few centimeters and are usually restricted to the plant on which eggs were laid (the primary host plant species). During the first two instars, larvae spin a fairly conspicuous web and feed in groups. Third instar larvae usually wander independently in search of food, and may switch from feeding on the plant on which they hatched (primary host plant) to another plant of the same species, or another host plant species (secondary host plant). By mid-third instar, larvae can travel up to 1 meter (3.3 feet) to find host plants (G. Pratt, pers. comm.). Early instar larvae (first two or three instars), are most susceptible to mortality because of their dependence on annual foodplants that senesce and dry rapidly following the last rain of the season.

During larval development, the host plants age, eventually drying out and becoming inedible (senescence). At the time of host plant senescence, if larvae are old enough and have accumulated sufficient reserves, they are able to enter an obligatory diapause. Diapause is a resting state that enables larvae to maintain a low metabolic rate during periods when host plants are not available. While in diapause, larvae are much less sensitive to climatic extremes and can tolerate temperatures from over 49 degrees Celsius (120 degrees Fahrenheit) to below freezing (M. Singer, pers. comm.). The larval exterior, or skin, is distinctive during diapause, becoming much blacker with denser "hairs" (setae) than earlier instars. Diapausing *Euphydryas editha* larvae have been observed curled up under rocks or sticks, or within the lower branches of *Eriogonum fasciculatum* (G. Pratt pers. Comm..), and enclosed in a light webbing (C. Parmesan and M. Singer, pers. comm.). Observations of post diapause larvae near dense grass and shrub cover indicates they may diapause in these areas (Osborne and Redak 2000). Extended periods of diapause may occur during times of drought (G. Ballmer, in litt., 1990). Post-diapause larvae develop through four more instars and then pupate, usually among low plants near the ground or under rocks (G. Pratt, unpubl. Data, White 1986). Pupae mature and to emerge as adults in about 10 days.

Quino checkerspot butterfly larvae can live for several years. One mechanism that generates longevity is repeated diapause (Singer and Ehrlich 1979), which occurs when larvae emerge from diapause, feed, and then re-enter diapause, postponing development until the next year. It has been suggested that Quino checkerspot butterfly larvae may also be able to survive without "breaking" diapause to feed in extremely dry years (G. Pratt, pers. comm.).

Habitat Affinities, Foodplants, and Nectar Sources

The Quino checkerspot butterfly is not associated with a single plant community, as are many butterflies, but instead with open spaces within several communities. Quino resource and climatic requirements are met, over the long term, by dynamic relationships that we can only generally recognize and at present describe imprecisely. The butterfly is found within several plant community types from scrub on coastal bluffs, through open grassland, coastal sage scrub, chaparral, oak woodland to desert pinyon-juniper woodland habitats of the interior foothills of southwestern California and Northwestern Baja California, Mexico (G. Ballmer, in litt. 1991, Mattoni et al. 1997). In all of these communities, it is found in openings within the dominant plant community where there is sufficient cover of larval foodplants which co-occur with nectar sources for adults. The definition of sufficient food plant density, however, has yet to be determined and may depend upon host plant species. Primary larval food plants (primary host plants) of the quino checkerspot include: *Plantago erecta* (dwarf plantain, family Plantaginaceae); *Plantago ovata*; *Castilleja exserta* (owl's clover, family Scrophulariaceae) (White 1974; G. Ballmer, pers. comm. 1993); *Antirrhinum coulterianum* (white snapdragon; Pratt 2001); *Plantago patagonica* (woolly plantain; Pratt 2000, 2001); and *Cordylanthus rigidus* (thread-leaved bird's beak), a partially parasitic plant often found at high densities in disturbed areas (Chuang and Heckard 1986). Additional primary host plant species may exist but remain unconfirmed at this time. Female Quino checkerspot butterflies appear to prefer ovipositing on individual plants that exhibit a spreading growth on leaves closest to the ground (Pratt 2001).

Plant community structure, and not the dominant species composition is the critical factor for Quino populations. Habitat is characterized by the presence of primary host plants (described above), secondary host plants which provide food resources for larvae, and nectar sources, which provide food resources for adult butterflies. Nectar sources for adult quino include a wide range of plant species. Butterflies alight on and find nectar in particular flower species, demonstrating some degree of nectar source constancy (McNeely and Singer, in press). *Euphydryas editha* prefers flowers with a platform-like surface on which they can remain upright while feeding (D. Murphy, G. Pratt, and M. Singer, pers. comm.). The butterflies frequently take nectar from *Lomatium* spp. (lomatium), *Muilla* spp. (goldenstar), *Achillea millefolium* (milfoil or yarrow), *Amsinckia* spp. (fiddleneck), *Lasthenia* spp. (goldfields), *Plagiobothrys* and *Cryptantha* spp.(popcornflower), *Gilia* spp. (gilia), *Eriogonum fasciculatum* (California buckwheat), *Allium* spp. (onion), and *Eriodictyon* spp. (yerba santa) (D. Murphy and G. Pratt, pers. comm.). *Salvia columbare* (chia) (Orsak 1978; K. Osborne, pers. comm. 2001; G. Pratt, D. Murphy, pers. comm. 2001), and *Dichelostemma capitatum* (blue dicks) (K. Osborne, pers. comm. 2002) may also be used for nectar feeding.

Quino checkerspot may preferentially select sites where exposure to winter sun is greatest (Weiss et al. 1987; Allen 1990). Among known colonies, there is usually some topographic relief, such as raised mounds, low to high hills, slopes and ridges. Cryptobiotic crusts (lower plant species crusts associated with undisturbed soils) have also been correlated to the presence of some host plant species and may be important for maintenance of appropriate habitat conditions for Quino (Mattoni et al. 1997).

Behavior

Adult Quino checkerspot butterflies spend time searching for mates, basking in the sun to thermoregulate, feeding on nectar, defending territories, and (in the case of females) searching for oviposition sites and depositing eggs. The Quino checkerspot butterfly is ectothermic, using air temperatures and sunshine to increase body temperatures to levels required for flight. If air temperature is cool, clear skies and bright sunshine may provide enough thermal power for flight, but flight is not possible below about 16 degrees Celsius (60 degrees Fahrenheit). In warmer air temperatures, flight may still be possible with scattered clouds or light overcast conditions, but has not been observed in very cloudy, overcast, or foggy weather. Adults remain hidden (often roosting in bushes or trees) during fog, drizzle, or rain, and usually avoid flying in windy conditions (sustained winds greater than 24 kilometers [15 miles] per hour). *Euphydryas editha* butterflies generally fly close to the ground in a relatively slow, meandering flight pattern (M. Singer, pers. comm.). Adult (K. Osborne, pers. comm. 2002) and larval (Osborne and Redak 2000) Quino checkerspot butterflies, like some other subspecies of *Euphydryas editha*, show a tendency to occur in barren spots amidst low-growing vegetation. Quino checkerspot butterflies tend to avoid flying over trees, buildings, or other objects taller than about 2 meters (7 feet), but natural vegetation does not constitute an impermeable barrier to dispersal (D. Murphy, G. Pratt, C. Parmesan, and K. Osborne, pers. comm.). Quino checkerspot butterfly thermodynamic requirements and natural avoidance of shaded areas deter flight in densely wooded areas and other types of closed-canopy vegetation (M. Singer, pers. comm.).

While Quino have been observed in areas with little topographic relief, male Quino checkerspot butterflies, and to a lesser extent females, are frequently observed on hilltops and ridgelines (Carlsbad Fish and Wildlife Office GIS Quino checkerspot butterfly database and metafile, Osborne 2001). A number of behaviors characteristic of species commonly found on hilltops have been documented. For example, male Quino checkerspot butterflies have been observed perching consistently in prominent locations on hilltops devoid of host plants and have been seen "attacking other male Quino checkerspot butterflies as well as other species of butterfly that approach (Osborne 2001, Pratt 2001). Hilltops may also represent centers of Quino checkerspot butterfly population density in some areas. Because adult Quino checkerspot butterflies are frequently observed on hilltops (U.S. Fish and Wildlife Service database), even in the absence of nearby larval host plants (Osborne 2001), hilltops and ridgelines may be important for population survival and therefore should be searched during presence/absence surveys and included in reserve designs.

Quino checkerspot butterflies are a sedentary species, however when quality host plants are in short supply, adult Quino checkerspot butterflies may respond by dispersing (White and Levin 1981, Murphy and White 1984). The likelihood of long-distance colonization by a given individual is considered low because environmental conditions promoting dispersal are not likely to also allow successful colonization. High emigration and habitat patch colonization rates probably only occur during rare outbreak years, when high local densities combine with favorable establishment conditions in "unoccupied" patches (not supporting larval development; Harrison 1989). Rare outbreak events are thought to play a crucial role in Quino checkerspot butterfly metapopulation resilience (Murphy and White 1984). Dispersal studies suggest that long distance movements by individual Quino checkerspot butterflies are not common, but may be sufficient to allow for infrequent between-patch exchanges of up to 6 kilometers (3.7 miles).

Abundance and Distribution
The Quino checkerspot may have been one of the most abundant butterflies in San Diego, Orange, and western Riverside Counties during the early part of the 20th century (Murphy 1990). The butterfly was historically distributed throughout the coastal slope of southern California, including Los Angeles, Orange, western Riverside, San Diego, and southwestern San Bernardino Counties and northern Baja California (Mattoni *et al.* 1997, Allen 1990). The species was once described as occurring; "on every coastal bluff, inland mesa top, and lower mountain slope in San Diego County and northern Baja California (D. Bauer, pers. Comm..) and occupied a variety of habitat types including coastal sage scrub, open chaparral, juniper woodland, forbland, and grassland communities (Brown and Faulkner 1984). By the 1970's most of the coastal bluff and mesa habitats in southern California had been disturbed, and by the mid-1980's the Quino checkerspot butterfly was believed to be extinct (USFWS 1997).

Current information indicates that the butterfly has been extirpated from Los Angeles, Orange, and San Bernardino Counties. Quino checkerspot butterflies are currently known to persist in San Diego and Riverside Counties, and in northern Baja California.

Quino checkerspot butterflies exhibit a metapopulation structure, which may be described as a set of populations that are interdependent over ecological time. Although member populations may change size independently, their probabilities of existing at a given time are not independent of one another because they are linked by processes of extirpation and mutual recolonization that occur on the order of every 10 to 100 generations. (Harrison et al. 1988).

Spatially clustered Quino checkerspot butterfly observations are referred to as "occurrence complexes" in the Quino Checkerspot Recovery Plan (USFWS 2003). Occurrence complexes represent areas of documented short-term local occupancy, probably within the greater distribution of extant metapopulations. The Quino Checkerspot Butterfly Recovery Plan has grouped occurrence complexes into "Habitat Areas". Areas with current records of Quino checkerspot butterfly include: The Northwest Riverside, Southwest Riverside, South Riverside, South Riverside/North San Diego, Southwest San Diego, and Southeast San Diego Habitat Areas, and more recently the Campo/La Posta area. The Campo/La Posta area is situated between the Southeast San Diego Habitat Area (Otay Mountain area) and the Southwest San Diego Habitat Area (Jacumba area). It was not recognized as a designated Habitat Area in the Recovery Plan due to a lack of Quino records at the time the Recovery Plan was drafted. Although not identified as an occurrence complex or Habitat Area in the Recovery Plan, the recent identification of Quino checkerspot butterflies on multiple properties in the La Posta/Campo area points to the existence of a Campo/La Posta "Habitat Area" for Quino checkerspot butterflies. This area may be of regional importance to the species as a linkage between the Southeastern San Diego Habitat Area, and the Southwestern San Diego Habitat Area as well as linkage between populations in Mexico, and those further to the north.

Although no estimates of population size for the Quino checkerspot butterfly are currently Available, the best available information indicates the species is highly endangered.

Threats

Threats to Quino checkerspot butterfly include habitat modification associated with development, invasive plant species establishment and proliferation, grazing/trampling, and predation. Climate change may adversely affect the species' distribution. In addition, the role of fire in the ecology of this species is poorly understood and fire has the potential to result in local extirpations that could exacerbate existing fragmentation.

Fifty to seventy-five percent of the known range of the Quino checkerspot butterfly was lost between 1900 and 1991 due to habitat degradation or destruction (Brown 1991) and additional significant levels of construction have occurred since 1991 in potential habitat.

Primary larval food plants can be displaced by exotic plants, which invade once the ground is disturbed by discing, grading, grazing and/or trampling (J. Johnson, in litt., 1989; G. Ballmer, in litt. 1990). Some food plants may colonize sites where grass does not grow well, like trails and road edges, where Quino checkerspot butterfly larvae are then subject to trampling (D. Hawks, pers. comm. 1993).

There is evidence that predation is a threat to Quino. Preliminary studies (D. Hawks, pers. comm., 1993; G. Ballmer, pers. comm. 1994) indicate that predation has contributed to the decline of the butterfly at sites where habitat has been invaded by non-native plant species, which may also harbor predatory arthropods.

Little data are published about the direct and indirect impacts of fire on Quino populations, nor on Quino host and nectar plants. The Recovery Plan states that "a combination of naturally occurring events (e.g. drought, cold snaps, flood, and fire), exacerbated by ongoing human caused habitat destruction and degradation (development, agriculture, and grazing), resulted in the apparent extirpation of formerly resilient Quino checkerspot butterfly populations in Orange County". Wildfire is apparently a natural perturbation that can directly extirpate a population of Quino, but the habitat patch might be recolonized depending on its distance from a source population. Based on research on bay checkerspot butterflies (*E.e. bayensis*), dispersal distances greater than 2 kilometers do not appear likely. The 2003 fires likely had an adverse effect on Quino populations due to the extent and severity of these fires. The "Cedar-Otay-Paradise Fire in 2003 burned 45.9% of the quino occurrences, and 21% of the habitat recorded in San Diego County. Interestingly, fire suppression activities have also been hypothesized to contribute to the changes in distribution and abundance exhibited for this species (Recovery Plan), as an increased fire return interval may allow changes in plant species composition or structure (i.e. a closed canopy) that would not be suitable as Quino habitat. Some areas occupied by Quino are in early post-fire succession (Mattoni et al. 1997) and several host plant species are known to be "fire following" species. Based on the metapopulation structure of the Quino checkerspot butterfly it is likely that the species is adapted to geographic and temporal variation in food plant distribution that would result from a habitat mosaic created from periodic fires.

Regional Status in San Diego County and the Campo/La Posta Area

The La Posta MWTF lies within southern San Diego County between the Southwestern San Diego and Southeastern San Diego Recovery Units (derived from the "Habitat Areas". The area surrounding the proposed La Posta MWTF supports habitat characteristic of higher elevation Quino sites such as Anza (G. Pratt pers. Comm.). The status of the Quino checkerspot butterfly in the area is largely unstudied. Several records now exist, associated with proposed habitat disturbing activities. Several projects are currently in the early planning stages in the vicinity of the proposed La Posta MWTF, including; a regional landfill, La Posta MWTF, and several housing developments.

A 400-acre landfill, approximately 400-acre well field and 200 acres of support facilities are proposed on tribal land located approximately 3 miles south of the proposed installation boundary (SAIC 2006). Quino have been documented in the immediate vicinity of, and within the project footprint for the proposed landfill.

Quino have also been documented on San Diego Mountain Ranch, within a mile (east) of the proposed MWTF boundary.

A significant number of the recorded Quino checkerspot butterfly occurrences, predicted species distribution, and critical habitat in San Diego County burned in 2003. Based on DOI BAER Vegetation Mortality, released 11/10/2003, 178 occurrences of 388 (pre-fire), or 45.0% burned. This same analysis indicates that 21% of the predicted distribution of Quino burned in these fires. The current status of the butterfly at sites that burned (3 years post fire) is under review.

In 2004 the Conservation Biology Institute finalized the Las Californias Binational Conservation Initiative. The Conservation Initiative provides a landscape level analysis of the biogeographic significance of the California-Baja California border region and presents a vision for conservation in the border region of California and Baja California. The Las Californias Conservation Initiative recognizes the Campo/La Posta area as a "critical opportunity area", where conservation values of existing habitat blocks are imminently threatened unless focused conservation actions take place. The Las Californias Conservation Initiative states a Conservation Goal in this area of creation of an area of unfragmented core habitat on the BLM lands around the La Posta Microwave Station property.

The Nature Conservancy recently acquired 2 parcels (330 acres) adjacent to the proposed La Posta Mountain Warfare Training Facility using funds provided by several agencies, including the Department of Defense. The land was acquired by the Nature Conservancy in accordance with the "Buffer Lands Initiative Memorandum of Understanding" to: (1) provide a buffer area between the La Posta Mountain Warfare Training Facility and surrounding private/public land; and (2) help maintain regional connectivity between National Forest lands to the north and habitats in Baja California. The buffer area is intended to reduce potential conflicts between

military training activities and surrounding land uses, thereby no training activities would be conducted within the buffer area. Although no natural resource inventory has been conducted and the suitability/occupancy of this site by Quino checkerspot butterflies is unknown, the acquired buffer lands may have conservation value for this species. Habitat assessment and surveys of acquired buffer lands are necessary to ascertain the presence of Quino checkerspot butterflies or suitable habitat on these parcels. The MOU precludes the use of this acquisition land as compensation for military impacts within the boundaries of the installation.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress.

The action area for the La Posta Mountain Warfare Training Facility includes parcels proposed for Exclusive Use Withdrawal and parcels proposed for Right of Way. The action area and surrounding area may be of great importance to Quino checkerspot butterfly given the metapopulation structure of the species and the position of the area between the Southwestern San Diego Recovery Unit and the Southeastern San Diego Recovery Unit. The action area is a subset of the Campo/La Posta area. The baseline condition of the Campo/La Posta area is discussed in the "Regional Status" section of this opinion (p. 15).

The action area lands are currently managed bv BLM under the guidance of the South Coast Resource Management Plan (SCRMP) (BLM 1994). The action area lies within the San Diego County Management Area of the SCRMP. The Management Plan lists Resource Condition Objectives for the area, including: emphasis on the protection and enhancement of sensitive species habitat and open space values; and enhancement of habitats for all wildlife species, including deer and quail.

The action area supports at least 18 vegetation series and is largely undeveloped. The action area is currently subject to foot and vehicle traffic due to ongoing training activities, recreational use, and illegal alien traffic; and has experienced several fires within the past twenty years. The existing withdrawal has been used by Naval Special Warfare, the Border Patrol, San Diego County Sheriff's Department and others for training since 1985. Existing development and disturbance exists primarily within the existing withdrawal and includes: (1) the microwave tower; (2) seven other buildings on Ranges 112 and 115; (3) a helicopter pad; (4) general purpose storage area; (5) breaching facility, (6) small arms range complex; (7) CQC house; (8) 300-yard known range; (9) three water wells; (10) simulated enemy missile site; (11) shotgun trail; (12) three dirt roads; (13) unmapped trails and some partially unvegetated and previously disturbed

areas. A grazing allotment is in place within Parcels E and F, and portions of Parcels B, C, and G, which may have affected the vegetation composition and soil structure of this area. Public recreational activities, such as horseback riding, camping, hiking, and hunting, are currently allowed within the action area. A network of undesignated and unmapped trails has developed as a result of ongoing use.

The Quino Checkerspot Butterfly Habitat Assessment did not assess the acreage of potential habitat on Right of Way parcels, however the areas proposed for withdrawal (the existing withdrawal and Parcels C, E, and G) support approximately 3,041.09 acres (1231 ha) of "non excluded" potential Quino checkerspot butterfly habitat and is occupied by Quino checkerspot butterflies (BA). The distribution of Quino checkerspot butterflies within the action area is under review- to date, occupancy has been documented in the areas proposed for facilities construction and expansion activities. The action area contains topographical features (hilltops and ridges) and host and nectar plants characteristic of Quino habitat. The primary host plant detected within the proposed construction areas is white snapdragon (*Antirrhinum coulterianum*). Approximately 420 individual plants of this species were detected within area proposed for construction during May 2006. The white snapdragon plants were located in a valley dominated by California annual grassland series, California buckwheat/white sage series, and chamise series. An additional occurrence of white snapdragon was mapped in Parcel G, in an area that is likely to receive limited use (foot traffic) as part of the proposed action. Additional surveys are necessary to determine the abundance of Quino and better define suitable habitat within the boundaries of the proposed MWTF.

Foot traffic currently occurs on trails and off trails within the boundaries of the proposed withdrawal. Individuals involved in outdoor recreation activities (horseback riding, hiking), illegal immigrants, Border Patrol agents, and military personnel all currently traverse the area. The current level of training activity onsite includes approximately 4,850 days per year of off road foot traffic.

The vicinity of the action area was not recognized as a Recovery Unit (USFWS 2003) or included as part of the Quino checkerspot butterfly Critical Habitat designation (USFWS 2002), due to lack of Quino checkerspot butterfly surveys and resulting lack of records from this area. Recovery Units were established based on the presence of one or more core (large) occurrence complexes within each habitat region. The action area lies between two Quino checkerspot Recovery units, the San Diego Southwest Recovery Unit and San Diego Southeast Recovery Unit. The Recovery Plan for the Quino Checkerspot Butterfly recommends the establishment of additional recovery units, including a Central San Diego Recovery Unit. Further surveys of the action area and surrounding lands may be necessary to determine whether this area should be recognized as an additional Recovery Unit.

The primary host plant that occurs within the action area is *Antirrhinum coulterianum. Antirrhinum coulterianum* appears to be a facultative fire-follower in nondesert areas (Thompson 1988, USFWS 2004). The plant displays morphological characteristics similar to those of some other primary host plant species, as individual plants often produce a substantial cluster of spreading leaves close to the ground (Thompson 1988). Quino females often oviposit on the underside of these leaf clusters

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

The Proposed Action is likely to result in the mortality of Quino checkerspot butterfly larvae within areas proposed for construction and in areas proposed for foot traffic. The proposed action would reduce the area of suitable and restorable habitat available to Quino checkerspot butterflies within the Existing Withdrawal and Parcel C. In addition, the proposed action may result in habitat changes from foot traffic throughout the action area. The area proposed for new facilities construction/expansion includes approximately 61.78 acres (25.0 hectares) of non-excluded Quino Checkerspot Butterfly Habitat within Parcel C and the existing withdrawal parcel. The area proposed for foot traffic associated with dispersed training includes approximately 2152.0 acres (870.9 hectares) of non-excluded Quino checkerspot butterfly habitat within parcels C, E, and G. Additional dispersed foot traffic would occur in Quino Checkerspot Butterfly habitat in parcels for which right of way is proposed.

Table 1. Habitat disturbance associated with proposed action.

Action	*Parcel*	*Acres (hectares) Quino Habitat*	*Impacts to Quino*
Road widening	C	1.4 (.5666) [60,984 ft^2]	Habitat Loss, Potential Larvae Mortality
Extend security fence	EW	.28 (.11) [12,000 ft^2]	Habitat Loss, Potential Larvae Mortality
Expand CQC House	EW	.22 (.08) [10,000 ft^2]	Habitat Loss, Potential Larvae Mortality
Install Eyebrow	EW	.25 (.10) [10,800 ft^2]	Habitat Loss, Potential Larvae Mortality
Install sniper backstop	EW	.01 (0) [256 ft^2]	Habitat Loss, Potential Larvae Mortality
Install sniper tower	EW	.02 (0) [1200 ft^2]	Habitat Loss, Potential Larvae Mortality

Paved parking area adjacent to tower	EW	.11 (.04) [5000 ft^2]	Habitat Loss, Potential Larvae Mortality
Construct firebreaks	TBD	To Be Determined	Potential Larvae Mortality (depending on location)
Relocate trails	TBD	To Be Determined	Potential Larvae Mortality (depending on location)
Construct MTC	C	59.5 (24.08)	Habitat Loss, Potential Larvae Mortality
Frequent Use: foot traffic, vehicle traffic	C,E,G,EW	1247.3 (504.8)	Potential Habitat Degradation, Potential Larval Mortality
Occasional Use	C,E, EW	904.7 (366.1)	Potential Larval Mortality
Total Anticipated Construction Disturbance	**C,EW**	**61.78 (25.00)**	**Habitat Modification, larval mortality**
Total Anticipated Foot Traffic Disturbance	**C,E, EW,G**	**2152.0 (870.9)**	**Potential Habitat Modification, larval mortality**

The Proposed Action includes Conservation Measures that may allow some butterfly larvae to survive that might otherwise perish within the construction footprint. In addition, the Proposed Action includes Conservation Measures that will help contain the impact to the identified construction areas. If nearby Quino checkerspot butterfly occurrences can be located, proposed Conservation Measures may result in positive management and augmentation of these occurrences. Based on the recovery plan, conservation measures that fully protect and/or restore habitat of greater value that the habitat lost should be outlined. A crucial aspect of conserving existing metapopulations is protection of dispersal areas between habitat patches. In order to protect dispersal areas between habitat patches, an increased understanding of the distribution of Quino checkerspot butterflies and host plants in the vicinity of the proposed La Posta MWTF is necessary.

The proposed action includes: (1) administrative changes in ownership that will give the U.S. Navy increased control of land uses; (2) ongoing and intensified training uses; (3) expansion of existing facilities; (4) development of new facilities, and; (5) implementation of conservation measures. The effect of each component of the proposed action on the Quino checkerspot butterfly is outlined below.

Administrative Change in Jurisdiction

The proposed change in administrative status to La Posta Mountain Warfare Training Area would remove approximately 3386 acres (1370 ha) of land from public access. The change in jurisdiction may result in some reduction in recreational and illegal entry, however the range would not be fenced and at this time, no additional security has been proposed. Where private or

BLM land abut the Withdrawal, gates would be installed, and signs would be posted. Access pursuant to existing rights and easements, including grazing allotments, would continue. Additional public access would be allowed on a case-by-case basis (i.e. hunting and horseback riding) when it does not conflict with the training mission. Some casual recreational use, as well as continued illegal entry, may continue to occur. However, the amount of recreational use is expected to be less than would occur if the lands were not withdrawn for exclusive Navy use. The net level of human activity at La Posta MWTF, taking into account increased training activity and some potential decrease in other human uses, is expected to increase. Increased levels of human activity would likely result in some level of degradation to Quino checkerspot butterfly habitat via weed introduction, spread, soil compaction, or host plant trampling (as discussed in the "Existing and intensified training activities" section, below). The proposed change in administrative status would also modify the natural resource goals that are currently in place under the South Coast Resources Management Plan, and may indirectly result in increased impacts to Quino checkerspot butterfly. Under the South Coast Resources Management Plan, resource goals for the area include emphasis on the protection and enhancement of sensitive species habitat and open space values; and enhancement of habitats for all wildlife species, including deer and quail. Withdrawal of these lands for exclusive use by the Navy Special Warfare units would likely change the goals for the area, as the primary goal would be to support the U.S. Navy training mission. The impacts of incremental changes in habitat quality associated with the change in administration would be reduce by implementation of the proposed Habitat Enhancement Plan. Increases in human foot traffic would increase the potential for harm to Quino larvae and adults, however the distribution of butterflies throughout the site has not been identified, so the level of impact remains unknown.

Right of Way Authorization on Parcels A, B, D, F, and H

Right of Way Authorization on Parcels A, B, D, F, and H would likely increase the level of human foot traffic on approximately 2169 acres (933 ha), as no reduction in other human uses would occur, but increased uses by trainees would occur.. Right of Way authorization would, however, retain the recognition of the natural resource goals set forth in the South Coast Resources Management Plan over this area. Increases in human foot traffic would increase the potential for harm to Quino larvae and adults; however the distribution of butterflies throughout the site has not been identified, so the level of impact remains unknown.

Existing and intensified training activities

Training activities that currently occur at the Mountain Warfare Training Facility Units involve 20-200 individuals during one class or training session. Approximately 12,011 use-days per year occur on the installation, and of these approximately 4,850 occur off roads or ranges, where there is more potential for Quino impact. Use is expected to increase on the installation, with 15,668 use-days per year expected in the future, including approximately 4,886 use days conducting off-road or off-range activities. Most of the anticipated increase in training use is expected to occur

on fixed range facilities (Range 113, Range 115, proposed CQC and sniper facilities). Approximately 1,247.33 acres (504.79 ha) of non-excluded Quino checkerspot butterfly habitat are proposed for frequent training use and approximately 904.65 acres (366.10 hectares) of non-excluded Quino checkerspot butterfly habitat are proposed for occasional training use.

Training activities could result in direct and indirect adverse impacts to Quino checkerspot butterflies as outlined below. In addition, foot traffic associated with training may result in "opening" of some closed canopy plant communities and improve conditions for Quino. Training exercises have been conducted at the proposed La Posta MWTF since the mid-eighties and Quino checkerspot butterflies currently occupy the site. It is unknown, however, whether the existing abundance and distribution is comparable to historical abundance and distribution at the site.

Trainees may step on, and unintentionally harm or kill larvae while traversing Quino checkerspot butterfly habitat. Quino larvae inhabit open areas between larger shrubs exposing them to potential harm from foot traffic, which is likely to occur in such open spaces. The extents of the impacts to Quino that may result from foot traffic are undeterminable because patterns of foot traffic and distribution of Quino checkerspot butterfly larvae at La Posta MWTF have not been identified. The relative intensity of use has been identified as a coarse measure of potential impacts associated with ongoing use. Based on this assessment, approximately 1,247.33 acres (504.79 hectares) of Quino checkerspot butterfly are likely to be subject to frequent use as part of the proposed action. We anticipate that Quino checkerspot butterfly harm, mortalities, and other impacts associated with foot traffic are most likely in these areas. Approximately 2152.0 acres (870.9 hectares) are likely to be subject to frequent or occasional foot traffic. Foot traffic may also degrade habitat by crushing larval host plants or nectar plants, compacting soils, or by spreading seeds of non-native invasive plants. Non-native invasive plants can out compete the native plant species on which the Quino checkerspot butterfly depends. Like foot traffic, vehicular traffic can crush larvae or host/nectar plants, and facilitate the spread of non-native invasive plants. In addition, adult butterflies may be hit and harmed or killed by vehicles. Based on the projections for changes in use levels associated with the proposed action, the impacts from off-road foot traffic and off-road vehicle activity associated with continued and intensified training at La Posta should remain similar to that which has occurred in recent years (currently 4850 use days increasing to 4886 use days, an increase of 36 days per year).

Fire, in the form of wildfires or controlled burns could occur as a result of training activities or range maintenance and is likely to kill Quino adults, eggs, larvae and host/nectar plants when it occurs in occupied areas. Fire, however, may also be important for the persistence of *Antirrhinum coulterianum* (white snapdragon), the local primary host plant. The risk of fire is increased in areas where pyrotechnics (flares, illumination rounds) would be used. Tracers, another potential ignition source, would not be used during live fire training exercises at La Posta MWTF, which reduces the overall potential for wildfire at this range. Controlled burns may also be propose in the future to implement fuel breaks or reduce the fuel load in safety arcs behind

fixed ranges, however the effects will be evaluated when locations for controlled burns are identified. In addition to the direct impacts associated with fire, fire is likely to change the plant community composition after a burn, affecting habitat suitability. One of the locations in which adult Quino were located in 2004 was in the vicinity of a previous burn. Fire could open the canopy and improve conditions for however fire could also result in annual grass invasion, which would decrease habitat value for the species.

Quino checkerspot butterflies or larvae may be hit by rounds that fall within the safety arcs behind existing or proposed ranges. Quino checkerspot butterflies have been found in the vicinity of the existing CQC house (Range 113), existing Small Arms Complex (Range 115), and have been found within the area proposed for similar exercises. Paradoxically, the safety arcs behind existing and proposed ranges also offer a degree of protection from foot traffic, as these areas are off-limits to foot traffic for safety reasons. Live fire exercises are expected to increase from 6,050 per year to approximately 9,662 per year (including future exercises conducted at MOUT) as part of the proposed action, which increases the possibility of butterflies being hit.

Expansion and Maintenance of Existing Facilities and Development of New Facilities

Expansion of existing facilities and development of new facilities is likely to result in the direct modification of approximately 61.78 acres of Quino habitat, including impact to the documented primary host plant occurrence in Parcel C. The Parcel C valley in which most new construction/ improvements/ training use is proposed supports over 95% of the Quino checkerspot host plants identified to date on the base. Modification of the 59.5 acre Parcel C MTC area, and resulting Quino checkerspot butterfly mortality and habitat loss may result in loss of this occurrence of Quino checkerspot butterfly. The significance of the loss of this occurrence is unknown, due to the limited amount of information about Quino checkerspot butterfly abundance and distribution in the Campo/ La Posta area. Based on the preliminary survey results, the loss may be significant, as host plant density appears low in most areas surveyed to date. An additional host plant occurrence documented in Parcel G has not been numerically quantified, and may also support a significant occurrence of host plants.

However, because the distribution of Quino checkerspot butterflies on the La Posta MWTF and in the La Posta/Campo region is poorly understood, the level of impact to the species associated with modification of this habitat is not known. We anticipate that larval, egg, and host plant losses would be significant to the local area, since this is the only place identified with this density of host plants. Loss of occupied Quino habitat is likely to be significant on a regional basis, given the location of La Posta MWTF between eastern, western, southern, and historical northern occurrences. The impact to the local Quino population is unknown due to information gaps concerning the presence of Quino throughout the local area.

Implementation of Proposed Conservation Measures

Proposed conservation measures include: (1) measures designed to clearly delineate construction project footprints and contain impacts to the project footprint area(s); (2) measures intended to reduce the number of larvae that are harmed or killed during construction activities; and (3) measures intended to reduce local and regional impacts of loss of Quino habitat and potential loss of a Quino occurrence by improving habitat.

The Navy has proposed several measures designed to clearly delineate construction project footprints and contain impacts to the project footprint area(s). Clearly marking the construction sites, utilizing siltation fences or means of controlling sediment runoff, and minimizing dust production are expected to reduce the potential for unplanned footprint expansion, erosion impacts, and loss of larvae or host plants due to dust.

The Navy has proposed several measures intended to reduce the number of Quino checkerspot butterfly larvae that are harmed or killed as a result of construction activities. The success of such efforts will be dependent upon the ability of biologists to find larvae. Adequate understanding of the Quino use of the construction area(s) that will allow location and collection of larvae will likely necessitate multiple seasons of site assessment.

The Navy has proposed continued surveys and habitat enhancement to reduce the local and regional impacts of the proposed action. Habitat enhancement is most likely to offset the impacts of the proposed action if implemented within the Quino dispersal distance from the construction areas. Surveys may help to identify appropriate areas for habitat augmentation or other Quino occurrences within the boundaries of the proposed installation. The Navy has committed to implementation of appropriate management activities if training is determined to be a negative impact to Quino on the installation, which should also reduce the impacts of the proposed action.

Approximately 657.32 acres (346.96 hectares) of Quino habitat occurs on La Posta MWTF in areas that are proposed for no training use. Quino checkerspot butterfly larvae and adults would likely benefit from any reduction in recreational use that occurs as a result of Navy administration of these areas.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future non-federal (State, tribal, local, or private actions) activities 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 consultation pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended. Previous actions (State, tribal, local, private, and Federal) are addressed in the Environmental Baseline section of this consultation. The action area includes only the federal lands proposed for withdrawal or right of way use. No future non-federal activities are anticipated.

CONCLUSION

After reviewing our understanding of the current status of the Quino checkerspot butterfly, the environmental baseline for the action area, effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the Quino checkerspot butterfly. We draw this conclusion for the following reasons:

1. Although the proposed action is likely to result in the loss of potentially significant Quino checkerspot butterfly habitat and individuals within this area, the Navy has committed to enhance Quino checkerspot butterfly habitat and minimize loss of individual butterflies/ larvae to offset anticipated impact;
2. A potentially significant host plant occurrence, which may support butterflies/larvae, is located within Parcel G in an area proposed for withdrawal likely to be subject to little use as part of the proposed action;

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations issued pursuant to section 4(d) of the Act prohibit take of endangered and threatened species without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing potential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral 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, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2) of the Act, such incidental take is not considered to be a prohibited taking under the Act, provided that such taking is in compliance with this incidental take statement.

The measures described below are nondiscretionary and must be undertaken by the Navy so they become binding conditions of any permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity covered by this incidental take statement. If the Navy (1) fails to adhere to the terms and conditions, (2) fails to require the enforceable terms that are added to the permit, and/or (3) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impacts of incidental take, the Navy must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Based on our discussion in the effects analysis, we anticipate that Quino checkerspot butterflies, eggs, or larvae that occur over approximately 2152.0 acres (870.9 hectares) are likely to be subject to frequent or occasional foot traffic and some butterflies or larvae within this area may be taken in the form of harm (injury, habitat degradation), harassment, or death (trampling, burning, vehicle contact), as a result of ongoing military training and facilities expansion at La Posta. We are unable to quantify the number of butterflies or larvae that may be taken due to the dispersed nature of the training activities, and the lack of information concerning butterfly and host plant distribution throughout the installation. It is not possible to quantify the amount of larvae that may be effected by the project. Any attempt at quantification of the number of larvae would not be based on any empirical data, therefore we will use acreage as a surrogate for numerical take. We anticipate that butterflies (3 observed in 2004) and host plants (420 recorded in 2006) that inhabit approximately 61.85 acres (25.03 hectares) of appropriate habitat may be lost in the course of facilities expansion and development for the new features proposed herein.

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the impact of incidental take anticipated in this biological opinion on the Quino checkerspot butterfly.

1. The Navy must implement the Proposed Avoidance and Minimization Measures outlined in the Biological Assessment subject to modifications described in the Terms and Conditions, to increase the measures' effectiveness in avoiding and minimizing impacts of incidental take.

2. The Navy must avoid, to the extent practicable, larval clusters that occur within the potential construction area for MTC in Parcel C, and in all other areas where facilities development or expansion is proposed.

3. The Navy must identify Quino Management Areas and focus management of Quino habitat in these areas to lessen the impact of the permanent modification of Quino habitat associated with construction and expansion of facilities at La Posta MWTF.

4. The Navy must augment or restore Quino checkerspot butterfly habitat to appropriate areas to lessen the impact of detected or anticipated Quino habitat degradation and/or Quino injuries/fatalities associated with ongoing foot traffic in Quino habitat within La Posta MWTF.

5. The Navy must educate all trainees who use La Posta Mountain Warfare Training Facility about the Quino checkerspot butterfly and the Navy's stewardship role regarding this species.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Endangered Species Act, the Navy must ensure that their military personnel, including all agents and contractors anticipated herein, comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline the required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure one, the Navy, including all of their agents and contractors, shall implement the Avoidance and Minimization Measures described in the BA and in the "Description of the Proposed Action" above, subject to the following specifications:

1. a. The Navy shall have a biological monitor present during the initial phases of clearing for construction projects to assure that construction sites are appropriately marked and to assure adequate communication regarding conservation measures and location of Quino checkerspot butterfly habitat. The Navy shall brief all contractors or Navy construction personnel regarding the presence of Quino checkerspot butterflies and habitat at La Posta MWTF, and the need to minimize the effective size of project footprints.

1. b. The Navy shall conduct host plant and larval surveys, as proposed in the "Proposed Avoidance and Minimization Measures" (BA) (and subject to the following modifications) during spring for 1 to 3 years preceding construction to gain understanding of the host plant dynamics and Quino checkerspot butterfly use of construction sites and thereby allow for successful collection of Quino larvae and white snapdragon seed.

Seed collection must be conducted by personnel qualified to identify, collect and properly store white snapdragon seed. The Navy shall collect seed from host plants identified within the construction footprint of the MTC, and other proposed facilities and utilize this seed to enhance Quino habitat outside the construction footprint. At least two years of seed collection prior to construction/disturbance of plants is likely necessary to collect sufficient seed for meaningful habitat augmentation. Based on meetings with the Range Manager, the area behind each range (safety arc) is a "no walk zone" and may provide an appropriate enhancement site to minimize the impact of unavoidable host plant impacts. The location of enhancement areas shall be identified as discussed in Term and Condition 1.d.

Larval salvage must be conducted by personnel qualified to identify, handle, and maintain Quino larvae. The Navy shall use a combination of techniques to relocate larvae outside the construction footprint, including Proposed Avoidance and Minimization Measure 5(1), "examine host plants detected within the construction footprint for larvae during the active season, and moving larvae detected to a preselected area (i.e. Quino Management

Areas) at least 10 m (32.8 ft) from the edge of the construction limits". Movement of larvae to the Quino Management Area must be conducted in accordance with the Habitat Enhancement Plan as discussed in Term and Condition 1.d. The Navy shall maintain larvae recovered from the construction limits through diapause and release these larvae to Quino Management Areas, using qualified personnel. Post-diapause larvae or adult butterflies recovered immediately preceding construction may also be relocated. All salvage work must be conducted in accordance with a Quino salvage protocol that may be included as part of the Quino Checkerspot Butterfly Habitat Enhancement Plan.

1. d. As proposed in Proposed Avoidance and Minimization Measure 4, the Navy shall develop of a comprehensive Quino Checkerspot Butterfly Habitat Enhancement Plan for La Posta MWTF, which will be included as part of the Integrated Natural Resources Management Plan for the installation. The Quino Checkerspot Butterfly Habitat Enhancement Plan shall use enhancement/restoration guidelines provided in the Recovery Plan, shall be consistent with the recovery objectives for the species and include: (1) identification local areas of importance to the species on the installation or in adjacent areas proposed as Quino Management Areas, (e.g. all areas where Quino adults, larvae, eggs, and potential host plants have been identified), cryptobiotic crusts, hilltops, ridgelines, and topographic features of likely importance to the butterfly, potential corridors to other known occurrences, and overlap with training areas; (2) the boundaries of areas managed to support Quino (Quino Management Areas); (3) specific management strategies (i.e. specifics regarding weed management, host-species augmentation, application of controlled burns) that will be implemented to benefit Quino in areas of the base; (4) mission-compatible mechanisms for avoiding trampling of Quino checkerspot butterfly larvae, host plants, or cryptobiotic crusts in any key areas if importance; (5) a habitat monitoring program designed to detect any significant changes in Quino habitat that could lead to decline of populations at La Posta MWTF; (6) A Chapter or Appendix that describes in detail the larval salvage and release techniques to be used (7) a Quino population monitoring program designed to detect changes in distribution, in which select occurrences on base are surveyed at least once every 4 years. The Quino Checkerspot Butterfly Habitat Enhancement Plan must be completed and receive Service concurrence prior to construction of facilities within Parcel C.

1. e. The Navy shall complete Quino checkerspot butterfly surveys initiated in 2006 to include all parcels of La Posta MWTF proposed for exclusive use for the Navy (approximately 2500 acres [1,012 hectares]).

1. f. As proposed in Avoidance and Minimization Measure 4, the Navy shall control the introduction of and spread of non-native plants throughout La Posta Mountain Warfare Training Facility. To prevent introduction of new invasive weed species, the Navy shall require that trainees' shoes and vehicles be free of soil and seed prior to travel throughout the installation. To control the spread of existing non-native species on base, the Navy

shall implement a weed control program. The weed control program may be included as part of the Quino Checkerspot Butterfly Habitat Enhancement Plan.

2. To implement reasonable and prudent measure two, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

2. a. Construction personnel shall using existing roads or existing parking lots for staging areas whenever possible.

2. b. Botanical surveys shall be conducted as close to the flowering period of *Antirrhinum* and within one year prior to construction. prior to grading activities to identify the locations of all primary and secondary host plants that lie within the clearly defined construction footprint, and;

2. c. Construction personnel shall avoid host plants where possible. This may be accomplished by slight modifications in construction boundaries, where possible, or by marking a buffer area around host plants. The Service acknowledges that due to the host plant distribution within the MTC footprint, in many instances, avoiding host plants will not be possible.

3. In order to implement Reasonable and Prudent Measure Number 3, the Navy shall:

3. a. Identify one or more sites that support a total of at least 61.78 acres of occupied Quino habitat, and manage this habitat under the guidance of the Quino Checkerspot Butterfly Habitat Enhancement Plan to offset the permanent modification of 61.78 acres of occupied Quino habitat. Quino management sites may be within the boundaries of the La Posta MWTF (preferably in areas that currently receive no use to reduce conflict), or may be off of the installation (in parcels that are acquired or encumbered for conservation), but must be within dispersal distance/ flight distance of parcel C and/or the Existing Withdrawal. Occupation of proposed management areas may be confirmed based on previous surveys or surveys conducted in support of identification of such sites.

3.b. Enhance at least one acre of habitat adjacent to the sniper platform constructed within the Existing Withdrawal in 2006 and manage this site to support Quino under the guidance of the Quino Checkerspot Butterfly Habitat Enhancement Plan.

4. In order to implement Reasonable and Prudent Measure Number 4, the Navy shall:

4. a. Include enhancement measures to address degradation associated with foot traffic in the Habitat Enhancement Plan.

5. In order to implement Reasonable and Prudent Measure Number 5, the Navy shall:

5. a. Include material regarding Quino checkerspot butterfly appearance and biology in briefings or range manuals distributed for the La Posta MWTF.

The Service believes that no more than the anticipated incidental take of Quino checkerspot identified above would result from the proposed action. The reasonable and prudent measures, with the implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Navy must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Reporting Requirements
In order to demonstrate compliance with the foregoing Terms and Conditions the Navy, or its designated contact, shall submit an annual report to the Service that describes and summarizes the implementation of the proposed Project, including a cumulative total of the amount of habitat impacted in order to track take, and its associated conservation measures.

Disposition of Sick, Injured, or Dead Specimens
The Service's Division of Law Enforcement, San Diego, California (619) 557-5063 is to be notified immediately should any quino checkerspot butterflies or quino checkerspot larvae be found sick, injured, or dead in the Project area. The Service's Carlsbad Fish and Wildlife Office should be notified concurrently at (760) 431-9440, ext. 274, 260, or 243. Written notification to both offices must be made within five calendar days and include the collection date and time, location of the butterfly(s), and any other pertinent information. Care must be taken in handling in handling dead specimens to preserve biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act 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.

(1) The Navy and the Service should collaborate and support research to contribute to our understanding of Quino checkerspot butterfly primary host plant utilization in higher elevation areas such as La Posta MWTF.

(2) The Navy and the Service should collaborate and support research to contribute to our understanding of Quino checkerspot butterfly diapuase locations.

(3) The Navy should authorize The Nature Conservancy to utilize any funds remaining from the Buffer Acquisition effort for acquisition of Quino habitat in the immediate vicinity of La Posta MWTF.

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

REINITIATION NOTICE

This concludes formal consultation on Land Withdrawal and Operations at Naval Special Warfare, La Posta Mountain Training Facility. 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 isexceeded (more than 61.85 acres); (2) new information reveals effects of the proposed 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 listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. This Opinion is based on the level of use and types of use outlined in the EA. Accordingly, if use of La Posta Mountain Warfare Training Facility exceeds the levels of use identified in this Opinion or if other types of uses are proposed, the Navy should seek re-initiation. In addition, some activities remain undefined in the Opinion; i.e. the locations for fuelbreaks and the number and locations of trails proposed for relocation are not identified. When fuelbreak locations or other aspects of installation development and management are determined, the Navy should initiate informal consultation to determine if re-initiation of formal consultation is necessary.

We look forward to working cooperatively with you to incorporate an effective conservation program for Quino checkerspot butterfly into the next revision of the Naval Base Coronado Integrated Natural Resources Management Plan.

If you have any questions regarding this biological opinion, please contact Sandy Vissman of this office at (760) 431-9440 extension 274.

Sincerely,

Therese O'Rourke

Therese O'Rourke
Assistant Field Supervisor

LITERATURE CITED

Bond, Monica and Curt Bradley. 2004. Impacts of the 2003 southern California wildfires on four species listed as threatened or endangered under the Endangered Species Act. Unpublished document produced by Center for Biological Diversity. 46 pp.

Bureau of land Management. 1994. South Coast Resource Management Plan and Record of Decision. 144pp.

Conservation Biology Institute. 2004. Las Californias Binational Conservation Initiative. Unpublished document, 43 pp.

EDAW, Inc. 2005. Biological Assessment of Land withdrawal and Operations at Naval Special Warfare La Posta Mountain Warfare Training Facility Campo, California. 98 pp.

Mattoni, Rudi, G.F. Pratt, T.R. Longcore, J.F. Emmel, and J.N. George. 1997. The endangered quino checkerspot butterfly, *Euphydryas editha quino*. Journal of Research on the Lepidoptera. 34:99-118.

Pacific Southwest Biological Services. 2005. Shadow Mountain Ranch, La Posta Area, Quino checkerspot butterfly 2005 flight season protocol survey results. 7 pp.

SAIC. 2006. Biological Assessment for the Campo Indian Reservation Solid Waste Disposal Facility Project. 52 pp.

U.S. Fish and Wildlife Service. 2003. Recovery Plan for the Quino Checkerspot Butterfly (*Euphydryas editha quino*). 179 pp.

US Fish and Wildlife Service 2004. Quino checkerspot butterfly monitored reference site information. Unpublished report. 13 pp. Available at: http://www.fws.gov/carlsbad/Rules/Quino/Documents/Quino_htms/2004

Personal Communications

Erin Fernandez, 2005. Discussion between Sandy Vissman and Erin Fernandez, Carlsbad Field Office wildlife biologist.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

In Reply Refer To:
FWS-SDG-4032.6

JAN 9 2007

Captain Anthony E. Gaiani
Commanding Officer
Naval Base Coronado
U.S. Department of the Navy
PO Box 357033
San Diego, California 92135

Mr. Peter A. Kennedy
Environmental Program Manager
Navy Region Southwest
U.S. Department of Navy
50 Nixie Way
San Diego, California

Attn: Ms. Tammy Conkle

Subject: Formal Section 7 Consultation on the Fiddler's Cove Marina Repairs and Improvements Project, San Diego County, California (1-6-06-F-4032.4)

Dear Captain Gaiani and Mr. Kennedy:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) based on our review of the proposed U.S. Department of the Navy's (Navy) Fiddler's Cove Marina Repairs and Improvements Project (Project), located on the western shore of San Diego Bay (Bay) at the Naval Amphibious Base Coronado (NAB) in the City of Coronado, San Diego County, California. This Opinion addresses the Project's effects to the federally listed endangered California least tern (*Sternula* [*Sterna*] *antillarum browni*, least tern) and the endangered brown pelican (*Pelecanus occidentalis californicus*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your May 1, 2006, request for initiation of formal consultation was received at our office on May 4, 2006.

This biological opinion is based on information provided in the following: (1) *Revised Administrative Draft Environmental Assessment for Fiddler's Cove Marina Repairs and Improvement Project* (Navy 2003), (2) *Memorandum of Understanding between the U.S. Fish and Wildlife Service and U.S. Navy concerning conservation of the endangered California least tern in San Diego Bay, California* (Navy and Service 2004), (3) multiple electronic mail messages, spanning June 27 to September 11, 2006, from the Navy to the Service that provided information requested in our June 16, 2006, letter and/or clarifications on the project description, and, (4) documents identified in the Literature Cited section of this document. A complete administrative record of this consultation is on file at this office.

CONSULTATION HISTORY

The consultation history includes documentation of any informal consultation and/or prior formal consultations on the action, documentation of the date consultation initiated a chronology of subsequent requests for addition data, extensions, and other applicable past or current actions. Discussions and documentation not specific to this project are provided in the Environmental Baseline of the Opinion.

January 13, 2004
The Service attended a site visit of the project area and discussed the Project with the Navy, U.S. Army Corps of Engineers (Corps), and California Department of Fish and Game. At the site visit, it was discussed that an Environmental Assessment for the project would be provided to the Service for concurrence.

April 27, 2004
The Service received a copy of the Navy's *Revised Administrative Draft Environmental Assessment for Fiddler's Cove Marina Repairs and Improvement Project*, dated November 2003, (EA) for review and comment.

June 3, 2004
The Service sent a letter to the Navy, dated June 3, 2004, commenting on the EA. Our primary comment was that the projects impacts to least tern and brown pelican foraging habitat[1] resulting from a net increase in 0.85 acre of structures covering San Diego Bay should be avoided and minimized. The Service also provided a list of actions the Navy could implement to minimize impacts.

September 16, 2004
The Navy sent a letter to the Service stating that the Navy did not concur with the Service's recommendation to avoid and minimize impacts to least tern and brown pelican foraging habitat because the Navy considered the impacts small in size in relation to the size of San Diego Bay.

June 6, 2005
The Service and Navy met to discuss our disagreement over whether impacts to least tern and brown pelican resulting from covering their foraging habitat with structures should be avoided or minimized. To address this issue, the Service suggested a consensus where impacts would be offset at a 1:1 ratio in a manner consistent with past projects when they either (1) occur within a specific distance to a least tern colony, or (2) reach a mutually agreed to cumulative threshold within the San Diego Bay. No consensus was reached at the meeting and the Navy expressed their intent to formally consult with the Service on the Project.

[1] Foraging habitat is defined as open water containing suitable fish prey that is available for foraging by plunge-diving birds (e.g., least terns and brown pelicans) by not being obstructed and/or covered by structures (e.g., piers, docks, or boats).

June 20, 2005
The Service sent a letter to the Navy in response to their September 16, 2004, letter to the Service and January 20, 2005, letter to the Army Corps of Engineers. Both Navy letters stated that the Navy did not concur with recommendations (from the Service, California Department of Fish and Game, and Audubon Society) to avoid and minimize impacts from losses in foraging habitat in San Diego Bay resulting from covering bay surface waters with structures. The Service's letter stated that the Navy's letters did not justify a change in the way impacts to bay surface waters are evaluated and offset, and that the Service recommended that Navy avoid and minimize impacts to losses in uncovered bay waters consistent with past projects. We also reiterated our concern with such impacts, particularly in light of (1) impacts to least tern and brown pelicans foraging habitat, (2) impacts to the overall biological community of San Diego Bay, (3) the cumulative loss of uncovered San Diego Bay waters and foraging habitat, and (4) consistency with past Navy projects that avoided and minimized such impacts.

May 3, 2006
The Service received a letter from the Navy, dated May 1, 2006, requesting formal consultation on the Navy's Fiddler's Cove Marina Repairs and Improvements Project. Although the Navy's letter requested formal consultation, it also stated that the Navy has determined that the proposed project may affect but is not likely to adversely affect the least tern and the brown pelican, in part because the losses in foraging habitat were relatively small and forage fish would remain available to least terns and brown pelicans. The Navy's letter stated "that the Navy has compensated for Bay coverage [e.g., loss of foraging habitat] in the past... [and] that bay coverage must be considered as a consequence of proposed actions,...but feels that it does not warrant automatic mitigation." As such, no measures to minimize the loss of foraging habitat for least terns or brown pelicans were proposed.

June 16, 2006
The Service sent a letter to the Navy agreeing to initiate formal consultation with the Navy on the Project. We also stated that we did not concur with the Navy's 'not likely to adversely effect' determination for impacts to listed species, particularly the least tern, because (1) losses in foraging habitat were occurring immediately adjacent to one of the largest least tern breeding colonies in California, and (2) the losses in foraging habitat could result in reduced productivity or reproductive success of least terns, particularly in years when their fish prey is limited. As such, we again suggested several measures that the Navy could implement to minimize or offset their impacts to foraging habitat. In our letter, we also requested that the Navy provide a list of information necessary to complete the consultation.

August 9, 2006
The Service and Navy met to discuss the consultation on the Fiddler's Cove project. The Service provided a draft of the Opinion's Description of the Proposed Action for the Navy's review and concurrence or comment. The Service discussed the basis for the Opinion's effects analysis. Furthermore, the Service suggested the Navy and Service come to consensus on measures to

minimize and offset unavoidable losses in foraging habitat. As a compromise, the Service suggested that the Navy minimize and offset impacts when they either (1) occur within a mutually agreed to distance of a least tern colony, (2) reach a mutually agreed to cumulative threshold within San Diego Bay, or (3) impact mutually agreed to preferred least tern foraging habitat within San Diego Bay. The Service again suggested several measures that the Navy could implement to minimize or offset their impacts to foraging habitat. The Navy indicated that they wanted to review our draft Opinion prior to finalization, and at that time would consider if they thought minimizing and offsetting impacts for losses in foraging habitat was warranted.

August 23, 2006
The Navy sent a revised project description to the Service via electronic mail.

August 30, 2006
The Navy and Service met for the Navy/Service Coordination meeting. The Fiddler's Cove Project was discussed as an agenda item at the meeting.

August 31, 2006
The Service sent an electronic mail message to the Navy requesting clarification on acreage of impacts for the project description as such information was not provided in the August 23, 2006, electronic mail message.

September 7, 2006
The Navy sent an electronic mail message to the Service indicating that they could not provide the requested acreages at that time.

September 18, 2006
The Service hand delivered a draft Opinion, dated September 15, 2006, to the Navy for review and comment. The draft Opinion concluded that the Project would result in incidental take of the least tern, particularly to chicks and eggs, and included measures (i.e., Terms and Conditions) to minimize the impacts of incidental take.

October 23, 2006
Therese O'Rourke (Service) and Captain Gaiani (Navy) had a telephone conversation regarding the draft Opinion. During the call, an agreement was reached regarding changes to the project description and the incidental take statement, specifically terms and conditions.

October 24, 2006
The Navy sent an electronic mail message to the Service with their draft comments on the draft Opinion.

October 31, 2006
Therese O'Rourke (Service) and Captain Gaiani (Navy) discussed the project and a disagreement between the agencies on whether the Project will result in incidental take to the least tern. They

agreed to have each of their respective staff present the issue to them and then come to a decision on the finalization of the consultation.

November 3, 2006
Carol Roberts (acting for Therese O'Rourke, Service) and Captain Gaiani (Navy) were provided a presentation outlining the basis for the Service's Opinion by Service staff (Carolyn Lieberman); and a summary of the Navy's stewardship program for the least tern by Navy staff (Tammy Conkle). Additional staff in attendance included David Zoutendyk (Service) and David Silverstein (Navy). Ms. Roberts and Captain Gaiani conferred and agreed that due to the Navy's stewardship efforts for the least tern and questions the Navy had regarding the Service's Opinion, the Service would reconsider whether the Project would: (1) adversely affect the least tern, or (2) result in incidental take to the least tern. The Navy agreed to provide documentation to the Service to support the Navy's position and to assist the Service in reconsidering their determination of adverse affect or take. Carol Roberts (Service) agreed to issue either: (1) a concurrence that the project was not likely to adversely affect the California least tern, or (2) a biological opinion without incidental take exemption, *provided that*; information provided by the Navy would support this determination, and the Navy would address the issue surrounding modification of foraging habitat within the bounds of the INRMP and the MOU. Discussion followed regarding the basis for such a reversal in the Service's Opinion.

November 8, 2006
The Service sent a letter to the Navy and a copy of the most recent draft Opinion that incorporated the Navy's comments on the first draft Opinion (see October 24, 2006) for the Navy's review and comment. The letter stated that "based on the discussion at our November 3, meeting, we are reconsidering whether incidental take of the least tern is likely to occur as a result of the project, and/or whether there are necessary and appropriate measures that would minimize the impacts of that take on the California least tern." The Service requested "written documentation of the Navy's position with supporting references (e.g., published reports or studies, journal articles)".

November 21, 2006
The Service received a letter from the Navy stating that based on the outcome of the November 3, 2006 meeting, it was the Navy's understanding that the Service had agreed to issue an Opinion without incidental take exemption. The Navy also provided available documentation to support statements made at the November 3, 2006, meeting.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The purpose of the Project is to improve and expand a multi-use, year-round recreational facility to support the military's regional recreational needs. The proposed action is needed to restore serviceability of deteriorated marina facilities at Fiddler's Cove, control erosion and stabilize

shoreline, and enhance / expand existing recreational functions of the marina. The Project includes the following six elements at the existing Fiddler's Cove Marina (Figure 1):

1) Fixed pier replacement:
Replacement of the fixed pier includes demolition of an existing fixed pier and construction of an aluminum brow for pedestrian and utility access to the marina. The aluminum brow will be 0.01 acre. Up to six new piles may be installed during construction of the new brow. Total duration of construction is estimated at 6 weeks.

2) Floating dock utilities upgrade and expansion:
Upgrade and expansion of the floating dock utilities includes construction of a new headwalk G and associated finger piers that can accommodate up to 30 boat slips, and upgrade of utilities to provide services to new boat slips and to fix existing inadequacies. The new headwalk would extend east from the existing headwalk F in an area containing about 10 boat moorings. The new headwalk will be approximately 0.28 acre. When filled with boats, the dock will cover 0.9 acre. The existing mooring blocks would be removed prior to construction of the new headwalk. The new headwalk would be braced against lateral movement by four to six new anchor piles. Ten to 20 pier piles currently used to support the existing headwalks would also be replaced. Up to 26 new piles would be needed for the new headwalk. Fluorescent fixtures will be mounted within each dock utility box, which is provided at each boat slip. Total duration of construction is estimated at five weeks.

3) Boat ramp repair and extension:
Repair and extension of the existing boat ramp consists of demolition of the existing boat ramp and installation of a new concrete slap. The ramp would be extended an additional 40 feet to reach an elevation of -3.0 feet Mean Lower Low Water (MLLW) so that vessels can be launched at low tides resulting in the loss of 640 square feet of non-vegetated soft bottom habitat. Improvements to the boat ramp would require dredging of an estimated 50 to 55 cubic yards of bottom sediments from the foot of the boat ramp using a land-based excavator and a temporary cofferdam for dewatering. A concrete pedestal would also be installed for a future pole and light. Total duration of construction is estimated at six weeks.

4) Recreational vehicle park expansion and repair:
Redevelopment of the existing recreational vehicle park consists of enlarging parking pads, upgrading utilities, and expanding the park eastward to provide additional campsites, a comfort station, washroom facility, and picnic area. Total duration of construction is estimated at three months.

5) Seawall repair:
Replacement of the seawall will remove and replace an existing 330-foot deteriorated timber seawall with a 1,182 foot sheet vinyl retaining wall constructed above the +7.8 feet MLLW line. The new retaining wall will consist of a vinyl sheet pile face, steel tie back rods, and a cast-in-place concrete cap. After the retaining wall is built, the void behind the wall would be

backfilled. With the placement of the new retaining wall above the +7.8 feet MLLW line, approximately 5,300 square feet (0.12 acre) of intertidal habitat will be created. Total duration of construction is estimated at five weeks.

6) Wave attenuation replacement.
The existing floating-tire wave attenuator will be removed and replaced with a concrete floating wave attenuator. The new system would incorporate a concrete exterior with a Styrofoam interior for buoyancy. Each interlocking section would measure about 50 feet in length and would be moored with chains to cement blocks. The new attenuator would be installed in the current footprint, retaining the existing access route into the marina. The new wave attenuator will be approximately 0.23 acre. Total duration of construction is estimated at six weeks.

Construction plans for the new headwalk G have not been completed, so the following impact acreages are only estimates. The replacement of various in-water structures would result in the net addition of approximately 0.85 acre (3,540 m^2) of man-made structures to the waters of Fiddler's Cove, including boats that would use the new floating dock (Table 1). The proposed project will add a total of 1.01 acres of new man-made structures as a result of the floating dock utilities upgrade and expansion (+0.9 acre of structure covering the bay), boat ramp repair and replacement (+0.02 acre of fill), and wave attenuation replacement (+0.09 acre of structure covering the bay). A total of 0.16 acre of existing structures covering or filling the Bay will be removed as a result of the fixed pier replacement (-0.04 acre removal of structure covering the bay) and a seawall repair (-0.12 acre removal of fill). Overall, the proposed project will result in a net loss of 0.85 acre of open bay surface area currently uncovered by structures.

Table 1. Effects of Project Components on Surface Area of Structures in Fiddler's Cove

Project Component	*Existing In-Water Surface Area*	*Proposed In-Water Surface Area*	*Net Change*
Floating Dock Addition	~ 6.0 acres (including boats)	~ 6.9 acres (including boats)	+0.9 acre
Fixed Pier Replacement	0.05 acre	0.01 acre	-0.04 acre
Boat Ramp Replacement	0.02 acre	0.04 acre	+0.02 acre
Wave Attenuator Replacement	0.14 acre	0.23 acre	+0.09 acre
Seawall Replacement	0.012 acre	0	-0.12 acre
Total	6.44 acres	7.18 acres	+0.85 acre

CONSERVATION MEASURES

1) Per the *Memorandum of Understanding between the U.S. Fish and Wildlife Service and U.S. Navy concerning conservation of the endangered California least tern in San Diego Bay, California* (MOU; Navy and Service 2004), no in-water construction (e.g., pile driving or dredging) will be conducted during the least tern nesting season (April 1 to September 15).

2) Per the MOU and the *Endangered Species Consultation and Draft Biological Opinion on Military Training Operations during 2005 and 2006 Breeding Seasons at Naval Amphibious Base, Coronado and Naval Radio Receiving Facility, Imperial Beach, Naval Base Coronado, San Diego, California* . (Service 2005), the Navy will conduct predator control at the least tern nesting sites at Naval Amphibious Base (NAB) Ocean (i.e., Silver Strand Training Complex) and Delta Beaches North and South.

3) To minimize the temporal loss of waters of the U.S. and open water habitat available for foraging birds (e.g., least terns and brown pelicans), the seawall replacement will occur prior to, concurrently, or within six months of the upgrade and expansion of the floating dock utilities and the boat ramp repair and replacement.

4) Pre- and post-construction eelgrass (*Zostera marina*) surveys will be conducted for all in-water construction activities. If the post-construction activities survey indicates eelgrass has been impacted by construction activities, banked credits from the Navy's Eelgrass Mitigation Bank (Draft) South and South Central San Diego Bay sites will be used to offset those impacts.

5) Construction Best Management Practices will be utilized to limit the potential for discharges of pollutants into the marine environment during construction.

6) The Navy will ensure that development lighting (dock and ramp lighting) adjacent to open water, and nesting and roosting habitat (e.g., South Delta Beach, wave attenuator) will be directed away from and/or shielded so as not to illuminate, nesting habitats. Lighting will be of the lowest illumination possible for human safety.

7) If night work is necessary, night lighting will be of the lowest illumination necessary for human safety, selectively placed, shielded and directed away from open water and roosting habitats.

8) Sediments proposed for removal will be tested prior to dredging using standard Environmental Protection Agency and Army Corps of Engineers testing protocols to determine suitable disposal options.

9) Staging or lay down areas for construction materials and equipment will be located at Fiddler's Cove Marina for all project components.

10) All debris will be transported to, and disposed of, at an appropriate upland disposal site, or recycled, if appropriate.

11) Prior to project implementation the Navy will provide the Service with final construction drawings with an overlay of habitat to be impacted and habitat areas that are to be avoided to

verify impacts identified in the Opinion are not exceeded and/or determine whether the Opinion needs to be amended.

12) During project implementation the Navy will regularly monitor construction activities to ensure that no deviations from the proposed action as described herein are occurring. The Navy will report any violation of authorized impacts to the Service within 24 hours of its occurrence.

13) After project implementation, the Navy will submit a final report to the Service within 60 days of project completion that includes: as built construction drawings with an overlay of habitat that was impacted and photographs of habitat areas that were to be avoided, and other relevant summary information documenting that authorized impacts were not exceeded

STATUS OF THE SPECIES/CRITICAL HABITAT

California least tern (*Sternula* [*Sterna*] *antillarum browni*)

Listing Status

The California least tern (least tern) was federally listed as endangered on October 13, 1970 (35 FR 16047) and State listed as endangered in California on June 27, 1971. A recovery plan was adopted in 1980, revised September 27, 1985 (Service 1985a). No critical habitat has been designated for the least tern.

Species Description

The least tern is the smallest of all North American terns, weighing approximately 40-50 grams, with an average length of 21-23 centimeters, and a wingspan of 48-53 centimeters (Thompson et al. 1997). Adult least terns are characterized by white underparts, light gray back and wings, short orange legs, and a black-tipped, straight, pointed yellow bill (Service 1985b). Adults have a black crown and nape, and a white patch extending from the bill to the forecrown and over the middle of the eye. The white tail is shallowly forked. Their flight is light and buoyant, but direct, with deep, quick wing beats. The sexes are similar. Immature birds have darker plumage and a dark bill, and their white heads with dark eye stripes are distinctive (Service 1985b).

Distribution

The breeding range of this subspecies has historically been described as extending along the Pacific Coast from Moss Landing, Monterey County, California, to San Jose del Cabo, southern Baja California, Mexico (American Ornithologists' Union 1957, Grinnell and Miller 1944). However, since 1970, nesting sites have been recorded from San Francisco Bay to Bahia de San Quintin, Baja California (Service 1985b). The nesting range in California is thought to have been widely discontinuous, with the majority of birds nesting in southern California from Santa

Barbara County south through San Diego County (Service 1985a). Their migration route in California is along the coast in both spring and fall. South of the Mexican border, the migratory route is not known, but is assumed to be coastal (Service 1985a).

The majority of least tern breeding populations are concentrated in southern California within the Counties of Los Angeles, Orange, and San Diego. Over half (i.e., 58 percent in 2005) of the U.S. least tern breeding population is found in San Diego County (Marschalek 2005). In southern San Diego County, recent nesting sites are known from Mission Bay (including FAA island, north Fiesta Island, Mariner's Point, Stony Point, and San Diego River Mouth), San Diego Bay [including South San Diego Bay National Wildlife Refuge, Sweetwater Marsh National Wildlife Refuge, Lindbergh Field, Naval Air Station North Island, Naval Amphibious Base Coronado (North and South Delta Beaches and NAB Ocean Beach), and the Chula Vista Wildlife Reserve], and the beach areas north and south of the Tijuana River mouth. In northern San Diego County least terns are known to breed at the mouth of the Santa Margarita River on Camp Pendleton Marine Corps Base, at Batiquitos Lagoon (Fancher 1992, Powell and Collier 2000, Marschalek 2005), and at San Elijo Lagoon (Robert Patton, unpubl. data). All of these colonies are in close proximity or adjacent to estuaries, lagoons, and/or river mouths.

Least terns exhibit a high degree of nest site fidelity from year to year (Atwood and Massey 1988) but inter-colony movement can occur in response to failure at a particular site. Factors which can affect colony site fidelity include reproductive failure and the physical attributes of the nest site such as the amount of vegetative encroachment. Declines at one nesting site sometimes are balanced by increases at another nearby site, assuming access and availability of a nearby appropriate food source. These shifts appear to be related to heavy predation or human disturbance event(s) which often times result in poor reproductive success. For example, least terns relocated from the colony sites in western Mission Bay (i.e., San Diego River Mouth and Mariner's Point) to colony sites in eastern Mission Bay (i.e., Stony Point and North Fiesta Island) during the 2006 breeding season to re-nest after predation decimated the offspring at the western sites. Of concern is the apparent trend towards fewer, larger colonies that concentrate the species into fewer areas that may be more vulnerable to predation or stochastic events. Management actions that provide for more, dispersed colonies could be beneficial to the long term recovery population of the species (Service 2006).

Habitat Affinities

Unfrequented sandy beaches close to estuaries and coastal embayments have traditionally served as nesting sites for the California least tern (Grinnell and Miller 1944, Garrett and Dunn 1981). In recent years, some non-beach sandy surfaces in coastal areas (e.g., salt pond dikes, sand flats, sandfills, airports, and landfills around bays and estuaries) have been successfully utilized by least terns for nesting because potential nesting habitat has been greatly reduced by human recreation and development (Massey and Atwood 1979 – 1985, Thompson *et al.* 1997).

Least terns feed exclusively on small fishes captured in estuaries, embayments, and shallow near shore waters, particularly at or near estuaries and river mouths (Massey 1974, Collins et al. 1979, Atwood and Minsky 1983, Atwood and Kelly 1984, Minsky 1984, Bailey 1984). They characteristically forage by hovering 1-10 meters above the water, then plunging headfirst into the water to seize small fish. Least terns primarily forage on juvenile or larval anchovies [Engraulidae: deep-bodied anchovies (*Anchoa compressa*), slough anchovies (*A. delicatissima*), northern anchovies (*Engraulis mordax*)] and silverside smelt [Atherinidae: topsmelt (*Atherinops affins*) and jacksmelt (*Atherinopsis californiensis*)] that are less than 5 centimeters long and occur in the upper half-meter of the water column, which is probably the deepest least terns can plunge-dive (Atwood and Kelly 1984, Furness and Monagam 1987, Baird 1997). Chicks receive smaller food items than adults or juveniles and newly hatched chicks consume fish that are approximately 2.5 centimeters long (Atwood and Kelly 1984, Ehrler et. al. 2006). Adults do not dismember prey fish before delivering to chicks, so chicks must be given fish that is small enough for them to swallow whole. Otherwise, the chick will starve.

Estuaries and seagrass beds are important habitats for prey of least terns and are thus also important to the least tern. Least terns will forage more in protected bays that in oceans or seas, where more appropriately sized fish prey are available (Copper 1986, Zuria and Mellink 2005). Food availability for least terns is related to recent recruitment of their fish prey as most fish consumed by least terns are first-year fish or of age class 1 (Atwood and Kelly 1984, Baird 1997). Topsmelt spawn in estuaries on aquatic plants, especially eelgrass, and young anchovy move into shallow water such as bays and estuaries found along the coast (Baird 1997, Ehrler et. al. 2006).

Least terns typically forage close to their nesting colony (Atwood and Minsky 1983, Minsky 1984, Copper 1986, Massey 1987, Ehrler et. al. 2006). One study observed that although more abundant prey is available at a more distant location, least terns most intensely forage (i.e., number of least terns per hour per hectare) within approximately one kilometer of their nesting colony (Ehrler et. al. 2006). In San Diego Bay, a two year foraging study found that least terns nesting at Delta Beach North foraged the most intensely and frequently in sampling stations immediately adjacent to Delta Beach North, which extended up to 0.5 to 0.8 kilometers away from the nesting colony, and that least terns forage more in the bay than in the ocean (Copper 1986). Another study observed that the majority of least terns forage less than 1 (1.6 kilometers) to 2 miles (3.2 kilometers) from their nesting colony while a small proportion of least terns will sometimes forage up to 5 miles (8.0 kilometers) from a colony site (Atwood and Minsky 1983). Adult terns exhibit two patterns of foraging activity, one of which is observed before the hatching of eggs and another observed subsequent to hatching. Adults feeding only themselves tend to go farther and feed on larger fish than when they are feeding chicks. After the eggs hatch, adults make shorter and more frequent trips to find the smaller fish needed by the chicks (Massey 1987).

Due to the variable nature of food availability and foraging habitat requirements between sites and time, it is important to maintain a range of foraging habitats for least terns and other sight-

foraging birds (Service 1985c). Foraging habitat is defined as open water habitats containing suitable fish prey that is not obstructed and/or covered by structures (e.g., piers, docks, or boats) so the fish in the water column are available prey for foraging least terns. A two year foraging study in San Diego Bay observed that least terns forage more in San Diego Bay than in the Pacific Ocean (Copper 1986). A subsequent four year foraging study in San Diego Bay and nearshore ocean waters found that California least terns utilized both the Bay and the nearshore ocean waters, but the Bay appeared relatively more important during the high energy chick stage (Baird, 1997). A foraging study in Northern Gulf of California observed that least terns, though nesting closer to the Gulf of California, foraged more in the nearby protected bay (Bahia de San Jorge) where more abundant appropriately sized fish were available (Zuria and Mellink 2005). Least terns' requirements for foraging habitat (e.g., nearshore ocean waters, estuarine, undisturbed river mouths) vary between colony sites, reproductive stages during the breeding season (e.g., courtship, egg, chicks, fledglings), and years (Atwood and Minsky 1983, Baird 1997). Terns nesting near productive estuarine habitats use such areas heavily during the nesting phase of the breeding cycle. Utilization of coastal freshwater and estuarine foraging sites is greater during the chick-feeding and post-fledging period, the later of which suggests that juvenile birds need a calmer environment (e.g., shallow subtidal) to develop their fishing skills (Atwood and Minsky 1983). Utilization of foraging areas varies annually based on prey availability and prior success, so that areas where prey are not found are avoided within a foraging season but may be utilized in other years when the prey are found at that location (Baird 1997).

Life History

The least tern is migratory, typically arriving in California from Central and South America in mid-April and departing by the end of August (Massey 1974). However, terns have been recorded in the breeding range as early as March 13 and as late as November 24 (San Diego Natural History Museum specimen records).

Least terns are gregarious year-round, feeding and migrating in flocks of 5-20 or more. The terns flock together before the nesting season, at night roosts during the nesting season, and at shallow-water, freshwater, and estuarine marshes after the nesting season (Atwood and Minsky 1983, Service 1985b). Nesting colonies of least terns are as large as 2,000 pairs, but usually consist of less than 25 pairs. They are more loosely colonial than other tern species; nests are sometimes so widely spaced as to be out of sight of conspecifics (Thompson *et al.* 1997).

Least tern nesting is characterized by two waves of nesting from approximately May through August (Massey and Atwood 1981). Most of the initial nesting attempts are made by experienced breeders and are completed by mid-June. A second wave of nesting usually occurs from mid-June to early August that is comprised of re-nests after initial failures and second year birds nesting for the first time (Massey and Atwood 1981).

The nest of the least tern is a simple scrape or depression in the sand that the birds sometime adorn with small fragments of shell or pebbles. One to three eggs are laid, usually two. Both parents share duties throughout nesting and chick-rearing, but the female incubates and broods chicks more than the male (Keane 1987). Nests are incubated for 20 – 25 days with a mean time of about 21 days. After their eggs hatch, breeding adults catch and deliver small fish [2.5 centimeters (Atwood and Kelley 1994, Ehrler et. al. 2006)] to the flightless young. Newly hatched downy chicks are capable of walking in the vicinity of the nest (e.g., to seek shade) (Cornwell 1986). Young are capable of flight at approximately 20 days but continue to be fed and are taught how to feed by their parents for some time after fledging (Thompson *et al.* 1997). Recently fledged chicks intermingle with adults and chicks from other colonies, feed inexpertly for several weeks, and ultimately depart colony areas in preparation for migration within 4-8 weeks of fledging. Minimum breeding age is 2 years (Massey and Atwood 1981) and the average breeding life-span of least terns is 9.6 years (Massey et. al. 1992).

Population Trend

The least tern was formerly "common to abundant" (Grinnell and Miller 1944) along the central and southern California coast, to the extent of being described as "numberless" on the beaches of Los Angeles County (Bent 1921). Grinnell and Miller (1944), however, commented that least tern breeding colonies were, by 1943 "few and sparsely populated, owing to the almost complete human use of suitable beaches." By 1970, when the species was federally listed as an endangered species, numbers of least tern had declined to 600-700 breeding pairs with 26 nesting sites (Bender 1974). Intensive management efforts, particularly protection of foraging and nesting areas and predator management, have allowed the least tern to increase in abundance from 623 pairs in 1969 to an estimated range of 6865 - 7341 pairs in 2005 (Marschalek 2006). However, the statewide increase in the 1970s and 1980s has been attributed to increased sampling and associated personnel effort rather than an actual increase in the number of least terns (Atwood et al. 1977, Service 1980, Massey 1988). The least tern population size in California has grown substantially since 1990 (Table 2), though the number of fledglings produced has been variable.

Least tern reproductive success in recent years has been significantly lower than that deemed necessary to maintain a stable population. While the Least Tern Recovery Plan (Service 1985) determined that the reproductive rate of no less than one young fledge per tern pair may be necessary for stable or increasing populations, examination of productivity and subsequent population change suggest that the recovery plan may need to be revised (Service 2006). Fancher (1992) determined that if the fledgling to pair ratio was near 0.7, the breeding population two years later would not greatly differ from the preceding year. However, if the ratio fell below about 0.7, the breeding population would be expected to decline over time. Since 2001, range-wide least tern reproduction has been low (Table 2), which may foretell of a future population decline. It is probable that the associated reduction in the population size has yet to occur because least terns breed for approximately 9.6 years and live for a much longer (Massey et. al.

1992, Thompson et. al. 1997), thus creating a time lag in observing the effects of reduced reproductive success.

Table 2. State-wide least tern estimated pairs, nests, fledglings, and fledgling/pair ratio.

Year	CLT pairs (minimum)	CLT fledglings (minimum)	Fledgling/Pair Ratio	CLT Nests	Occupied Sites
1990	1706	759	.61	--	28
1991	1827	1745	.96	--	26
1992	2100	1376	.66	--	31
1993	2324	2043	.88	--	27
1994	2792	1784	.64	--	30
1995	2599	1021	.39	--	28
1996	3362	1916	.57	--	26
1997	4017	3231	.80	--	30
1998	4141	2686	.65	--	29
1999	3493	671	.19	--	27
2000	4521	3710	.82	5301	--
2001	4712	1773	.38	5319	38
2002	3569	692	.19	4093	--
2003	6780	2627	.39	7677	--
2004	6351	1547	.23	7937	41
2005	6865	1721	.23	8124	42

Threats

The escalating recreational use of southern California beaches during the tern nesting season has led to isolated, small colony sites that artificially concentrate breeding terns, putting them at risk of depredation. Episodic reproductive failure or reduction in population size has been attributed to cold, wet weather, extreme heat, dehydration and starvation, unusually high surf or tides, and human disturbance. Birds nesting in areas frequented by humans often suffer from disturbance. Humans kill eggs and chicks by stepping on them inadvertently, by deliberately collecting eggs for food or fun, or by off-road-vehicle traffic and earthmoving equipment (Goodrich 1982, Burger 1989, Cowgill 1989, Lingle 1993, Smith and Renken 1993, Kirsch 1996).

Limitation in number and restriction in size of breeding sites may exacerbate effects of predation on least tern populations. Many colony sites have been restricted to small discrete areas often protected by fencing. Although this species is loosely colonial in nature, least terns have been artificially concentrated within these fenced areas, often adjacent to heavily used public beaches or on tiny man-made islands. The adults, eggs, and young are thus confined, rendering them susceptible to major problems such as predation and disturbance events with limited options to

relocate. Loss of tern chicks has been attributed to a number of predators, including American kestrels (*Falco sparverius*), burrowing owls (*Athene cunicularia*), loggerhead shrikes (*Lanius ludovicianus*), American crows (*Corvus brachyrhynchos*), common ravens (*Corvus corax*) coyotes (*Canis latrans*), red foxes (*Vulpes vulpes*), skunk (*Mephitis mephitis*), opossum (*Didelphis marsupialis*), house cats (*Felis catus*), and dogs (*Canis familiaris*) (Service 1985b). Hence, predator control is considered by many species experts to be one of the most crucial management strategies for reproductive success.

The sensitive status of some predatory species requires special consideration and may reduce the predator management options available. For example the gull-billed tern (*Gelochelidon nilotica*), an extremely rare tern species, has recently posed a localized problem for least terns nesting on beaches around San Diego Bay. The Service Migratory Bird Office has not issued depredation permits for the removal of gull-billed terns or gull-billed tern eggs due to the sensitive status of this species. This may affect the long-term potential for least tern colonies in this area. This issue is of particular concern for terns nesting on Navy installations adjacent to San Diego Bay because reproductive success has declined significantly in recent years.

The presence of eelgrass is important as habitat for several prey species of least terns, such as northern anchovy, topsmelt, and jacksmelt (Baird 1997). The abundance of these species plays an important role in the foraging habits of least terns. Therefore, impacts to eelgrass beds could disrupt the foraging behavior of terns. Like most aquatic plant species eelgrass negatively responds to increased turbidity, decreased light levels from shading, elevated temperatures, and degradation of water quality, which may result from urban development. Development-related impacts to eelgrass may affect the productivity and health of the fish species associated with them. In this manner, and by otherwise disrupting ecological function within lagoons, development-related impacts to eelgrass may adversely affect least terns.

Reductions in food supplies for least terns can decrease recruitment to the breeding population. Low reproductive success and high chick mortality in recent years has been attributed to shortages of fish prey (Marschalek 2005 and 2006). Reduced food availability negatively affects the reproductive success of the tern by reducing clutch sizes, significantly lowering weights of chicks, and increasing levels of egg abandonment and non-predator chick mortality (Atwood and Kelly 1984). More specifically, scarcity of small fish results in chick mortality. The "El Niño" warm sea current phenomenon can have deleterious long-term effects on the entire least tern population. During the El Niño event of 1982-1983, diminished fish populations throughout the southern California bight caused a drastic reduction in least tern breeding success resulting in the lowest annual production of fledged young on record (Massey 1988, Massey et al. 1992). Subsequently, it took five years for the population to recover from this event. El Niño conditions were also evident during the 1992 breeding season, which also resulted in reduced statewide production of fledglings (Caffrey 1993).

Loss and/or degradation of foraging habitat through filling habitat, covering it with structures, or by reducing visibility in the upper water's surface can reduce the ability of least terns to capture

their prey. Schreiber et al. (1975) concluded that terns select individual fish, even within a school. Even if schools of fish utilized by least terns are not totally obscured, turbid water conditions could adversely affect tern foraging behavior by obscuring individual fish (Service 2000). To avoid temporary degradation of foraging habitat during the nesting season, Copper (1986) recommended that dredging and water-related construction in important foraging habitats, such as foraging habitat immediately adjacent to least tern colonies, occur outside the non-nesting season.

California least terns may also be somewhat susceptible to the expressed effects of pesticide contamination and bioaccumulation (Boardman 1988).

California brown pelican (*Pelecanus occidentalis californicus*)

Listing Status

The California brown pelican (brown pelican) was federally listed as endangered in 1970 (35 FR 16047) and listed as endangered by the State of California on June 27, 1971. No critical habitat has been designated for this species; however a recovery plan was adopted in 1983. This is a fully protected species by the State.

Species Description

Brown pelicans are recognized by their large size, impressive wingspan (up to 2 meters), short legs, distinctive long, hooked bill and flexible lower mandible from which the highly expandable gular pouch is suspended. Six subspecies of *P. occidentalis* have been described; geographic variation in size is the primary distinguishing feature (Wetmore 1945). Unlike other brown pelican subspecies, a California brown pelican typically has a bright red gular pouch (basal portion) during the courtship and egg-laying period (Service 1983).

Distribution

The current breeding distribution of brown pelicans range from the Channel Islands of southern California southward to Isla Isabela, Islas Tres Marias off Nayarit, Mexico, and Isla Ixtapa off Acapulco, Guerrero, Mexico (Service 1983). Between breeding seasons, pelicans may range as far north as Vancouver Island, British Columbia and south to Central America (Palmer 1962).

Habitat Affinity

The brown pelican is typically found in marine habitats which range from the open ocean to inshore waters, estuaries, bays, and harbors. This species may also use large freshwater lakes when they are near the coast (e.g., Sweetwater Reservoir). Pelicans commonly use undisturbed beaches, breakwaters, and jetties near coastal bays as roosting areas and forage nearby. Roosting sites and loafing areas are essential habitat for resident and migrant brown pelicans. Brown

pelicans are tropically-derived seabirds that have plumage subject to getting wet, so they must have terrestrial roost sites to dry wet plumage after feeding or swimming (Jaques and Anderson 1987). Roost sites are also important for resting and preening. They tend to breed on offshore islands and will nest on the ground or in small bushes and trees (American Ornithologists' Union 1983).

Life History

Brown pelicans are diurnally active throughout the year. In California, brown pelicans feed mainly on northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinopus sagax*), and Pacific mackerel (*Scomber japonicus houttuyn*) (Thelander and Crabtree 1994). Brown pelicans generally forage in early morning or late afternoon, or when the tide is rising. They feed almost entirely on fish, caught by diving from 6-12 meters in the air, and occasionally from up to 20 meters. They may completely, or only partially, submerge in shallow or deep water. Feeding is often concentrated in shallow waters of less than 50 fathoms (91 meters) (Gress et al. 1980). Occasionally brown pelicans will feed on crustaceans, carrion, and young of its own species (Palmer 1962). They usually rest on water or inaccessible rocks (either offshore or on mainland), but will also use mudflats, sandy beaches, wharves, and jetties. At night, they concentrate at a few traditional roosts on mainland or islands, but have been known to roost overnight on water (Briggs et al. 1981).

California brown pelicans are colonial nesters. The nest is a small mound of sticks or debris on rocky, or low, brushy slopes of undisturbed islands (Cogswell 1977); usually on the ground, but less often in bushes (Palmer 1962). Brown pelicans are present at nesting islands March to early August, and lay eggs March to April, but possibly as late as June (Palmer 1962). During the nesting season, they generally stay within 20 kilometers of nesting islands (Briggs et al. 1981). Nests are spaced a minimum distance of approximately 1.5 meters apart (Palmer 1962). Clutch size is usually 3 eggs, sometimes 2 with a single brood each year. Incubation lasts about 4 weeks. Young are altricial and tended by both parents and first fly between 10 and 13 weeks. Brown pelicans first breed at about 3 years. After breeding, they begin migrating as early as mid-May. Individuals leave colonies in the Channel Islands and in Mexico, and disperse along the entire California coast. Large numbers of brown pelicans can be found on the mainland coast after the breeding season. Small numbers visit the Salton Sea and Colorado River reservoirs.

Gulls, especially the Heermann's, frequently steal fish from pouches of brown pelicans immediately after a dive. Gulls and vultures are typical nest predators, and eggs and nestlings sometimes are lost in storms (Palmer 1962).

Population Trend

At the time the recovery plan was published (1983), it was estimated that the breeding population size throughout the range was approximately 55,000 to 60,000 pairs (Service 1983). The species considerable decline in the late 1960s (Garrett and Dunn 1981), is attributed to the use of

organochlorine pesticides (e.g., DDT), disturbance of nesting colonies, and over-harvesting of northern anchovies, their major food source (Garrett and Dunn 1981). The ecological effects of DDT contamination have not been entirely eliminated, and incidences of eggshell thinning still occur. While low-level, chronic contamination remains, populations of brown pelicans in the southern California area have been increasing since the late 1970s. This population increase may be from outside recruitment and improved reproduction in local populations (Anderson and Gress 1983). Between 1983-1993, five-year means of number of California brown pelican nesting attempts in the Southern California Bight (SCB) have increased from less than 2,700 to over 4,700, suggesting that the breeding population has increased comparably during that period (Gress, unpublished data). In southern California, brown pelican colonies are found only on Anacapa and Santa Barbara islands; they do not nest on any of the other Channel Islands. The breeding population of brown pelicans in southern California is estimated at 4,500 to 6,000 pairs. Some genetic exchange occurs among colonies by the recruitment of new breeders. The largest breeding group is located on the Gulf of California, comprising approximately 68 percent of the total breeding population.

Threats

Food availability, disturbance, and oceanic pollution currently appear to be the major limiting factors to populations of California brown pelicans (Service 1983). Potential threats related to these limiting factors include commercial fisheries, oil development, recreational fisheries, sonic booms and increased tourism (Service 1983). The Santa Barbara Channel has been the site of offshore petroleum drilling. The potential of oil well blowouts and the effects of resultant oil spillage in the Channel Islands area was observed in the 1969 Santa Barbara oil spill, although the spill did not reach Anacapa Island and had little impact on breeding pelicans (Service 1983). Further oil development in the Santa Barbara Channel may pose a threat to the brown pelican colony at West Anacapa Island. There are several lease tracts overlapping with Channel Islands Marine Sanctuary boundaries.

Pelicans and their eggs fouled with oil have been observed on numerous occasions in the SCB and Gulf of California. Trace amounts of fresh oil transferred from feathers to eggs is lethal to embryos in a variety of waterfowl species. If an oil spill occurred near a nesting colony and washed on shore during the breeding season, significantly high adult and fledgling mortality could occur (Service 1983). The Santa Barbara Channel also has numerous natural oil seeps which represent another source of fouling (Service 1983). The risks to pelicans associated with an oil spill are not limited to the breeding season. During the fall and winter thousands of migrant pelicans from Mexico flood the SCB and could be greatly affected by a major oil spill. The impact of an oil spill on brown pelicans is influenced by the size of the spill, the time of the year, the type of oil, the distance offshore of the spill, and the environmental conditions at the time of the spill.

The Santa Barbara Channel and the coast just north of Point Conception have current petroleum development in local proximity to brown pelican colony or roost sites. There has been a concern

about the potential adverse environmental effects of oil and gas development in these coastal areas which has led to a moratorium on new oil and gas development and drilling along the California coast. The Channel Islands National Marine Sanctuary has helped buffer the West Anacapa Island colony from the threats of petroleum industry accidents (Service 1983). In the event of an oil spill, the buffer zone would provide time and distance for break-up of oil discharges before reaching nearshore communities, as well as increase available response time. The sanctuary provides a 6-mile (9.7 kilometer) zone within which new petroleum operations are prohibited. The sanctuary has little effect on development of the few existing leases within sanctuary boundaries that existed prior to the creation of the marine sanctuary in 1980. Currently there are no platforms within the marine sanctuary.

Marine sanctuary regulations allow cargo-carrying vessels, including oil tankers, to operate to within one nautical mile of Anacapa Island. Most cargo vessels stay within the established shipping lanes in the Santa Barbara Channel, but their compliance is not mandatory. The northbound shipping lane passes within 8 to 9.7 kilometers (5 to 6 mi) of Anacapa Island while the southbound shipping lane passes within a 1.6 to 3.2 kilometers (1 to 2 miles) distance of East Anacapa Island. Because of greater probability of a spill occurring from a tanker than from a platform, the possibility of tanker traffic outside the established sea lanes as close as one nautical mile from Anacapa poses a potential threat to brown pelicans (Service 1983).

Federal laws regulating offshore oil and gas operations have also been more stringent in recent decades. The oil content of water produced from offshore operational discharges is limited by effluent guidelines promulgated by EPA, which are enforced by National Pollution Discharge Elimination System permits. The Minerals Management Service (MMS) is responsible for day-to-day inspection and monitoring of Outer Continental Shelf (OCS) oil and gas operations and monitoring hydrocarbon discharges resulting from such operations. Additionally, an Environmental Impact Statement must be prepared for all MMS and OCS lease sales.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of State and private actions which are contemporaneous with the consultation in progress.

The action area includes Fiddler's Cove, the least tern colonies at Delta Beach South and NAB Ocean, and the expected primary foraging habitat located in San Diego Bay and utilized by least terns nesting at these colonies (Figure 2). The expected primary foraging habitat was delineated by including the bay foraging habitat immediately adjacent to the Delta Beach South and contiguous habitat with the relatively highest prey abundance within one kilometer of the colony. The delineation is based on (1) the least tern's preference to forage close to their least tern

colony, especially when they are feeding their growing chicks, while (2) recognizing that they will opportunistically forage where prey is available (hence including contiguous high quality habitat) and (3) the restriction in the MOU that turbidity not intrude within one kilometer of a least tern colony.

Least terns typically forage most intensely and frequently close to their nesting colony, particularly when chicks are being reared (Atwood and Minsky 1983, Copper 1986, Minsky 1984, Massey 1987, Ehrler et. al. 2006). A two year foraging study in San Diego Bay found that least terns nesting at Delta Beach North foraged the most heavily and frequently in sampling station immediately adjacent to Delta Beach North, which extended up to 0.5 to 0.8 kilometers away from the nesting colony, and that least terns forage more in the bay than in the ocean (Copper 1986). A foraging study conducted primarily during the chick rearing phase at Alameda Point observed that although significantly more abundant prey is available at more distant locations, least terns most intensely forage (i.e., least terns per hour per hectare) within approximately one kilometer of their nesting colony (Ehrler et. al. 2006). Another foraging study conducted throughout the nesting season observed that the majority of least tern forage less than 1 (1.6 kilometers) to 2 miles (3.2 kilometers) from their nesting colony while a small proportion of least terns will forage up to 5 miles (8.0 kilometers) from their nesting colony (*see Table 5 in* Atwood and Minsky 1983).

San Diego Bay

San Diego Bay covers approximately 10,858 acres. Habitats consist of 1,196 acres (11 percent) of intertidal habitat or shallower (> -2 feet MLLW), 3,239 acres (30 percent) of shallow subtidal habitat (- 2 to -12 feet MLLW), 2,378 acres (22 percent) of moderately deep subtidal habitat (-12 to -20 feet MLLW), and 4,046 acres (37 percent) of deep subtidal habitat (< -20 feet MLLW) (Figure 3 [2]). This is significantly less than the historic acreage of habitats in San Diego Bay. Changes to the natural shoreline and depths during the last 100 years have led to a 70 percent loss of salt marsh, 84 percent loss of historic intertidal habitat, and 42 percent loss of shallow subtidal habitat (Navy and Port 2000).

San Diego Bay is an important component of the Pacific Flyway for migratory birds because it provides the second largest expanse of contiguous, protected coastal bay waters in California. San Diego Bay is visited by millions of migrating birds and supports large populations of overwintering birds (Navy and Port 2000). More than 135 bird species (including shorebirds, seabirds, and waterfowl) utilize San Diego Bay (Manning 1995). One-third of the birds dependent on San Diego Bay have been identified as sensitive or declining (Navy and Port 2000).

[2] The acreage of habitats was calculated by overlaying GIS bathymetry data with a coverage of San Diego Bay. Both GIS datasets were provided by the Navy. Depths above 0 feet were not available. Based on mapping in the INRMP, we determined that unavailable depths were intertidal habitat or shallower.

The least tern and brown pelican are common inhabitants of San Diego Bay (Navy and Port, 2000). Because of the distribution of six recognized least tern nesting colonies throughout San Diego Bay, all of San Diego Bay is within potential least tern foraging distance. While least terns forage as close to their nesting colony as possible (Copper 1986), they have typically been observed to forage less than 1 (1.6 kilometers) to 2 miles (3.2 kilometers) from their nesting colony (Atwood and Minsky 1983). Small chicks must have small fish delivered to them and adults make many shore trips rather than fewer longer trips to obtain food for their chicks. Outside the chick rearing period, a small proportion of least terns have also been observed to forage up 5 miles (8 kilometers) from their nesting colony site (Atwood and Minsky 1983). The Brown pelicans reside year-round and migrate through San Diego Bay. Fiddler's Cove is one of the most heavily used areas in San Diego Bay by the brown pelican, which roost on the shoreline and floating structures (e.g., wave attenuator) and forage in the surrounding shallow waters (Navy 2003).

The least tern population in the San Diego Bay area [i.e., South San Diego Bay National Wildlife Refuge, Sweetwater Marsh National Wildlife Refuge, Lindbergh Field, Naval Air Station North Island, Naval Amphibious Base Coronado (North and South Delta Beaches and NAB Ocean Beach), Chula Vista Wildlife Reserve, and Tijuana Estuary National Estuarine Research Reserve] has increased parallel to the statewide increase. After a period of apparent instability during the 1980s, the population has been increasing since 1992 (Table 3) due to intense management of least tern nesting sites. The San Diego Bay population has also increased in relative range-wide (i.e., statewide) importance, increasing from 10 percent of the range-wide population in 1990 to 25 percent in 2005. On average, reproductive success of San Diego Bay least tern colonies has been declining since 2000.

Table 3. San Diego Bay area annual (1990 – 2005) least tern estimated pairs, fledglings, and fledgling/pair ratio. Data from California Department of Fish and Game annual summaries.

Year	CLT pairs -minimum (percent of statewide estimate)	CLT fledglings – minimum	Fledgling/ Pair Ratio	Occupied Sites
1990	178 (10)	119	.66	4
1991	141 (7)	95	.67	5
1992	251 (12)	74	.29	5
1993	257 (11)	165	.64	6
1994	292 (11)	223	.76	6
1995	307 (12)	231	.75	7
1996	436 (13)	409	.94	5
1997	608 (15)	435	.72	5
1998	567 (14)	553	.98	6
1999	680 (19)	96	.14	6
2000	759 (17)	474	.62	5
2001	869 (18)	484	.56	6
2002	853 (24)	93	.11	7
2003	1666 (25)	226	.14	6
2004	1498 (23)	125	.08	8
2005	1726 (25)	241	.12	8

The abundance of least tern prey is not evenly distributed throughout San Diego Bay (Figure 4). The Navy and Port (2000) mapped the abundance of least tern prey based on a 5-year fisheries study (Allen 1998), the results of which are shown in Figure 4 and Table 4. Only four percent of the Bay (482 acres) contains habitat with high prey abundance (i.e., prey abundance greater than 25,000) and this habitat is located in North and North Central San Diego Bay. Only 32 percent of the bay (3,492 acres) contains habitat with a medium-high to high prey abundance (i.e., prey abundance greater than 10,000). Within this area, approximately 50 acres is covered by docks and piers, rendering only 3442 acres of medium-high to high prey abundance area available to least terns and brown pelicans for foraging.[3] Total foraging habitat unavailable to least terns and brown pelicans due to coverage by boats and docks could be up to three to four times greater (i.e., 150 to 200 acres) when the docks are at capacity. For example, 131 acres of the historic surface waters in San Diego Bay were covered by docks, piers, and wharves in 1995, but 496 acres of surface waters could have been covered when the docking structures were at capacity with boats and ships (Navy and Port 2000).

[3] The acreage of docks was calculated from a GIS dataset provided by the Navy to the Service that included piers and docks digitized from a one foot resolution 2003 aerial photograph.

Table 4. San Diego Bay estimated acreage of habitat for different abundances of least tern prey (data from Navy GIS dataset provided to the Service).

Prey Habitat Quality	*Prey Abundance*	*Total Area*	*Area Covered by Docks*	*Available Foraging Habitat*
Low	0 – 2,500	2636.9	35.0	2601.3
Low-Medium	2,500 – 5,000	2649.4	22.0	2627.4
Medium	5,000 – 10,000	2080.0	28.1	2051.9
Medium-High	10,000 – 25,000	3010.1	26.1	2983.9
High	> 25,000	481.6	23.6	458.0
Total		10,857.9	134.8	10,723.1

Losses in Foraging Habitat

Pursuant to the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended, 16 U.S.C. 661 et seq.), the Act, and other authorities mandating Department of the Interior concern for environmental values, the Service has consistently identified the surface waters of San Diego Bay as important for the general ecology of San Diego Bay and as foraging habitat for sight-feeding birds that plunge-dive to forage, including the least tern and brown pelican. Losses in least tern and brown pelican foraging habitat results from covering surface waters with structures (e.g., piers, docks, boats) because these sight foraging birds cannot see their prey under the structures or plunge dive through the structures to catch their prey. Due to the past cumulative loss of uncovered surface waters in San Diego Bay and the important resources it supports (i.e., foraging habitat), the Service has consistently recommended that unavoidable impacts to bay surface water be offset at a minimum 1:1 ratio. The status of uncovered surface waters (e.g., foraging habitat) in San Diego Bay for which impacts are avoided and minimized is clearly documented. As shown in Table 5, recent projects in San Diego Bay have evaluated potential impacts to foraging habitat (i.e., uncovered surface waters) and adopted alternatives to avoid and minimize such impacts as a result of informal consultations between the federal action agency [i.e., Navy, U.S. Coast Guard (Coast Guard), Corps] that may include non-federal agencies (Port of San Diego), if applicable, and the Service. Similarly, several recent projects in Mission Bay have also avoided impacts to foraging habitat from covering water through consultation with the Service (Service 2004b).

Table 5. In-water construction projects in San Diego Bay and their impacts, and measures to offset impacts, from covering open water and obstructing foraging habitat.

Project Name	Corps Permit No.	Loss or Gain of Foraging Habitat by Covering Bay Surface Waters with Docks, Piers, and Wharves	Offsetting Measures
Navy Homeport	982004900-KMM	- 123,700 square feet (- 2.8 acres)	removal of the 63,000 square foot Pier J/K and the 2,472 square foot ferry flag landing; ~ 10 acres of intertidal/subtidal habitat creation at the NAB Enhancement Area;
Navy Replacement Pier and Dredging for Piers 10 and 11	200101128-RLK	- 92,347 square feet (- 2.12 acres)	Creation of 2 additional acres of intertidal habitat at NAB Enhancement Area
San Diego Aircraft Carrier Museum	962006400-SBK	- 104,544 square feet (-2.4 acres)	9 acres of salt marsh creation
U.S. Coast Guard Dock	200301569-KJC	- 1,350 square feet	Equal area of intertidal/subtidal enhancement through riprap removal
NASSCO Mooring Dolphins	200400539-SKB	- 140 square feet	removal of 195 square feet of water covering structure
Red Sails Marina Renovation	200401867-KJC	139 square feet	NA[4]
Koehler Kraft	200300987-RRS	30 square feet	NA
Varasano & Oliver	200500877-KJC	2 square feet	NA
Bali Hai Guest Dock Replacement	200600321-SMJ	147 square feet	NA
Glorietta Bay Marina	200600861-MMV	97 square feet	NA
South Bay Boatyard	200600144-TCD	191 square feet	NA
Kettenburg Marina	200600554-RRS	6,927 square feet	NA

[4] Not Applicable (NA): No offsetting measures were necessary because the project was designed to avoid a net loss of foraging habitat.

The administrative record shows that the Navy has recognized that covering surface waters with structures results in losses of foraging habitat and should be minimized. The Navy's Final Environmental Impact Statement for Developing Home Port Facilities (Navy 1999) states that "loss of shallow-water habitat to provide the capacity to homeport one additional CVN is considered a significant impact for California brown pelican and California least tern. This is because of the temporary loss of resting habitat for the pelicans, and foraging habitat subject to medium to high use by both species." The Mitigation Measures section of this document states that "Potential effects due to coverage/shading by the new wharf (123,700 square feet) would be partly offset by the removal of existing Pier J/K (63,000 square feet) and the ferry/flag landing (2,472 square feet)..." and the construction of the Naval Amphibious Base (NAB) Enhancement Area. Also, the Navy and Port (2000) Integrated Natural Resources Management Plan states that "piers, docks, and wharves over the Bay may ... interfere with foraging of sight-feeding fish and birds." Despite a history of evaluating and avoiding net impacts to foraging habitat (i.e., bay surface waters), the Navy changed their position of avoiding and minimizing such impacts starting in 2004 with the following projects (net acreage loss of foraging habitat shown in parentheses): Navy Modular Hybrid Pier at Naval Station San Diego, 200401192-TCD (0.1148); and the Fishing Pier and Dock Expansion at the Marine Corps Recruit Depot, 200200659-JMB (0.134).

Action Area

Fiddler's Cove is south and immediately adjacent to the Delta Beach South and east of the Naval Amphibious Base (NAB) Ocean least tern nesting colonies (Figures 2, 3, and 4). The proposed headwalk G is less than 40 meters (130 feet) from Delta Beach South. The combined populations for NAB least tern nesting colonies (i.e., Delta Beach North, Delta Beach South, NAB Ocean) represent one of the top three populations of nesting least terns in California over the past five years (Table 6), less to Camp Pendleton from 2000 to 2005 and L.A. Harbor in 2005 (California Department of Fish and Game 2000-2005). However, like the statewide population, reproductive success in San Diego Bay has been declining over the last several years (California Department of Fish and Game annual summaries).

Table 6. Naval Amphibious Base (NAB) estimated minimum least tern nesting pairs from 2000 – 2005. The pair estimate is based on the number of nests. The number of least tern pairs was utilized in lieu of nests because least tern pairs can nest more than once in a season. Data from California Department of Fish and Game annual summaries.

	2000	*2001*	*2002*	*2003*	*2004*	*2005*
Delta Beach North	225	245	226	265	237	315
Delta Beach South	63	67	70	189	173	192
NAB Ocean	253	352	238	500	469	502
Total	541	664	534	954	879	1009

The North Delta Beach site was officially designated as a least tern nesting site in 1984 and the South Delta Beach site was first prepared for least tern nesting in 1988. The North and South Delta Beaches received further management commitments in 1987 when the Navy and Service first signed the *Memorandum of Understanding between the U.S. Fish and Wildlife Service and U.S. Navy concerning conservation of the endangered California least tern in San Diego Bay, California* (MOU; Navy and Service 2004). In accordance with the MOU, the Navy intensified management of the least tern colonies on naval facilities to offset impacts of in-water construction projects. Since that time, active management has included but is not limited to extensive biological monitoring of the least tern nesting sites, nest site preparation (e.g., grading, removal of vegetation, addition of sand, repair of protective fencing, etc...), predator management, ant control, research, and contribution to the Project Wildlife effort to rehabilitate sick or injured least terns (Navy and Service 2004, Service 2005, Navy 2006c). Such intense management has greatly contributed to the increase of the least tern populations at these sites. From 2005 to 2006, the abundance of least tern nests decreased at the Delta Beaches and increased at the NAB Ocean, in part due to a combination of excessive vegetation and presence of predators at the Delta Beaches and previous nesting success at NAB Ocean (Tammy Conkle, pers. comm. October 27, 2006; Navy 2006c).

Although least terns from the Delta Beach North colony may forage in Fiddlers Cove, we expect Fiddler's Cove to be used primarily by least terns nesting at Delta Beach South and within Navy training lanes Red 2, Green 1, Green 2, and Blue 1 at NAB Ocean (which are within 1 kilometer of Delta Beach South; Figure 5) because least terns forage most frequently and heavily immediately adjacent to their nesting colony and in some years forage more in the bay than in the ocean (Copper 1986, Zuria and Mellink 2005). Foraging by least terns in the Bay is expected to primarily occur in the primary foraging habitat, which encompasses key foraging habitat identified in previous studies (Copper 1986, Navy and Service 2004) and contiguous habitat with a relatively high abundance of least tern prey, within one kilometer of Delta Beach South and NAB Ocean (Figure 2). A two year foraging study conducted on the Delta Beach North least tern colony found that least terns forage more in San Diego Bay than in the Pacific Ocean and within areas immediately adjacent to the colony (Copper 1986). Least tern's preferences for foraging in the Bay is further supported below in Effects of the Action, *The Importance of Relatively High Quality Foraging Habitat in San Diego Bay to the California Least Tern.* Nesting in the aforementioned Navy training lanes has been on average approximately 33 percent of all nesting at NAB Ocean in the last 3 years [i.e., 2004 (41 percent), 2005 (39 percent), and 2006 (20 percent). Nesting data provided by the Navy to the Service in an electronic mail message dated October 27, 2006]. The relative decline in usage of these training lanes in comparison to the other lanes on NAB Ocean is likely because they are used for military training and thus currently not managed exclusively for nesting (Figure 5) (Service 2005). Based on the average abundance of least terns pairs from Delta Beach South (185 pairs) and 33 percent of the average abundance of least tern pairs nesting at NAB Ocean (161 pairs) over the past three years (i.e., 2003 – 2005, Table 6), it is anticipated that the majority of 346 pairs of least terns from these colonies will forage within this area.

The primary foraging habitat in San Diego Bay where we expect the majority of least terns nesting at Delta Beach South and the aforementioned training lanes at NAB Ocean to preferentially forage to meet their feeding, nesting, rearing, and survival requirements is less than 197 acres (Figure 2 and Table 7). Approximately 139 acres (71 percent) of the primary foraging area contains a medium-high least tern prey abundance (Table 7) and this habitat is predominantly located within Fiddler's Cove (Figure 2), which is approximately 49 acres in size. This habitat also is the primary source for very small fish required by newly hatched chicks, which will die if the small fish aren't delivered at a steady rate. The remaining primary foraging area occurs between the Delta Beach South and Delta Beach North, and contains a lower abundance of least tern prey. All other things aside (e.g., disturbances), least terns would likely forage more in Fiddler's Cove because it has the highest prey abundance, making it high quality foraging habitat, and least terns opportunistically forage where fish occur (Thompson et. al. 1997, Baird 1997). Approximately 6.4 acres (13 percent) of foraging habitat in Fiddler's Cove is currently unavailable for foraging by least terns because it is obstructed by docks, boats and the existing wave attenuator. The existing docks (including the boats docked within them) cover 4.8 acres of foraging habitat in Fiddler's Cove (Navy 2006b). The wave attenuator covers 0.14 acre of foraging habitat. Based on the approximate size of boats moored in Fiddler's Cove [420 square feet or 35 feet x 12 feet (40 square meter; 10.7 meter x 3.7 meter); lengths estimated using GIS and an aerial photograph of Fiddler's Cove], and the number of moorings at Fiddler's Cove (150), moored boats cover approximately 1.45 acre of foraging habitat (Figure 6). The majority of the primary foraging habitat is potentially subject to disturbance from Navy in-water training operations, with the exception of Fiddler's Cove and an area immediately east of Fiddler's Cove (Figure 7).

Table 7. Acreage of habitat for different abundances of least tern prey in primary foraging habitat in San Diego Bay within one kilometer of Delta Beach South and NAB Ocean (data from Navy GIS dataset provided to the Service and digitized (i.e., primary foraging area) from the MOU).

Prey Habitat Quality	*Prey Abundance*	*Total Area*
Low	0 – 2,500	13.5
Low-Medium	2,500 – 5,000	2.6
Medium	5,000 – 10,000	41.4
Medium-High	10,000 – 25,000	139.3
High	> 25,000	0
Total		196.8

Fiddler's Cove is one the most heavily used areas for brown pelican within San Diego Bay (Navy 2003). Pelicans roost on the shoreline and floating structures (e.g., wave attenuator) at Fiddler's Cove and forage in the surrounding shallow waters (Navy 2003).

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

California least tern

The least tern forages by visually searching for their prey (Schreiber et. al. 1975, Thompson et. al. 1997). Least terns hover 1-10 meters above the water and then plunge headfirst into the water to seize their prey. Covering surface waters with structures (e.g., piers, docks, boats) will result in a loss in least tern foraging habitat because this sight foraging bird cannot see their prey under the structures or plunge dive through the structures to catch their prey (Navy 1999, Navy and Port 2000). The proposed action will adversely affect least terns that nest at Delta Beach South and training lanes Red 2, Green 1, and Green 2, and Blue 1 at NAB Ocean by permanently covering foraging habitat that provides an essential food supply for least tern chick growth and survival during the breeding season.

Based on the above information, the least terns nesting at Delta Beach South and the aforementioned training lanes at NAB Ocean are likely to use the primary foraging habitat within San Diego Bay within one kilometer of South Delta Beach (Figure 2). The proposed project will permanently cover 1.01 acres (0.5 percent) of least tern primary foraging habitat within one kilometer of South Delta Beach; this will increase the total amount of primary foraging habitat that is covered and unavailable to this species within this area to 7.41 acres or 3.8 percent. The proposed project will cover 0.7 percent of the medium-high quality prey abundance foraging habitat within the primary foraging habitat area depicted in Figure 2, increasing the total coverage of such habitat to approximately 5.3 percent within this area. Within Fiddler's Cove, the proposed project will cover 2.1 percent of foraging habitat, increasing the total amount of foraging habitat unavailable to these species within Fiddler's Cove to 15.1 percent.

The proposed project will partially offset impacts to least tern foraging habitat in Fiddler's Cove by creating 0.17 acres of open water through removal of 0.04 acres of structure and 0.12 acres of fill in Fiddler's Cove, and 0.1 acre of moored boats that will have to be moved to accommodate the new headwalk. In aggregate, the proposed project will result in a net loss of 0.84 acres of medium-high prey abundance least tern foraging habitat (Figure 2).

Construction activities associated with the project, such as dredging and pile driving or jetting, can temporarily create turbid water conditions that obscure the visibility of forage fish. If in-

water construction activities occurred during the breeding season, they would be expected to adversely affect the ability of least terns to successfully capture prey (Service 2000), however the Navy proposes to conduct in-water construction outside the nesting season to avoid this impact.

To minimize impacts to nursery habitat (i.e., eelgrass) for least tern prey, pre- and post-construction eelgrass surveys will be conducted for all in-water construction activities. If the post-construction activities survey indicates eelgrass has been impacted by construction activities, banked credits from the Navy's Eelgrass Mitigation Bank (Draft) South and South Central San Diego Bay sites will be used to offset those impacts.

The Importance of Relatively High Quality Foraging Habitat in San Diego Bay to the California Least Tern

Although least terns from the Delta Beach South and NAB Ocean nesting colonies forage in the ocean as well as the Bay, the loss of primary foraging habitat in San Diego Bay is likely to adversely affect the least tern due to its requirement for foraging area near nesting sites where an abundance of appropriately sized prey is available to feed growing chicks (Atwood and Minsky 1983, Copper 1986, Baird 1997, Zuria and Mellink 2005). Least terns depend on a diversity of foraging habitats that (1) will be collectively more productive than a single habitat type, (2) are more likely to provide food during the incubation and chick-rearing period if one of the foraging habitats types fails to provide sufficient food supplies, and (3) will accommodate changes in the preferential use of foraging habitat use during the breeding season (Service 1985c). Most successful least tern colonies have bays, estuaries, or rivers nearby that support concentrations of small fish consumed by least terns (Atwood and Minsky 1983, Baird 1997). Terns from colonies where the ocean is available for foraging (e.g., Batiquitos Lagoon, San Diego Bay, and Anaheim Bay and Bolsa Chica, Orange County, La Purinera) have been observed to primarily feed in estuarine habitats (Atwood and Minsky 1983, Copper 1986, Zuria and Mellink 2005). Baird (1997) observed more birds returning to the colony with fish from the Bay than from the Ocean, particularly during the chick stage during 2 of the 3 years studied. Available foraging habitat in San Diego Bay likely contributes to the relative high success of the least tern colonies in and adjacent to San Diego Bay. Permanent removal of 0.84 acres of relatively high quality foraging habitat in the Bay immediately adjacent to the least tern colonies would incrementally reduce the availability of suitable estuarine foraging habitat adjacent to the colony. This would be of particular concern when other oceanic foraging habitats are less productive, obscured by red tides, or otherwise unavailable.

Least terns preferentially forage in areas of calm water that are close to the nesting colony to meet their feeding, nesting, rearing, and survival requirements during the breeding season (Atwood and Minsky 1983, Minskey 1984, Massey 1987, Ehrler et. al. 2006). Reproductive success of a least tern pair and productivity of a colony depends on the proximity of foraging areas (Minsky 1984). Adult terns exhibit two patterns of foraging activity, one of which is observed before the hatching of eggs and another observed subsequent to hatching. Adults feeding only themselves tend to go farther and feed on larger fish than when they are feeding

chicks. After the eggs hatch, adults make shorter and more frequent trips to find the smaller fish needed by chicks (Massey 1987). Terns nesting near productive estuarine habitats, such as the San Diego Bay colonies, use such areas heavily during the chick-feeding phases of the breeding cycle (Atwood and Minsky 1983). Utilization of coastal freshwater and estuarine foraging sites is greater during the post-fledging period, suggesting that juvenile birds need a calmer water environment (e.g., estuarine) to develop their fishing skills (Atwood and Minsky 1983, Minsky 1984). Survivorship of fledglings may be reduced by losses of calm foraging habitat (Atwood and Minsky 1983).

A two year foraging study conducted in San Diego Bay and the nearby ocean waters observed that least terns forage more in San Diego Bay than in the Ocean (Copper 1986). Preferential foraging in the Bay in lieu of the Ocean by least terns during poor reproductive years (Baird 1997) suggests that bay foraging habitats are particularly important to least tern survival when prey resources are limited. Chick survival is diminished if parents must be away longer (i.e., flying farther to find suitable small fish) or if nearby sources of small fish are insufficient to sustain and grow chicks. Baird (1997) found that least terns in San Diego Bay abandon frequent use of oceanic habitat (using it less than 50 percent of the time) and preferentially forage in the bay during poor reproductive years. During one of these years, she also observed that least terns and their fledglings were comparatively more successful at capturing their fish prey in the bay, further supporting that fledglings need calm waters to improve their fishing skills (Atwood and Minsky 1983, Minsky 1984). Similarly, a foraging and fish abundance study in Northern Gulf of California observed that least terns, though nesting closer to the Gulf of California, foraged more in the nearby protected bay (Bahia de San Jorge) where more abundant appropriately sized fish were available (Zuria and Mellink 2005).

Available information supports a finding that least terns exhibit a preference for foraging in shallower waters associated with bay habitats in comparison to deeper off-shore waters (Massey 1974, Collins et al. 1979, Atwood and Minsky 1983, Atwood and Kelly 1984, Minsky 1984, Bailey 1984). In San Diego Bay, shallower depths are correlated with higher least tern foraging (Baird 1997). During most years of a four-year study, terns preferentially foraged in areas with depths shallower than 6.7 to about 7.8 meters, except in one very poor reproductive year when the average depths of foraging areas were over 10 meters (Baird 1997). Consistent with other southern California foraging areas, least terns in Los Angeles Harbor preferentially forage where depths are less than 20 feet (6.1 meters), despite it being the most rare water depth in the Harbor (Massey and Atwood 1982). As such, the availability of foraging habitat in water less than 20 feet deep (6.1 meters) and that is close to nesting colonies may be essential to maintain least tern breeding populations (Massey and Atwood 1982). The primary foraging area in the Bay where most of the least terns nesting at Delta Beach South and the aforementioned training lanes at NAB Ocean forage is at depths less than 20 feet (6.1 meters).

The biological significance of losing high quality foraging habitat in San Diego Bay is considerable because San Diego Bay contains important nursery habitat associated with a high abundance of appropriately sized fish for least tern chicks. The requirement of least terns to feed

in estuaries, embayments, and shallow nearshore waters at or near estuaries and river mouths (Massey 1974, Collins et al. 1979, Atwood and Minsky 1983, Atwood and Kelly 1984, Minsky 1984, Bailey 1984) is likely because these habitats are highly productive for their prey. As most fish consumed by least terns are either first-year or of age class 1 (Atwood and Kelly 1984, Baird 1997), it is not surprising that they would preferentially forage at or near their prey's nursery habitat, particularly when they must provide smaller fish to their chicks (Atwood and Kelly 1984). Newly hatched chicks consume fish with an average size of 2.5 cm (Atwood and Kelley 1994, Ehrler et. al. 2006). San Diego Bay provides critical nursery habitat for bay, estuarine, and nearshore fish species consumed by least terns. The majority of fish found in San Diego Bay between 1994 and 1999, and in 2005, were juveniles (67 percent and 70 percent, respectively) and consisted largely of northern anchovies, deepbody anchovies, and topsmelt (Allen 1998, Pondella et. al., 2006), which constitute the primary prey consumed by least terns (Atwood and Kelly 1984, Furness and Monagam 1987, Baird 1997). Topsmelt move into shallower water to spawn and thus there is a relatively high abundance of young fish along beaches and in-protected lagoon-like or estuarine habitats (Ehrler et. al. 2006). Young anchovy move into shallow water bays and estuaries found along the coast (Baird 1997). Such nursery habitats are important as both foraging grounds and as a source for food that may move into other foraging areas utilized by least terns (Ehrler et. al. 2006).

Reduced Least Tern Reproductive Success resulting from Losses in Foraging Habitat

The reduction in available high quality foraging habitat and thus available food in the immediate vicinity of nesting least terns at Delta Beach South and the aforementioned training lanes at NAB Ocean is expected to incrementally reduce the fitness and productivity (i.e., reproductive success and survivability) of these least tern populations (Minsky 1984, Atwood and Kelly 1984, Marschalek 2006), especially when appropriately sized prey resources are limited. Food shortages can be manifest locally and/or regionally. Regional events can affect the whole population while local events may be undetectable unless colony surveillance is good. Reduced food availability can negatively affect the reproductive success of the least tern by reducing clutch sizes, lowering weights of chicks, and increasing levels of egg abandonment and non-predator chick mortality (Atwood and Kelly 1984, Massey 1988, Massey et. al. 1992). For example, the low productivity or reproductive success of least terns in recent years has been attributed to shortages of their fish prey (Marschalek 2005 and 2006).

The proposed project will incrementally reduce availability of high quality least tern foraging habitat in close proximity to nesting least terns. This reduction may result in increased competition among least terns for food (Furness and Monaghan 1987). The impacts from intraspecific competition can exacerbate losses in least tern productivity when prey availability is low since reproductive success is closely related to access of nearby waters with adequate supplies of appropriately sized fish. For example, increased competition can negatively affect adults and result in a decrease in egg size (Furness and Monaghan 1987). Least terns may reduce such intraspecific competition for food by traveling further from the colony to feed, however, the

partial cost of traveling further is less time is devoted to other breeding and parental care activities (Furness and Monaghan 1987).

Less parental care for their nests and chicks for longer periods of time due to increased competition for food can exacerbate the existing threats of predation, starvation, and overexposure on the reproductive success of the least tern population. Eggs and chicks will be exposed and unprotected for greater periods of time, making them more vulnerable to predators (Safina and Burger 1983). Currently, the Navy conducts predator control at the least tern nesting sites at NAB Ocean and Delta Beaches North and South, which is vital to minimizing reductions in reproductive success associated with predation. However, predator control is restricted from controlling the gull-billed tern, which has been a great threat to the least terns nesting at NAB nesting colonies. As such, adults being away from their nests longer as a result of Project-related extended foraging trips could cause greater predation of least tern chicks by gull billed terns. In addition, the adults will provide less food to their chicks due to the increased time needed to search and capture food farther from their nests (Manning 2002). Furthermore, chick mortality due to overexposure to cold, wet weather, or extreme heat will be more likely if the parents incubate nests for shorter periods of time.

Increasing flight time for adults to capture food for themselves and their chicks, or fledgling least terns to feed themselves, will result in a greater expenditure of energy and reduction in storage of fat necessary for breeding and migration (Belanger and Gedard 1989, Lafferty 2001). The energy cost of traveling further for food is relatively high for least terns because they fly by flapping their wings (Furness and Monaghan 1987). Additionally, birds that forage slowly or ineffectively, such as fledglings, may not be able build the requisite fat reserves that are especially important to successfully make their upcoming migratory journey (Lafferty 2001). As such, survivorship of first-year least terns (i.e., recruits) is expected to be negatively impacted, especially in years when the food base is low. Such increased costs are expected to cumulatively affect reproduction and survivorship of the population (Lafferty 2001).

The increase of least tern populations in San Diego Bay places a premium on maintaining or increasing the amount of high quality foraging habitat in the Bay to sustain these populations. Larger least tern populations are dependent upon larger foraging areas to sustain themselves. Given the annual variation in the distribution and abundance of least tern prey, more (not less) foraging habitat is needed to sustain the San Diego Bay population of the least tern, especially during periods of food scarcity.

Based on the above information, least tern eggs, chicks, and fledglings at Delta Beach South and the aforementioned training lanes at NAB Ocean colonies are likely to be injured to varying degrees as a result of the proposed action causing a permanent loss of 0.84 acres of high quality foraging habitat immediately adjacent to these colonies, especially during the chick phase of the nesting cycle. The likelihood of this injury is greatest during those years when least tern prey populations in the Bay are most limited.

Habitat Disturbance

The proposed project is likely to reduce the ability of least terns to forage in their primary foraging habitat by increasing boating access and boating activity (Navy 2003) in and adjacent to Fiddler's Cove. Approximately 167 acres (85 percent) of primary foraging habitat within one kilometer of Delta Beach South and the aforementioned training lanes at NAB Ocean will be disturbed by boating activities, assuming that boating activity is restricted to depths greater than -2 feet MLLW. The proposed project will increase docking capacity of Fiddler's Cove and the ability to launch water vehicles at low tide. Increased disturbances to foraging habitat could negatively affect the stability of the adjacent least tern colonies because disturbance-free foraging areas to obtain food for chicks are important (Rodgers and Smith 1997). Increased boating can displace waterbird access to feeding areas and result in a subsequent loss of production of young (Drent and Guiguet 1961, Conservation Committee Report 1978, Huffman 1999, Manning 2002). Increased boating activity, particularly high speed boating, can reduce foraging by least terns. The Navy (2003) found that least terns tended to forage in areas with relatively less boating activity. Bailey (1995) suggests that heavy boat activity in an estuary near Alameda Naval Air Station dissuades least terns from foraging in suitable habitat. Although the least terns could fly to other areas to avoid highly disturbed foraging habitat, such behavioral adaptations can increase the numbers of flights and flight times between foraging and loafing, resulting in energy deficiencies that could translate to reduced productivity and fitness (Manning 2002). The likelihood of this increase in boating activity disrupting least tern foraging in the Bay is greatest during those years when least tern prey populations in the Bay are most limited.

The proposed project is likely to adversely affect the least terns nesting at South Delta Beach and the aforementioned training lanes at NAB Ocean by increasing human activity in the vicinity. The project will increase human use of the Fiddler's Cove area by adding additional capacity to the marina and by expanding the existing recreational vehicle park. The expansion includes creation of additional campsites, a comfort station, washroom facility, and a picnic area. Improvements to the existing boat ramp may result in increased use of the ramp and a resulting increase in small watercraft use in the waters adjacent to the Delta Beach colonies. Increased human use may encroach into the adjacent least tern colonies and could result in: eggs and chicks being inadvertently stepped on; the deliberate collection of eggs for food or fun; and eggs or chicks injured or killed by off-road-vehicle traffic (Goodrich 1982, Burger 1989, Cowgill 1989, Lingle 1993, Smith and Renken 1993, Kirsch 1996). However, it is anticipated that the Navy will continue to protect these nesting colonies from human encroachment. The nesting colony at Delta Beach South is currently protected with fencing and signage. However, the NAB Ocean nesting colony is not fenced and is subject to human encroachment.

Brown pelican

Brown pelicans forage by visually searching for their prey and dive from 6-12 meters in the air, and occasionally from up to 20 meters, to capture their prey (Schreiber et. al. 1975). Like the least tern, their foraging habitat is unavailable when it is covered by structures (e.g., piers, docks,

wharves) they cannot see or plunge-dive through (Navy 1999, Navy and Port 2000). The brown pelican is negatively affected by the project's resulting permanent loss (0.84 acre) of foraging habitat in a brown pelican high use area (Navy 2003). Additionally, construction activities associated with the project, such as dredging and pile driving or jetting, can temporarily creating turbid water conditions that obscure available forage fish and affect the success of brown pelicans to capture prey items (Service 2000). However, brown pelicans do not breed in San Diego and are less dependent than the least tern on prey of a maximum size and age class for reproductive success.

The demolition and replacement of the existing wave attenuator will likely negatively affect the brown pelican by temporarily (for about 6 weeks) removing highly utilized roosting habitat. Because brown pelicans prefer to roost on undisturbed areas (American Ornithologists' Union 1983, Service 1983), disturbances associated with project construction are likely to cause an increased number of flights between loafing areas resulting in energy deficiencies to migrant brown pelicans that translate to reduced productivity and fitness at the breeding grounds (Manning 2002). Roosting and loafing sites are essential habitat for brown pelicans (Service 1983), in part, because they use them to dry their feathers after getting wet, thermo-regulate, rest, and to preen (Jaques and Anderson 1987). However, sufficient alternative brown pelican roosting areas (e.g., the shoreline in Fiddler's Cove) will be available during replacement of the wave attenuator.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, 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 consultation pursuant to section 7 of the Act.

We anticipate that non-Federal actions, such as the prevalence of contaminants in San Diego Bay waters associated with certain marine activities (e.g., marinas and shipyards), the continued development of nearshore ocean and bay waters for commercial and recreational purposes, and the disturbance of nesting areas by humans and feral mammals, are expected to cumulatively contribute to adverse effects to the least tern.

Continued build-out of piers and wharfs in San Diego Bay would likely have a cumulatively significant impact on San Diego Bay resources, particularly because most piers and wharfs occur in relatively shallower waters. Covering the shallower waters of the bay (e.g., intertidal, shallow subtidal) would likely change its community composition resulting in an ecological type conversion. Covering these habitat types with docks and wharves will reduce foraging habitat, light availability in the water column and negatively affect photosynthesizing organisms (e.g., eelgrass, algae, phytoplankton), and introduce hard substrate which will likely support a different species composition and biological community. It could also reduce critical nursery habitat for least tern and brown pelican fish prey.

CONCLUSION

After reviewing the current status of the California least tern and the brown pelican, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the California least tern and brown pelican.

We reached this conclusion for the following reasons:

California Least Tern

With implementation of the proposed action (inclusive of proposed avoidance and minimization measures), the South Delta Beach and NAB Ocean colonies are expected to remain, which is essential to the survival and recovery of the California least tern. However, it should be noted that the significance of any future net losses of such habitat on the survival and recovery of the least tern will be magnified given the importance of protecting or enhancing high quality foraging habitat in San Diego Bay in close proximity to these nesting colonies to maintain the colonies' viability.

Brown Pelican

Implementation of the proposed action is likely to be compatible with the brown pelican's current use because sufficient foraging, although at reduced levels, and roosting areas will remain in the action area post-project.

Reporting Requirements

The Navy, or its designated contact, shall submit an annual report to the Service that describes and summarizes the implementation of the proposed project and its associated mitigation and minimization/conservation measures.

Disposition of Sick, Injured, or Dead Specimens: The Service's Carlsbad Fish and Wildlife Office is to be notified within three working days should any endangered or threatened species be found dead or injured within the action area. Notification must include the date, time, and location of the carcass, and any other pertinent information. Dead animals may be marked in an appropriate manner, photographed, and left on-site. Injured animals should be transported to a qualified veterinarian or to Project Wildlife, using existing procedures. Should any treated animals survive, the Service should be contacted regarding the final disposition of the animals. The Service contact person is Carolyn Lieberman and she may be contacted at (760) 431-9440.

CONSERVATION RECOMMENDATIONS

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act 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.

1. To minimize the impact of a 0.84-acre net loss of available tern foraging habitat in the Fiddler's Cove area, the Navy should:

   1.1. Remove 0.84 acres of structures covering the Bay within 1 kilometer of Fiddler's Cove to avoid a net loss of available foraging habitat; or

   1.2. Remove 0.84 acres of upland fill from the Bay within 1 kilometer of Fiddler's Cove to avoid a net loss of available foraging habitat; or

   1.3. Shallow-up 0.84 acres of deep, subtidal habitat to shallow, subtidal habitat to create more preferred foraging habitat within 1 kilometer of Fiddler's Cove; or

   1.4. Create 0.84 acre of eelgrass habitat or credit 0.84 acre at the Navy's eelgrass South Central mitigation bank sites within 1 kilometer of Fiddler's Cove to enhance fish nursery habitat and thus prey populations for least tern; or

   1.5. Remove 0.84 acres of non-functional rip-rap or debris that occurs in intertidal or shallow subtidal habitat within 1 kilometer of Fiddler's Cove to enhance nursery habitat for least tern prey and create more preferred foraging habitat; or

   1.6. Conduct a combination of the measures listed above that total 0.84 acres.

2. The Navy, in coordination with the Service, should design and conduct a study to a) delineate primary foraging areas in San Diego Bay, and b) quantify the relationship between prey availability in primary foraging areas and the reproductive success of the associated least tern colony (i.e., production of fledglings. The study should evaluate the relative usage of foraging habitat during different stages of the breeding season, different years, and at different proximities to least tern colonies.). Fish sampling should be standardized within the expected primary foraging areas and include measures of fish density, species, and size. This measure will update information provided in Baird (1997) which was collected prior to the initiation of nesting at South Delta Beach and NAB Ocean.

3. To minimize the potential effects of ongoing and increased human disturbance adjacent to the Delta Beach and NAB Ocean nesting sites, the Navy should implement a recreational user education and enforcement program in coordination with the Service. The program should

address marina employees, marina tenants, and campers. We recommend that the education program include the following topics: a description of the ecology and local distribution of the California least tern and the western snowy plover; information concerning the sensitivity of these species to human activities, including the potential impacts from free-roaming pets, beach landings of small watercraft, etc.; information regarding speed limits and/or suggested routes of travel to minimize disturbance to the Delta Beach colonies; information regarding the legal protection afforded these species and penalties for violations of Federal and State laws; reporting requirements; and a description of the Navy's ongoing conservation efforts to reduce impacts to the least tern and western snowy plover and promote continued successful occupation of protected areas. The program should include, but not be limited to, information pamphlets and signage and barriers along the west-side of the road between Fiddler's Cove and NAB Ocean. Pamphlets should be distributed to all recreational users during the nesting season of the least tern.

4. The Navy should implement a conservation strategy in San Diego Bay to avoid and minimize obstruction or degradation of least tern and brown pelican foraging habitat. Foraging habitat is defined as open water containing suitable fish prey that is available for foraging by plunge-diving birds (e.g., least terns and brown pelicans). The goals for this conservation strategy should include retention of (or an increase in) existing levels of foraging habitat and forage prey. In this regard, we recommend that the Navy and the Service renew and expand the *California Least Tern In-Water Construction MOU* and the San Diego Bay/ Naval Base Coronado Integrated Natural Resource Management Plans to address permanent and temporary modifications to least tern foraging habitat. The Navy should work with the Service to identify primary foraging habitat where permanent modifications will require offsetting measures or thresholds at which a cumulative loss of foraging habitat would require offsetting measures.

5. To minimize the impact of disturbance to 167 acres of least tern primary foraging habitat within one kilometer of South Delta Beach, the Navy should identify and mark primary foraging areas for the least tern and seasonally restrict boating activity to outside marked primary foraging areas during the least tern nesting season (April 1 to September 15). The Navy should regularly enforce any seasonal boating restrictions implemented.

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

REINITIATION NOTICE

This concludes formal consultation on the Fiddler's Cove Marina Repairs and Improvements Project outlined in the initiation 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) 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; (2) 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 (3) a new species is listed or critical habitat designated that may be affected by the action.

If you have any questions or concerns about this biological opinion, please contact Sandy Vissman or David Zoutendyk of my staff at (760) 431-9440.

Sincerely,

Therese O'Rourke
Assistant Field Supervisor

cc: U.S. Army Corps of Engineers (Jeannette Baker)
California Coastal Commission, San Francisco (Mark Delaplaine)
California Department of Fish and Game (Marilyn Fluharty)
National Marine Fisheries Service (Robert Hoffman)

LITERATURE CITED

Allen, L.G. 1998. Fisheries inventory and utilization of San Diego Bay, San Diego, California. 4th annual report, FY 1997-98 summary for the sampling period July 1994 to April 1998. Prepared for the U.S. Navy, Naval Facilities Engineering Command, Southwest Division and San Diego Unified Port District.

American Ornithologists' Union. 1957. Check-list of North American birds. 5th ed. Am. Ornithol. Union, Washington, D.C.

American Ornithologists' Union. 1983. Check-list of North American birds, 6th ed. Allen Press. Lawrence, KA. 877 pp.

Anderson, D. W., and F. Gress. 1983. Status of a northern population of California brown pelicans. Condor 85: 79-88.

Atwood, J.L., and D.E. Minsky. 1983. Least tern foraging ecology at three major California breeding colonies. Western Birds 14: 57-72.

Atwood, J.L., and P.R. Kelly. 1984. Fish dropped on breeding colonies as indicators of least tern food habits. Wilson Bull. 96: 34-47.

Atwood, J.L., and B.W. Massey. 1988. Site fidelity of least terns in California. The Condor 90:389-394.

Bailey, S. 1984. California least tern foraging and other off-colony activities around Alameda Naval Air Station during 1984. Dept. of Ornithology and Mammology, California Academy of Sciences, Golden Gate Park, San Fransisco, CA.

Bailey, S. 1985. California least tern foraging and other off-colony activities around Alameda Naval Air Station during 1985. Dept. of Ornithology and Mammology, California Academy of Sciences, Golden Gate Park, San Fransisco, CA.

Baird, P.H., 1997. Foraging of the California least tern in San Diego Bay, California, 1993-1996. Final Report. California Sate University, Long Beach, 90840.

Bender, K. 1974. California least tern census and nesting survey, 1973. Spec. Wildl. Invest. Prog. Rep., Job II-11, California Department of Fish and Game, Sacramento.

Bent, A. C. 1921. Life histories of North American gulls and terns. U.S. Natl. Mus. Bull. 113. 345 pp.

Boardman, C.J. 1988. Organochlorine pesticides in California least terns (*Sterna antillarum browni*). M.S. Thesis, California State University, Long Beach. 24 pp.

Briggs, K.T., D.B. Lewis, W.B. Tyler, and G.L. Hunt, Jr. 1981. Brown pelicans in southern California: habitat use, and environmental fluctuations. Condor 83: 1-15.

Burger, J. 1989. Least tern population in coastal New Jersey: monitoring and management of a regionally endangered species. Journal of Coastal Resources 5(4):801-811.

California Department of Fish and Game. 1990 – 2005. California least tern breeding survey.

Caffrey, C. 1993. California least tern breeding survey: 1992 season. Calif. Dept. of Fish Game. Wildl. Manage. Div., Nongame Bird and Mammal Section Rep. 93-11, Sacramento, California. 35 pp.

Cogswell, H.L. 1977. Water birds of California. Univ. California Press, Berkeley. 399 pp.

Collins, C.T., K.E. Bender, and D.D Rypka. 1979. Report on the feeding and nesting habits of the California least tern in the Santa Ana River marsh area, Orange County, California. Unpubl. Report to the U.S. Army Corps of Engineers, Los Angeles, California.

Conservation Committee Report. 1978. Management of National Wildlife Refuges in the United States: impacts on birds. Wilson Bulletin 90: 309-321.

Copper 1986. A study of the breeding biology of the California least tern at Delta Beach, Naval Amphibious Base, Coronado and the Foraging ecology of the California least tern at Navy bases on San Diego Bay in 1986. Report for the Western Division, Naval Facilities Engineering Command.

Cornwell, G. 1986. Adopt-A-Tern-Nest project. Chat 50:12-13.

Cowgill, R. W. 1989. Nesting success of least terns on two South Carolina barrier islands in relation to human disturbance. Chat 53:81-87.

Drent, R.H., and C.J. Guiguet. 1961. A catalogue of British Columbia sea-bird colonies. Occasional Papers of the British Columbia Provincial Museum 12: 1-173.

Ehrler, C.P., M.L. Elliot, J.E. Roth, J.R. Steinbech, A.K. Miller, W.J. Sydeman, and A.M. Zoidis. 2006. Oakland Harbor deepening project (-50'): Least tern, fish, and plume monitoring. Project year 2005 and four-year final monitoring report. Tetra Tech, Inc., San Francisco, California. July 2006.

Fancher, J.M. 1992. Population status and trends of the California least tern. Transactions of the Western Section of the Wildlife Society 28: 59-66.

Furness, R.W. and P. Monaghan. 1987. Seabird Ecology. Blacki & Son Ltd. 164 pp.

Garrett, K. and J. Dunn. 1981. Birds of southern California: status and distribution. Los Angeles Audubon Society. 407 pp.

Goodrich, L.J. 1982. The effects of disturbance on reproductive success of the least tern (*Sterna albifrons*). M.S. thesis, Rutgers State University, New Brunswick, NJ.

Gress, F., P.R. Kelly, D.B. Lewis, and D.W. Anderson. 1980. Feeding activities and prey preference of brown pelicans breeding in the Southern California bight. Administrative report, California Department of Fish and Game, Sacramento, California.

Grinnell, J. and A.H. Miller. 1944. The Distribution of the Birds of California. Pacific Coast Avifauna Number 27: 1-608, 337-338. Copper Ornithological Club, Berkeley, California. Reprinted by Artemisia Press, Lee Vining, California; April 1986. 617 pp.

Huffman, K. 1999. San Diego South Bay Survey Report: Effects of human activity and water craft on wintering birds in the south San Diego Bay.

Jaques, D.L., and D.W. Anderson. 1987. Conservation implications of habitat use and behavior of wintering brown pelicans (*Pelecanus occidentalis californicus*). University of California. Davis. California.

Keane, K. 1987. Sex roles in the parental care of least terns (*Sterna antillarum*). M.S. thesis. California State University, Long Beach, California.

Kirsch, E. M. 1996. Habitat selection and productivity of least terns on the lower Platte River, Nebraska. Wildlife Monograph Number 132. The Wildlife Society, Bethesda, MD.132: 1-48.

Lafferty, K.D. 2001. Birds at a Southern California beach: seasonality, habitat use and disturbance by human activity. Biodiversity and Conservation 10: 1949-1962.

Lingle, G.R. 1993. Causes of nest failure and mortality of least terns and piping plovers along the central Platte River. Pp. 130-134. *In.* Higgins, Kenneth F. & M.R.Brashier, Editors.

Manning, J.A. 1995. Waterbirds of central and south San Diego Bay 1993-1994. Coastal Ecosystem Program, U.S. Fish and Wildlife Service.

Manning J.A. 2002 *in review*. Distributions of wintering seabirds in a coastal bay: the influence of waterfront development-induced edge effects.

Marschalek, D.A. 2005. California least tern breeding survey, 2004 season. Final report to State of California Department of Fish and Game, South Coast Region.

Marschalek, D.A. 2006. California least tern breeding survey, 2005 season. Final report to State of California Department of Fish and Game, South Coast Region.

Massey, B.W. 1974. Breeding biology of the California least tern. Proc. Linnaean Soc. N.Y. 72: 1-24.

Massey, B.W. 1987. California least tern foraging study, Los Angeles Harbor, 1986/1987. Port of Los Angeles, Environmental Div./Marine Ecological Consultants, Encinitas, CA.

Massey, B.W. 1988. California least tern field study, 1988 breeding season. A report to the Calif. Dept. of Fish and Game. Final report FG 7660. 22 pp.

Massey, B.W. and J.L. Atwood. 1981. Second-wave nesting of the California least tern: age composition and reproductive success. Auk 98: 596-605.

Massey B.W. and J.L. Atwood. 1982. Application of ecological information to habitat management for the California least tern. Progree Report No. 4. prepared for the U.S. Department of the Interior, Fish and Wildlife Service, Laguna Niguel, California.

Massey, B.W., D.W. Bradley, and J.L. Atwood. 1992. Demography of a California least tern colony including effects of the 1982-1983 El Niño. Condor 94: 976-983.

Minsky, D. 1984. A study of the foraging ecology of the California least tern in Los Angeles and Orange Counties, season of 1984. U.S. Navy, Nav.Fac.Engr.Cmd., San Bruno, CA. 31 pp.

Minsky, D. 1984. A study of the foraging ecology of the California least tern at Camp Pendleton, Season of 1984. Report to Department of the Navy, natural Resources Management Branch, San Bruno, California.

Palmer, R.S. (ed.). 1962. Handbook of North American birds, Vol. 1, loons through flamingos. Yale Univ. Press, New Haven, CT. 567 pp.

Pondella, D., J. Froeschke, and B. Young. 2006. Fisheries inventory and utilization of San Diego Bay, San Diego, California for surveys conducted in April and July 2005.

Powell, A.N., and C.L. Collier. 2000. Habitat use and reproductive success of western snowy plovers at new nesting areas created for California least terns. J. Wildl. Manage. 64: 24-33.

Rodgers, J.A. Jr., and H.T. Smith. 1997. Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida. Wildlife Society Bulletin 25(1): 139-145.

Safina C. and J Burger. 1983. Effects of human disturbance on reproductive success in the black skimmer. Condor 85:164-171.

San Diego Natural History Museum. Specimen records.

Schreiber, R.W., G.E. Woolfenden, and W.E. Curtsinger. 1975. Prey capture by the brown pelican. Auk 92:649-654.

Smith J.W., R.B. Renken. 1993. Reproductive success of least terns in the Mississippi River Valley. Colonial Waterbirds 16:39-44.

Thelander, C.G., and M. Crabtree. 1994. Life on the edge: a guide to California's endangered natural resources. Biosystem Books, Santa Cruz, CA. 550 pp.

Thompson, B.C., J.A. Jackson, J. Burger, L.A. Hill, E.M. Kirsch, and J.L. Atwood. 1997. Least Tern (*Sterna antillarum*). *In* The Birds of North America, No. 290 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.

U.S. Fish and Wildlife Service. 1980. California Least tern recovery plan. U.S. Fish and Wildlife Service, Region 1, Portland, Oregon.

U.S. Fish and Wildlife Service. 1983. California brown pelican recovery plan. Prepared by the U.S. Fish and Wildlife Service under contract with F. Gress and D. W. Anderson (University of California, Davis). Dated February 3, 1983. 179 pp.

U.S. Fish and Wildlife Service. 1985a. Revised California least tern recovery plan. U.S. Fish and Wildlife Service, Region 1, Portland, Oregon.

U.S. Fish and Wildlife Service. 1985b. Interior population of the least tern determined to be endangered. *U.S. Federal Register* 50:21784-21792.

U.S. Fish and Wildlife Service. 1985c. Habitat suitability index models, Least Tern. Biological Report 82(10.103).

U.S. Fish and Wildlife Service. 2000. Biological Opinion on San Diego Regional Beaches Sand Replenishment Project, Coastal Zone of San Diego County, California; FWS Log No. I-6-01-F-1046; Corps Public Notice No. 1999-15076-RLK.

U.S. Fish and Wildlife Service. 2004b. Informal consultation on Seaforth Marina in Mission Bay with the U.S. Army Corps of Engineers (FWS-SDG-4282.2).

U.S. Fish and Wildlife Service. 2005. *Endangered Species Consultation and Draft Biological Opinion on Military Training Operations during 2005 and 2006 Breeding Seasons at Naval Amphibious Base, Coronado and Naval Radio Receiving Facility, Imperial Beach, Naval Base Coronado, San Diego, California.*

U.S. Fish and Wildlife Service. 2006. California least tern (*Sternula antillarum browni*). 5-Year Review Summary and Evaluation.

U.S. Department of the Navy. 1999. Final Environmental Impact Statement for Developing Home Port Facilities.

U.S. Department of the Navy. 2003. Foraging behavior of the California least terns adjacent to piers in San Diego Bay, San Diego, CA. Prepared by Merkel & Associates, Inc., San Diego, CA.

U.S. Navy, Southwest Division (USDoN, SWDIV) and San Diego Unified Port District. 2000. San Diego Bay Integrated Natural Resources Management Plan. September 2000. San Diego, CA. Prepared by Tierra Data Systems, Escondido, CA.

U.S. Department of the Navy. 2006a. Letter to the Service requesting initiation of formal consultation for Fiddler's Cove Marina Repairs and Improvements Project, dated May 1, 2006.

U.S. Department of the Navy. 2006b. Electronic mail message to the Service regarding cumulative coverage in Fiddler's Cove, dated August 17, 2006.

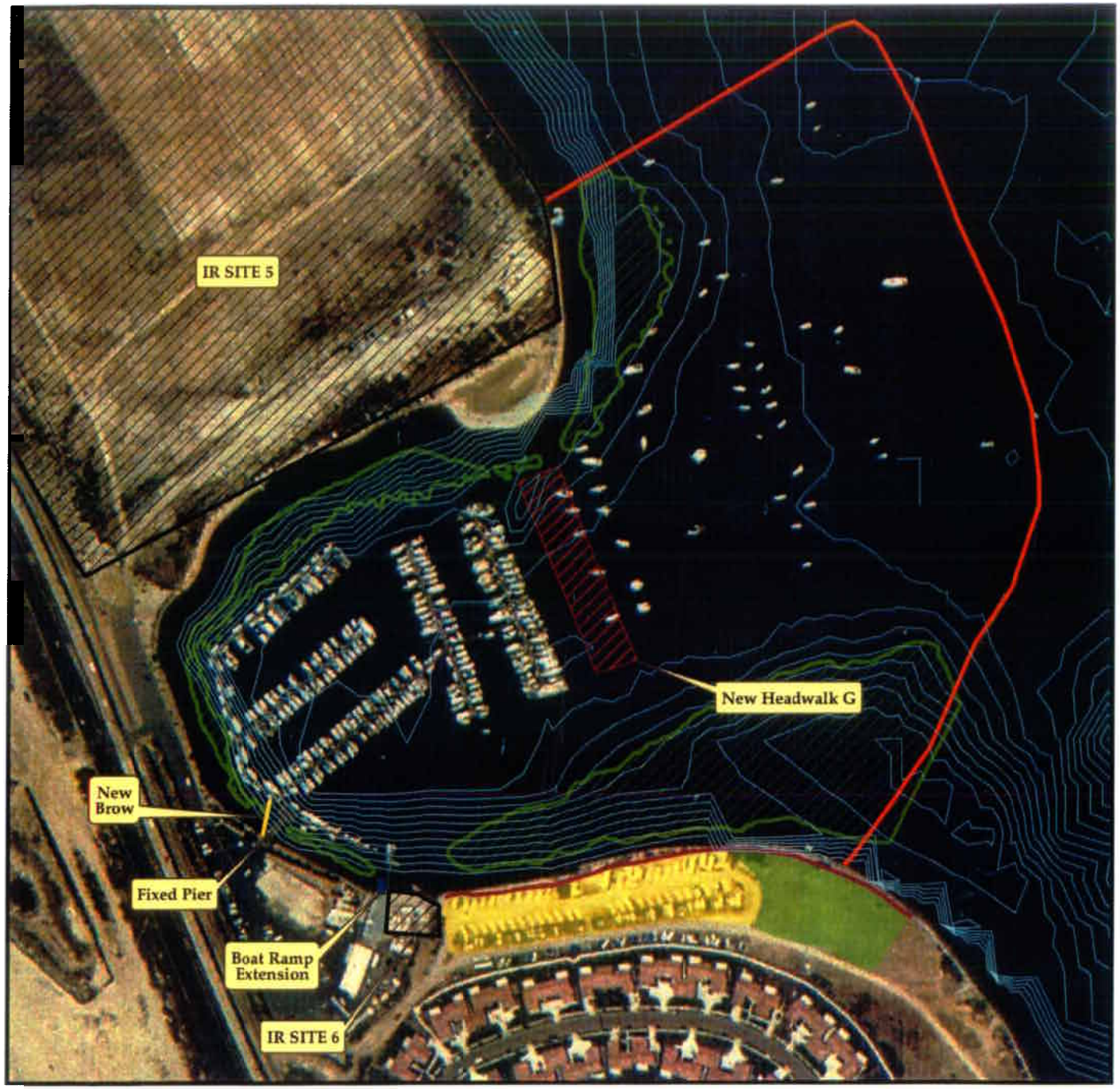
U.S. Department of the Navy. 2006c. Electronic mail message to the Service providing draft Navy Comments on the Draft Section 7 Consultation on the Fiddler's Cove Marina Repairs and Improvements Project, San Diego County, California (1-6-06-F-4032.4) Dated 15 Sep 06., dated October 24, 2006.

U.S. Navy, Southwest Division (US Don, SWDIV) and San Diego Unified Port District. 2000. San Diego Bay Integrated Natural Resources Management Plan. September 2000. San Diego, CA. Prepared by Tierra Data Systems, Escondido, CA.

U.S. Department of the Navy and U.S. Fish and Wildlife Service. 2004. *Memorandum of Understanding between the U.S. Fish and Wildlife Service and U.S. Navy concerning conservation of the endangered California least tern in San Diego Bay, California*

Wetmore, A. 1945. A review of the forms of the brown pelican. Auk 62: 557-586.

Zuria, I. and E. Mellink. 2005. Fish abundance and the 1995 nesting season of the least tern at Bahia de San Jorge, Northern Gulf of California, Mexico. Waterbirds 28(2): 172-180.



LEGEND

- Existing RV Park
- RV Park Expansion Area
- Boat Ramp
- New Headwalk
- IR Sites
- Eelgrass
- Wave Attenuator
- New Retaining Wall
- New Brow
- Bathymetric Contours (1 foot interval)

N

0 50 100 150 200

Meters

Figure 3.4-1.

Fiddler's Cove
Baseline Conditions

FIGURE 1

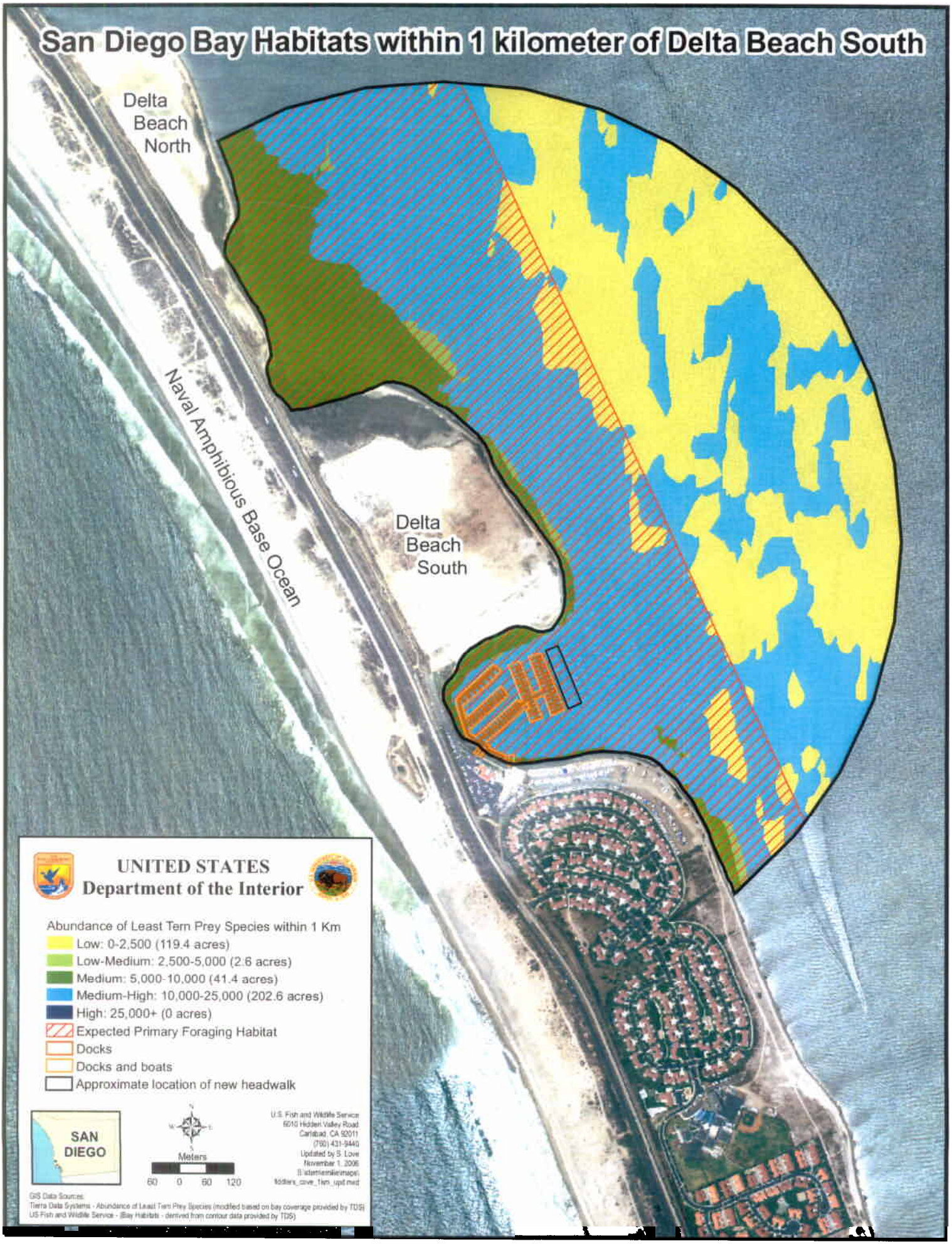

San Diego Bay Habitats within 1 kilometer of Delta Beach South
Delta Beach North
Naval Amphibious Base Ocean
Delta Beach South
UNITED STATES
Department of the Interior
Abundance of Least Tern Prey Species within 1 Km
Low: 0-2,500 (119.4 acres)
Low-Medium: 2,500-5,000 (2.6 acres)
Medium: 5,000-10,000 (41.4 acres)
Medium-High: 10,000-25,000 (202.6 acres)
High: 25,000+ (0 acres)
Expected Primary Foraging Habitat
Docks
Docks and boats
Approximate location of new headwalk
SAN DIEGO
Meters
60 0 60 120
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92011
(760) 431-9440
Updated by S. Love
November 1, 2006
fiddlers_cove_1km_upd.mxd
GIS Data Sources:
Tierra Data Systems - Abundance of Least Tern Prey Species (modified based on bay coverage provided by TDS)
US Fish and Wildlife Service - Bay Habitats - derived from contour data provided by TDS)

FIGURE 2

San Diego Bay Habitats

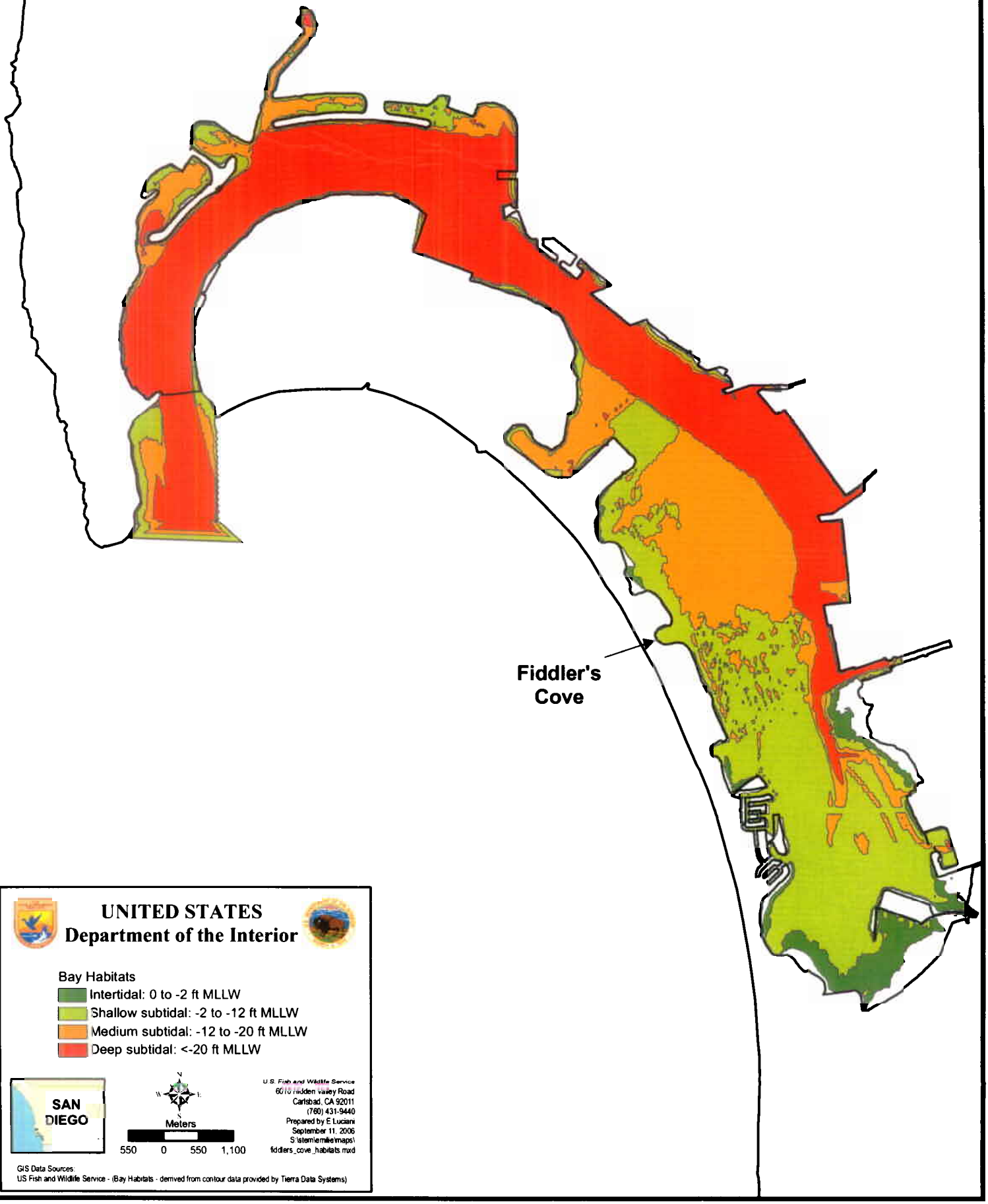


FIGURE 3

California Least Tern Prey Abundance in San Diego Bay

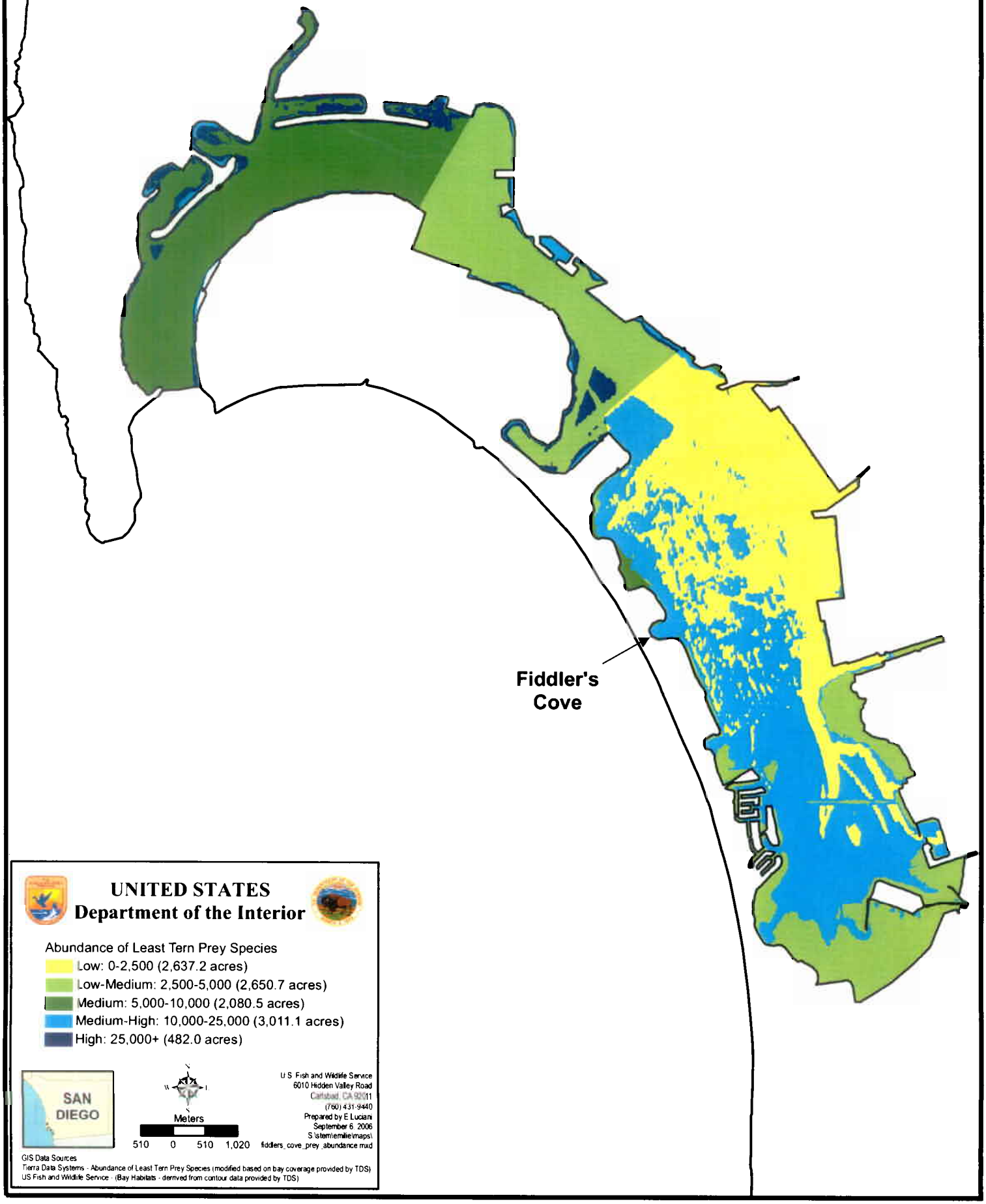


FIGURE 4

Silver Strand Beach Training Lanes

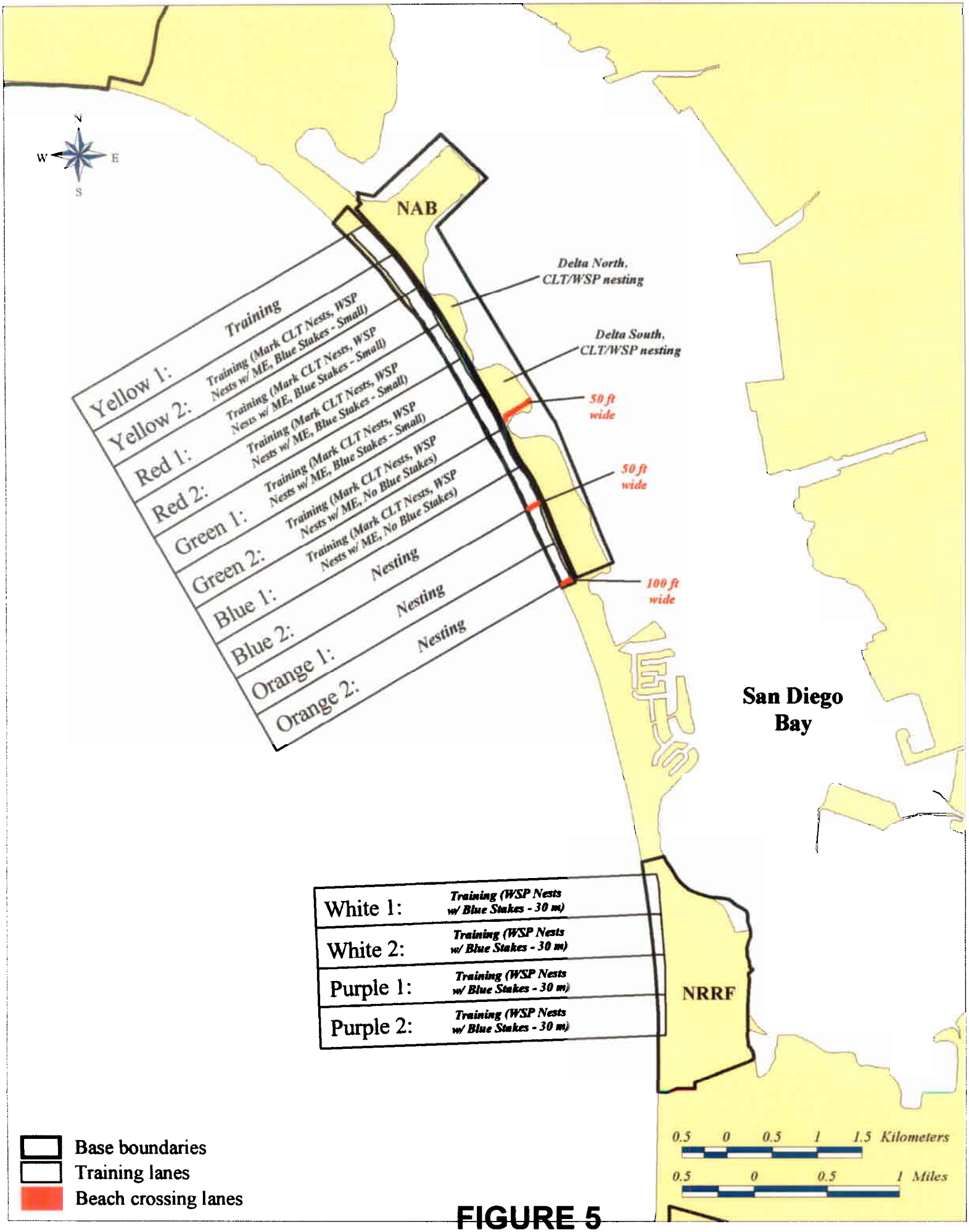


FIGURE 5

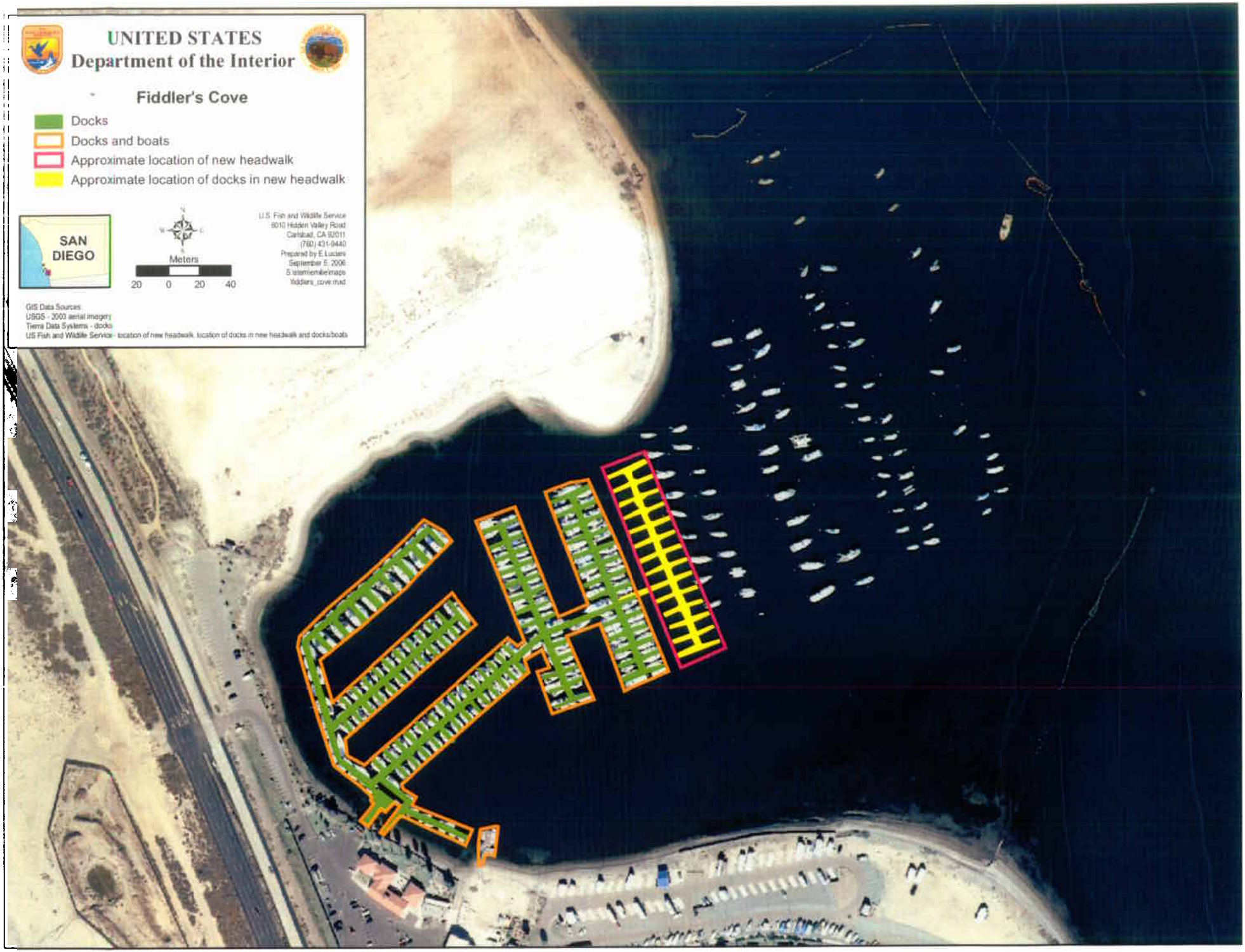
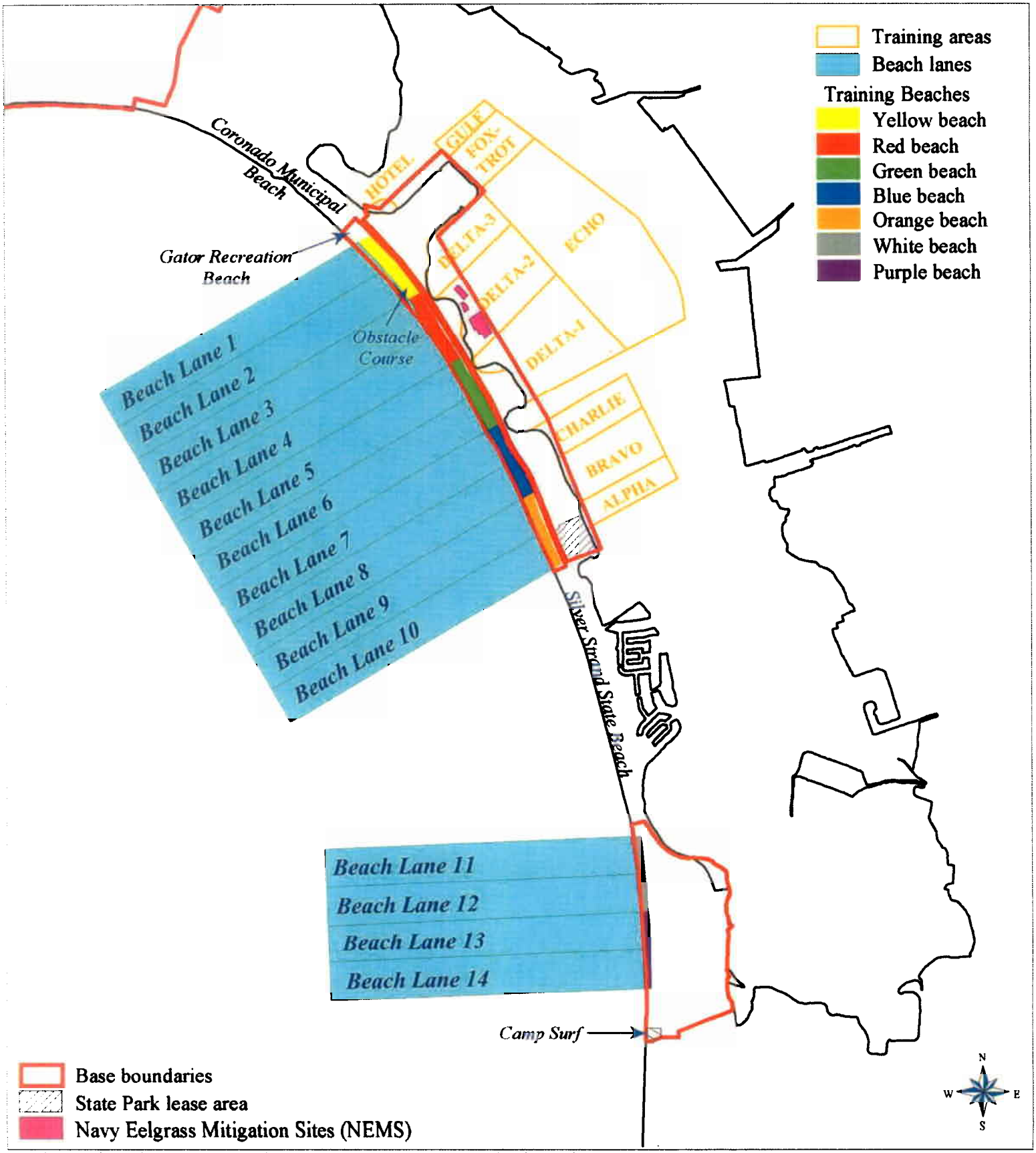

UNITED STATES
Department of the Interior
Fiddler's Cove
Docks
Docks and boats
Approximate location of new headwalk
Approximate location of docks in new headwalk
SAN DIEGO
Meters
20 0 20 40
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92011
(760) 431-9440
Prepared by E.Luciani
September 5, 2006
S:\elem\emlw\maps
fiddlers_cove.mxd
GIS Data Sources:
USGS - 2003 aerial imagery
Tierra Data Systems - docks
US Fish and Wildlife Service - location of new headwalk, location of docks in new headwalk and docks/boats

FIGURE 6

Beach Lanes and Training Areas at NAB and NRRF



0.5 0 0.5 1 1.5 2 Miles

0.5 0 0.5 1 1.5 2 2.5 3 Kilometers

FIGURE 7

COMMANDER NAVY REGION SOUTHWEST
937 NO. HARBOR DRIVE
SAN DIEGO, CA 92132-0058

U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BLVD
LOS ANGELES, CA 90017

NOAA FISHERIES, SOUTHWEST REGION
501 OCEAN BLVD, SUITE 4200
LONG BEACH, CA 90802

First Party	CNRSW
Party References	5000
Block	N00242-080624-X42-MOA

MITIGATION BANKING INSTRUMENT BETWEEN COMMANDER, NAVY REGION SOUTHWEST AND UNITED STATES ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT AND NATIONAL ATMOSPHERIC ADMINISTRATION NATIONAL MARINE FISHERIES SERVICE CONCERNING THE SAN DIEGO BAY EELGRASS MITIGATION BANK

This Banking Instrument ("BI") dated this 2nd day of July, 2008, is made by and among the Commander, Navy Region Southwest ("Navy" or "Bank Sponsor"), the Los Angeles District of the U.S. Army Corps of Engineers ("USACE"), and the National Oceanic Atmospheric Administration National Marine Fisheries Service ("NOAA Fisheries"). The USACE and NOAA comprise and are referred to jointly as the "Resource Agencies." The Navy and the Resource Agencies are hereinafter referred to jointly as the "Parties". This BI sets forth the agreement of the Parties regarding the establishment, use, operation and maintenance of the Navy Region Southwest San Diego Bay Eelgrass Mitigation Bank (the "Bank").

RECITALS

A. The Bank Sponsor is the entity responsible for establishing and operating the Bank.

B. The Navy, as Bank Sponsor and Property Owner, desires to create a Bank over 4.38 hectares (10.82 acres) of real property, located in San Diego Bay, County of San Diego, State of California (the "Bank Property"). The Bank Property is generally shown in the Commander, Navy Region Southwest Eelgrass Mitigation Bank Management Plan for San Diego Bay (the "Plan") (**Exhibit A)**.

C. USACE has jurisdiction over Waters of the U.S. pursuant to the Clean Water Act, 33 USC § 1251 *et seq*.

D. NOAA Fisheries, an agency within the U.S. Department of Commerce, has

jurisdiction over the conservation, protection, restoration and management of fish and the habitat necessary for biologically sustainable populations of these species within the U.S. pursuant to the federal Endangered Species Act, 16 U.S.C. § 1531, *et seq*., the Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661-666c, the Fish and Wildlife Act of 1956, 16 U.S.C. § 742(f), *et seq*., Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1801 *et seq.*, and other provisions of federal law.

E. The Resource Agencies, United States Fish and Wildlife Service, and the California Department of Fish and Game comprise and are referred to jointly as the Mitigation Bank Review Team ("MBRT"), an interagency group which oversees the establishment, use, operation, and maintenance of the Bank.

F. The goals and objectives for the Bank are set forth in the Plan (**Exhibit A**) attached hereto.

G. The USACE allowed 0.17 Credits to be Transferred in advance of the Bank Establishment Date described herein.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing Recitals and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties hereby agree as follows:

Section I. Purpose and Authorities

A. Purpose

The purpose of this BI is to establish guidelines and responsibilities for the establishment, use, operation, and monitoring of the Bank to compensate for unavoidable impacts to eelgrass habitat (Zostera marina), a special aquatic site defined at 40 C.F.R. § 230.43. The Bank Sponsor has Created and will monitor the eelgrass habitat in accordance with this BI and its Exhibits.

B. Authorities

The establishment and use of the Bank for off-site compensatory mitigation is governed by one or more of the following statutes, regulations, policies, and guidelines:

1. Clean Water Act (33 U.S.C. § 1251 *et seq*.);
2. Rivers and Harbors Act (33 U.S.C. § 403);
3. Fish and Wildlife Coordination Act (16 U.S.C. § 661 *et seq*.);
4. Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 *et seq*.)
5. Regulatory Programs of the U.S. Army Corps of Engineers, Final Rule (33 CFR Parts 320-331);

6. Guidelines for Specification of Disposal Sites for Dredged and Fill Material (40 CFR Part 230);

7. Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army concerning the Determination of Mitigation Under the Clean Water Act, § 404(b)(1) Guidelines (February 6, 1990);

8. Federal Guidance for the Establishment, Use and Operation of Mitigation Banks (60 Fed. Reg. 58605 *et seq*. (November 28, 1995));

9. Regulatory Guidance Letter 02-2, dated December 24, 2002, titled "Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to § 404 of the Clean Water Act and § 10 of the Rivers and Harbors Act of 1899".

Section II. Definitions

The initially-capitalized terms used and not defined elsewhere in this BI are defined as set forth below.

1. "Bank Establishment Date" is the date determined pursuant to Section V, when the Bank is considered established and Transfer of Credits may begin.

2. "Catastrophic Event" shall mean an unforeseen event, such as the impact of a vehicle or falling aircraft, which has a material and detrimental impact on the Bank, and over which the Bank Sponsor has no control.

3. "Creation" means the establishment of a target habitat in an area where it does not exist, nor has the potential to exist under normal circumstances.

4. "Credit" is a unit of measure representing the accrual or attainment of aquatic functions at the Bank. One Credit is equivalent to one hectare.

5. "Credit Release" means an action by the MBRT to make specified Credits available for Transfer pursuant to this BI.

6. "Eelgrass Mitigation Bank Ledger and Asset Report (Ledger)" means an accounting system that documents the Transfer of Credits.

7. "Force Majeure" shall mean war, insurrection, riot or other civil disorder, flood, earthquake, fire, disease, governmental restriction or the failure by any governmental agency to issue any requisite permit or authority, or any injunction or other enforceable order of any court of competent jurisdiction, which has a material and detrimental impact on the Bank and over which the Bank Sponsor has no control; *provided, however*, that (i) a riot or other civil disorder shall constitute an event of Force Majeure only if the event has broad regional impacts and is not endemic to the Bank and its immediate locale; (ii) a flood shall be considered an event of Force Majeure only if it is greater than a presently projected 100-year flood, where "flood"

refers to a runoff event; (iii) an earthquake shall constitute an event of Force Majeure only if the ground motion it generates at the Bank is greater than that presently projected from an earthquake with a return period of 475 years; (iv) disease shall constitute an event of Force Majeure only if such event has broad regional impact and is not endemic to the Bank and its immediate locale; and (v) governmental restriction or the failure by any governmental agency to issue any requisite permit or authority, or any injunction or other enforceable order of any court of competent jurisdiction shall not constitute an event of Force Majeure unless there is no other feasible means of Remedial Action.

8. "Long-term Monitoring Period" means the period beginning upon the Bank Establishment Date and continuing until Bank closure, during which the Bank Property is to be monitored pursuant to the Plan.

9. "Success Criteria" means the minimum standards set forth in the SCEMP to define the successful development of eelgrass habitat.

10. "Remedial Action" means any corrective measures which the Bank Sponsor is required to take prior to Bank closure to ameliorate any injury or adverse impact to the Bank Property.

11. "San Diego Bay Eco-regions" means segments of San Diego Bay that exhibit unique environmental characteristics useful in characterizing ecological communities and are defined as distinct regions within the bay.

12. "Service Area" means the geographic area(s) within which impacts to eelgrass habitat that occur may be mitigated or compensated through the application of Credits from the Bank.

13. "Southern California Eelgrass Mitigation Policy (SCEMP)" is defined in the Plan.

14. "Transfer" means the use, sale, or conveyance of Credits by the Bank Sponsor.

15. "Unlawful Act" shall mean the unlawful act of any person or entity other than the Bank Sponsor and shall include an event or series of events, such as the intentional dumping within the Bank, or any connected watercourse, of any Hazardous Substance, or the discharge of such a substance in violation of a statute, ordinance, regulation or permit, which event or series of events has a material and detrimental impact on the Bank.

16. "Waters of the U.S." means all waters and wetlands over which the USACE and the USEPA is granted jurisdiction in the Clean Water Act, 33 U.S.C. § 1251, *et seq*. (2006), and the River and Harbor Act, 33 U.S.C. § 401, *et seq*. (2006). This definition encompasses both the term "waters of the United States" as defined in 33 C.F.R. Part 328 (2006) and "navigable waters" as defined in 33 C.F.R. Part 329 (2006).

Section III. Stipulations

A. Baseline Condition

The Bank consists of five sites located in the North and South – Central Eco-regions of San Diego Bay. Each of the sites is referred to as Navy Eelgrass Mitigation Sites (NEMS) 1, 2, 4, 5 and 6. The sites consist of eelgrass habitat Created in excess of regulatory requirements at specific mitigation site(s) associated with a Navy project. The Navy has completed the five-year monitoring period and all five sites have met the Success Criteria. NEMS 1, 2, 4, and 6 involved filling deeper mud-bottom bay areas to gain suitable elevations to support eelgrass habitat. At NEMS 5, uplands were excavated to create suitable elevations to support eelgrass habitat. NEMS 2 and 5 occur in the North and North-Central Eco-regions of the bay. These Eco-regions are typified by clearer water, a higher degree of tidal flushing, and species more representative of the open ocean. Eelgrass in this area can grow to a depth of 22 feet mean lower low water (MLLW) and turions can exceed 2 meters in length. NEMS 1, 4 and 6 occur in the South Eco-region of the bay, which consists of warmer water with significantly less clarity than the North Bay. Eelgrass in this Eco-region will typically not grow below 6 feet MLLW and turion length is approximately 1 meter. More detailed descriptions of these sites are provided in the Plan (**Exhibit A**).

B. Disclaimer

This BI does not in any manner limit, increase, or otherwise modify the legal authorities, powers or jurisdiction of any of the Parties, but is, instead, an implementation of such authorities, powers, and jurisdiction. Its terms, except those set out at Section VIII. D. (Bank Closure Plan), do not apply beyond the date that the Bank is closed.

C. Exhibits

The following Exhibits are attachments incorporated by reference into this BI:

1. "Exhibit A" - Plan
2. "Exhibit B" – Ledger
3. "Exhibit C" – SCEMP
4. "Exhibit "D" – San Diego Bay Eelgrass Permanent Transects

Section IV. Bank Evaluation and Development

A. Bank Site Assessment by the MBRT

Representatives of the MBRT have inspected and evaluated the Bank Property, and have agreed upon the assignment of Credits set forth in the Plan (**Exhibit A**) and Ledger (**Exhibit B**).

B. Bank Sponsor's Responsibility for Bank Development

All five of the NEMS have already been Created and monitored for five (5) years by the

Navy. The Resource Agencies agree all five NEMS' have met the Success Criteria as set forth in the SCEMP (**Exhibit C**). The Plan and Ledger includes monitoring each NEMS using permanent transects to account for any natural changes or fluctuations in bed width or density (**Exhibit D**).

Section V. Bank Establishment Date

The Bank Establishment Date will occur and additional Transfer of Credits may begin when the BI has been fully executed by all of the Parties. Within 30 days of the Bank Establishment Date, the Bank Sponsor shall provide an electronic copy of the final, signed BI including all of its Exhibits, to each member of the MBRT.

Section VI. Financial Assurances

As a military entity, the Navy would be required to obtain Congressional Authority to acquire a performance bond or other financial security. Consequently, the MBRT has agreed to waive the generally applied financial assurance requirements.

Section VII. Credit Release

The USACE allowed 0.17 Credits to be Transferred from NEMS 1 in advance of the Bank Establishment Date. Each additional Credit Release must be approved in writing by the USACE. Credits shall be released for Transfer, as described below. The actual number of Credits released shall be determined by the USACE, in consultation with the other MBRT agencies. No additional Credit Transfer shall occur until the applicable Credit Release has occurred. Credits shall be released as follows:

1. For accounting purposes, the 0.17 Credits the USACE allowed to be Transferred from NEMS 1 in advance of the Bank Establishment Date.
2. 0.17 additional Credits from NEMS 1 upon the Bank Establishment Date.

Each subsequent Credit Release shall be requested in writing by the Navy and is contingent upon the Navy's submission of the annual report(s) in accordance with Section IX and USACE approval, following an MBRT site visit at the appropriate time of year, as determined warranted by the MBRT.

Section VIII: Operation of the Bank

A. Service Area

The Service Area of the Bank includes all of San Diego Bay, which is divided into four Eco-regions. Impacts to eelgrass occurring in the north or north-central part of San Diego Bay may be mitigated through the application of Credits available in those eco-regions, i.e., existing Credits available in NEMS 2 and 5 may be used to mitigate future impacts within these Eco-regions. Likewise NEMS 1, 4, and 6 may be applied to mitigate for impacts to eelgrass resources occurring in the South-Central and South Eco-regions.

B. Transfer of Credits

1. Except for the 0.17 Credits the USACE allowed to be Transferred in advance of the Bank Establishment Date, additional Transfer of Credits may begin only upon the Bank Establishment Date. Bank Sponsor shall have the exclusive right to determine

the price for any and all Bank Credits it offers for sale. The minimum Credit unit that may be Transferred is 0.01 Credit.

2. In no case shall the number of Credits Transferred or obligated exceed the total number of Credits which have been released for Transfer.

3. Use of Credits at the Bank to mitigate or compensate impacts to eelgrass habitat must be authorized by the USACE, in consultation with the other MBRT members, on a case-by-case basis.

4. Bank Sponsor shall notify all members of the MBRT upon any Credit Transfer in accordance with Section IX.B. of this BI.

5. If the Bank Property is damaged after the Bank Establishment Date, and such damage materially impairs the eelgrass habitat values on such damaged Bank Property; then the MBRT may, at its discretion, direct Bank Sponsor to suspend the Transfer of Credits and/or reduce the number of Credits allocated to the Bank in proportion to such damaged area unless and until the Bank Sponsor has reasonably restored such damaged area pursuant to a Remedial Action plan approved by the MBRT.

6. Credit modifications due to expansion, restoration or other means that have been approved in writing by the MBRT, shall be set forth in an amendment to this BI according to Section XII.C below.

C. Long-term Monitoring

Upon the Bank Establishment Date and extending until Bank closure, the Bank Sponsor shall implement long-term monitoring of the Bank Property according to the Plan (**Exhibit A)**. The Navy and the MBRT members shall meet and confer upon the request of any one of them, to consider revisions to the long-term monitoring provisions in the Plan which may be necessary or appropriate to better conserve the habitat and conservation values of the Bank Property. During the Long-term Monitoring Period, the Navy shall be responsible for submitting annual reports to each member of the MBRT in accordance with Section IX.A. of this BI.

D. Bank Closure Plan

Upon Bank closure, no further credit transfer shall take place and this BI shall lapse and become void, its purpose having become irrelevant. Consequently, the relationships and obligations established herein shall no longer exist. The NEMs shall be protected as other similarly situated aquatic sites under applicable laws. Currently this means that CNRSW will have responsibility for them as set out in the current San Diego Bay Integrated Natural Resource Management Plan and its successors, developed in accordance with the Sikes Act of 1960 (16 USC sections 670a-670o).

The Bank shall be deemed closed upon occurrence of either:

1. The last authorized Credit has been Transferred; or

2. The Navy requests bank closure by written notice to the MBRT and MBRT

provides written approval of the closure.

E. Remedial Action

Upon discovery by any Party of any injury or adverse impact to the Bank's eelgrass habitat, the Party discovering the failure, injury or impact shall notify the other Parties. The Resource Agencies may require the Bank Sponsor to develop and implement a Remedial Action plan to correct such condition, as described below. The annual report required under Section IX.A. shall identify and describe any Remedial Action proposed or performed and, if the Remedial Action has been completed, evaluate its effectiveness.

1. Within 60 days of the date of written notice from the Resource Agencies, the Bank Sponsor shall develop a Remedial Action plan and submit it to the Resource Agencies for approval. The Remedial Action plan must identify and describe proposed actions to ameliorate injury or damage to the Bank Property and set forth a schedule within which the Bank Sponsor will implement those actions. The Bank Sponsor shall, at Bank Sponsor's cost, implement the necessary and appropriate Remedial Action in accordance with the Remedial Action plan approved by the Resource Agencies. In the event the Bank Sponsor fails to submit a Remedial Action plan to the Resource Agencies in accordance with this section, the Resource Agencies will notify the Bank Sponsor that the Bank Sponsor is in default and may identify Remedial Action the Resource Agencies deem necessary. If (a) the Bank Sponsor fails to develop a Remedial Action plan or to implement Remedial Action identified by the Resource Agencies, in accordance with this section, or (b) conditions have not improved or continue to deteriorate two years after the date that the Resource Agencies approved a Remedial Action plan or notified Bank Sponsor of Remedial Actions the Resource Agencies deemed necessary, Bank Sponsor shall immediately cease Transfer of Credits. The Resource Agencies will determine what Remedial Action is necessary to correct the Credit deficit, and Bank Sponsor shall implement such Remedial Action, in accordance with this Section.

2. If the MBRT determines that the Bank is operating at a Credit deficit (i.e., that Credit Transfers made exceeds the Credits authorized for release, as adjusted in accordance with this BI), then the MBRT shall notify the Bank Sponsor. Upon the MBRT giving notice, Bank Sponsor shall immediately cease Transfer of Credits. The MBRT will determine what Remedial Action is necessary to correct the Credit deficit, and Bank Sponsor shall implement such Remedial Action, in accordance with Section VIII.E.1.

Section IX: Reporting

A. Annual Report

The Navy shall submit an annual report to each member of the MBRT, in hard copy and in editable electronic format, within 45 days of completion of each field survey. The Navy shall be responsible for the reporting tasks described below until Bank closure. The annual report shall address the following:

1. An itemized account of the monitoring conducted during each field survey,

including the following:

i. Site background;

ii. Survey area;

iii. Survey methodology;

iv. Description of prior surveys;

v. Description of current survey results; and

vi. Date of field survey.

2. Any Remedial Action proposed or performed. If Remedial Action has been completed, the annual report shall also evaluate the effectiveness of that action.

3. An updated Ledger of all Transfer of Credits since execution of this BI and an accounting of remaining Credits.

B. Credit Transfer Reporting

Upon the Transfer of each and every Credit, the Navy will submit to each member of the MBRT:

1. A copy of the transfer agreement or instrument; and

2. An updated Ledger.

Section X: Responsibilities of the Bank Sponsor

A. Bank Sponsor hereby agrees and covenants that:

1. It shall not discharge or release to or from the Bank Property, or permit others to discharge or release to or from the Bank Property, any material, waste or substance designated as hazardous or toxic or as a pollutant or contaminant under any federal, state, or local environmental law or regulation (each a "Hazardous Substance");

2. It shall not grant additional easements, rights of way, or any other property interest in the Bank Property without the prior written consent of the USACE, in consultation with other members of the MBRT;

3. It shall not construct or install any structure or improvement on, or engage in any activity or use of, the Bank Property, including mineral exploration or development, excavation, draining, dredging, or other alteration of the Bank Property, that is not consistent with and in accordance with this BI and its Exhibits without the prior written consent of the MBRT;

4. It shall ensure that the Bank Property is monitored in accordance with this BI and its Exhibits;

5. It shall allow, or otherwise provide for, access to the Bank Property by the MBRT, as necessary, for the purpose of inspection and compliance monitoring consistent

with the terms and conditions of this BI.

B. Reasonably foreseeable technical problems, or unanticipated or increased costs or expenses associated with the implementation of actions called for by this BI in and of themselves shall not serve as the basis for modifications of this BI or extensions for the performance of the requirements of this BI.

C. An extension of one compliance date based on or related to a single incident shall not extend any subsequent compliance dates. The Bank Sponsor must show cause for any or every delayed step or requirement for which an extension is sought.

Section XI: Responsibilities of the Resource Agencies

A. Resource Agency Oversight

The Resource Agencies agree to provide appropriate oversight in carrying out provisions of this BI.

B. Resource Agency Review

The Resource Agencies will make a good faith effort to provide comments on the annual reports and Remedial Action plans within 60 days from the date of complete submittal. If the Resource Agencies are unable to review Remedial Action plans within the time specified, this fact will be reflected in any schedule established for performance of Remedial Action and any evaluation of timely performance of Remedial Action by Bank Sponsor.

C. Compliance Inspections

The Resource Agencies shall conduct compliance inspections as necessary:

1. To verify the Credits then currently available in the Bank; and/or
2. Recommend Remedial Action as needed; or
3. For any other purpose determined by the Resource Agencies as necessary to assess compliance with this BI.

Section XII: Other Provisions

A. Force Majeure

1. The Bank Sponsor shall be responsible to monitor the Bank Property and perform Remedial Action except for damage or non-compliance caused by Catastrophic Events, events of Force Majeure or Unlawful Acts. In order for such exception to apply, the Bank Sponsor shall bear the burden of demonstrating all of the following:
    a. That the damage or non-compliance was caused by circumstances beyond the control of the Bank Sponsor and/or any person or entity under the direction or control of the Bank Sponsor, including its employees, agents, contractors and consultants;

b. That neither the Bank Sponsor nor any person or entity under the direction of or controlled by the Bank Sponsor, including its employees, agents, contractors and consultants, could have reasonably foreseen and prevented such damage or noncompliance; and

c. The period of damage or noncompliance was a direct result of such circumstances.

2. In case of occurrence of a Catastrophic Event, event of Force Majeure, or Unlawful Act, Bank Sponsor and the MBRT shall meet to discuss the course of action in response to such occurrence. In the meantime, Bank Sponsor shall continue to monitor the Bank to the full extent practicable.

B. Dispute Resolution

Resolution of disputes about application of this BI shall be in accordance with those stated in the Federal Guidance for the Establishment, Use and Operation of Mitigation Banks (60 F.R. 58605 et seq., November 28, 1995).

C. Amendment and Modification

This BI may be amended or modified only with the written approval of the Parties. All amendments and modifications shall be fully set forth in a separate document signed by all of the Parties that shall be appended to this BI.

D. Termination

1. The Bank Sponsor may withdraw the entire Bank Property and terminate this BI at any time prior to any Credit Transfers.

2. In the event this BI is terminated or the Bank is closed prior to the Transfer of all authorized Credits, any remaining Credits shall be extinguished and will no longer be available for Transfer.

3. NOAA may terminate its participation upon 30 days' written notice to all other Parties.

4. The USACE may terminate its participation in this BI upon 30 days' notice to the other Parties, on the condition that each of the following has occurred:

   a. Bank Sponsor has breached one or more covenants, terms or conditions set forth herein;

   b. Bank Sponsor has received notice of such breach in accordance with Section XII.I.; and

   c. Bank Sponsor has failed to cure such breach within 30 days after such notice; provided that in the event such breach is curable in the judgment of the USACE, but cannot reasonably be cured within such 30 day period, the USACE shall not terminate this BI so long as Bank Sponsor has commenced the cure of such breach and is diligently pursuing such cure to completion.

E. Controlling Language

The Parties intend the provisions of this BI and each of the documents incorporated by reference in it to be consistent with each other, and for each document to be binding in accordance with its terms. To the fullest extent possible, these documents shall be interpreted in a manner that avoids or limits any conflict between or among them. However, if and to the extent that specific language in this BI conflicts with specific language in any document that is incorporated into this BI by reference, the specific language within the BI shall be controlling. The captions and headings of this BI are for convenient reference only, and shall not define or limit any of its terms or provisions.

F. Entire Agreement

This BI, and all exhibits, appendices, schedules and agreements referred to in this BI, constitute the final, complete and exclusive statement of the terms of the agreement between and among the Resource Agencies and the Bank Sponsor pertaining to the Bank, and supersede all prior and contemporaneous discussions, negotiations, understandings or agreements of the Parties. No other agreement, statement, or promise made by the Parties, or to any employee, officer, or agent of the Parties, which is not contained in this BI, shall be binding or valid. No alteration or variation of this instrument shall be valid or binding unless contained in a written amendment in accordance with Section XII.C. Each of the Parties acknowledges that no representation, inducement, promise or agreement, oral or otherwise, has been made by any of the other Parties or anyone acting on behalf of any of the Parties unless the same has been embodied herein.

G. Reasonableness and Good Faith

Except as specifically limited elsewhere in this BI, whenever this BI requires Bank Sponsor or the Resource Agencies to give its consent or approval to any action on the part of the other, such consent or approval shall not be unreasonably withheld or delayed. If the Bank Sponsor or the Resource Agencies disagree with any determination covered by this provision and reasonably requests the reasons for that determination, the determining Party shall furnish its reasons in writing and in reasonable detail within 30 days following the request.

H. Partial Invalidity

If a court of competent jurisdiction holds any term or provision of this BI to be invalid or unenforceable, in whole or in part, for any reason, the validity and enforceability of the remaining terms and provisions, or portions of them, shall not be affected unless an essential purpose of this BI would be defeated by loss of the invalid or unenforceable provision.

I. Notices

1. Any notice, demand, approval, request, or other communication permitted or required by this BI shall be in writing and deemed received when delivered personally, sent by receipt-confirmed facsimile, or sent by recognized overnight delivery service, addressed as set forth below, or ten (10) business days after deposit in the U.S. mail, postage prepaid, and addressed as set forth below or to such other address as any of the Parties may from time to time specify in

writing by notice given pursuant to this section.

2. Notice by any Party to any other Party shall be given to all Parties. Such notice shall not be effective until it is deemed to have been received by all Parties.

3. Addresses for purposes of giving notice are set forth below. Any Party may change its notice address by giving notice of change of address to the other Parties in the manner specified in this Section XII.I.

Bank Sponsor:

Commander
Navy Region Southwest
c/o Naval Facilities Engineering Command Southwest
Coastal IPT
2585 Callagan Highway, Bldg. 99
San Diego, California 92147-5110
Telephone: (619) 556-7594

Resource Agencies:

U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Blvd.
Los Angeles, California 90017
Attn: Chief, Regulatory Division
Telephone: (213) 452-3406

NOAA Fisheries
Southwest Region
501 West Ocean Blvd., Suite 4200
Long Beach, California 90802-4213
Attn: Regional Administrator
Telephone: (562) 980-4043

J. Counterparts

This BI may be executed in multiple counterparts, each of which shall be deemed an original and all of which together shall constitute a single executed agreement.

K. No Third Party Beneficiaries

This BI shall not create any third party beneficiary hereto, nor shall it authorize anyone not a party hereto to maintain an action, suit or other proceeding, including without limitation, for

personal injuries, property damages or enforcement pursuant to the provisions of this BI. The duties, obligations and responsibilities of the Parties to this BI with respect to third parties shall remain as otherwise provided by law in the event this BI had never been executed.

L. Availability of Funds

Implementation of this BI by the Parties is subject to the requirements of the Anti-Deficiency Act, 31 U.S.C. § 1341, and the availability of appropriated funds. Nothing in this BI may be construed to require the obligation, appropriation, or expenditure of any money from the U.S. Treasury. No Party is required under this BI to expend any appropriated funds unless and until an authorized official affirmatively acts to commit to such expenditures as evidenced in writing.

M. No Partnerships

This BI shall not make or be deemed to make any Party to this BI an agent for or the partner or joint venturer of any other Party.

N. Governing Law

This BI shall be governed by and construed in accordance with the Clean Water Act, 33 U.S.C. § 1251 *et seq*., and other applicable laws and regulations.

Section XIII: Execution

This BI shall be deemed executed on the date of the last signature by the Parties.

[Remainder Left Intentionally Blank]

IN WITNESS WHEREOF, the Parties execute this agreement as follows:

U.S. NAVY, SOUTHWEST REGION

By: _____ Date: _____

_____
Commander

U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

By: _____ Date: _____

David J. Castanon
Chief, Regulatory Division

NOAA FISHERIES

By: Rodney R McInnis Date: 6-30-08

Rodney R. McInnis
Regional Administrator

IN WITNESS WHEREOF, the Parties execute this agreement as follows:

U.S. NAVY, SOUTHWEST REGION

By: _____ Date: _____

_____
Commander

U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

By: David J. Castanon Date: 6-26-08
David J. Castanon
Chief, Regulatory Division

NOAA FISHERIES

By: _____ Date: _____
Rodney R. McInnis
Regional Administrator

IN WITNESS WHEREOF, the Parties execute this agreement as follows:

U.S. NAVY, SOUTHWEST REGION

By: _____ Date: 2 Jul 08

L. R. Hering Rear Admiral, U.S. Navy
Commander, Navy Region Southwest

U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

By: _____ Date: _____

David J. Castanon
Chief, Regulatory Division

NOAA FISHERIES

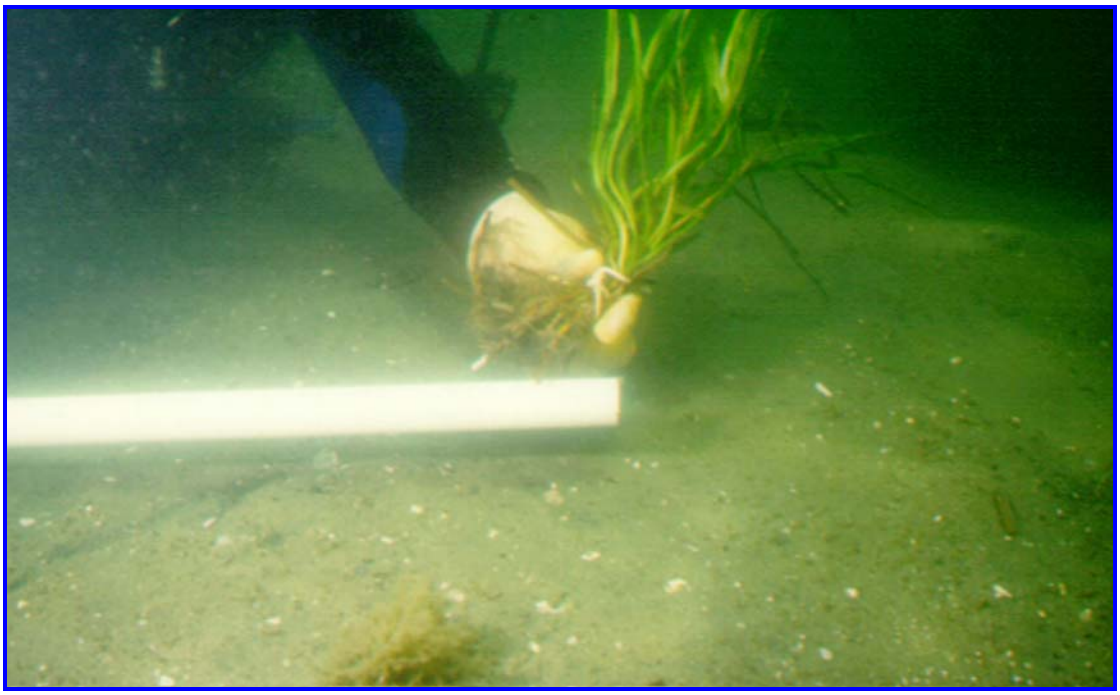
By: _____ Date: _____

Rodney R. McInnis
Regional Administrator

Exhibit A

Navy Region Southwest

EELGRASS MITIGATION BANK MANAGEMENT PLAN FOR SAN DIEGO BAY



DRAFT FINAL
February 2008

TABLE OF FIGURES

NAVY REGION SOUTHWEST
SAN DIEGO BAY EELGRASS MITIGATION BANK
MANAGEMENT PLAN

1.0 INRODUCTION

1.1 PURPOSE

The purpose of the Management Plan (Plan) is to describe the establishment, management, administration and accounting for the Commander, Navy Region Southwest (CNRSW) Eelgrass Mitigation Bank (Bank) in San Diego Bay, California. The Plan is outlined in the following sections, which incorporate the recommended elements found within the Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks (60 Fed. Reg. 58605 *et seq*. (November 28, 1995)).

1.2 BANK GOALS AND OBJECTIVES

The principal goal of the Bank is to replace essential aquatic functions of eelgrass habitat (*Zostera marina*), a special aquatic site defined at 40 CFR § 230.43, within San Diego Bay, which are anticipated to be lost through authorized activities within the Bank's geographic service area.

Specific objectives of the Bank include:

A. The establishment of an economically efficient means of mitigating Navy eelgrass impacts as required under section 404 of the Clean Water Act and/or section 10 of the River and Harbor Act.

B. The consolidation of resources to increase the potential for the establishment and long-term management of successful mitigation that maximizes the functions and values eelgrass habitat provides within San Diego Bay.

1.3 DEFINITION OF TERMS

Several specific terms, as used in this Plan and the BI, are defined below. Definitions in the BI also are applicable in this Plan:

- **Control Site** - Sites located within each San Diego Bay Eco-region that serve as indicators against which habitat changes at the Bank are evaluated. These surveys are conducted

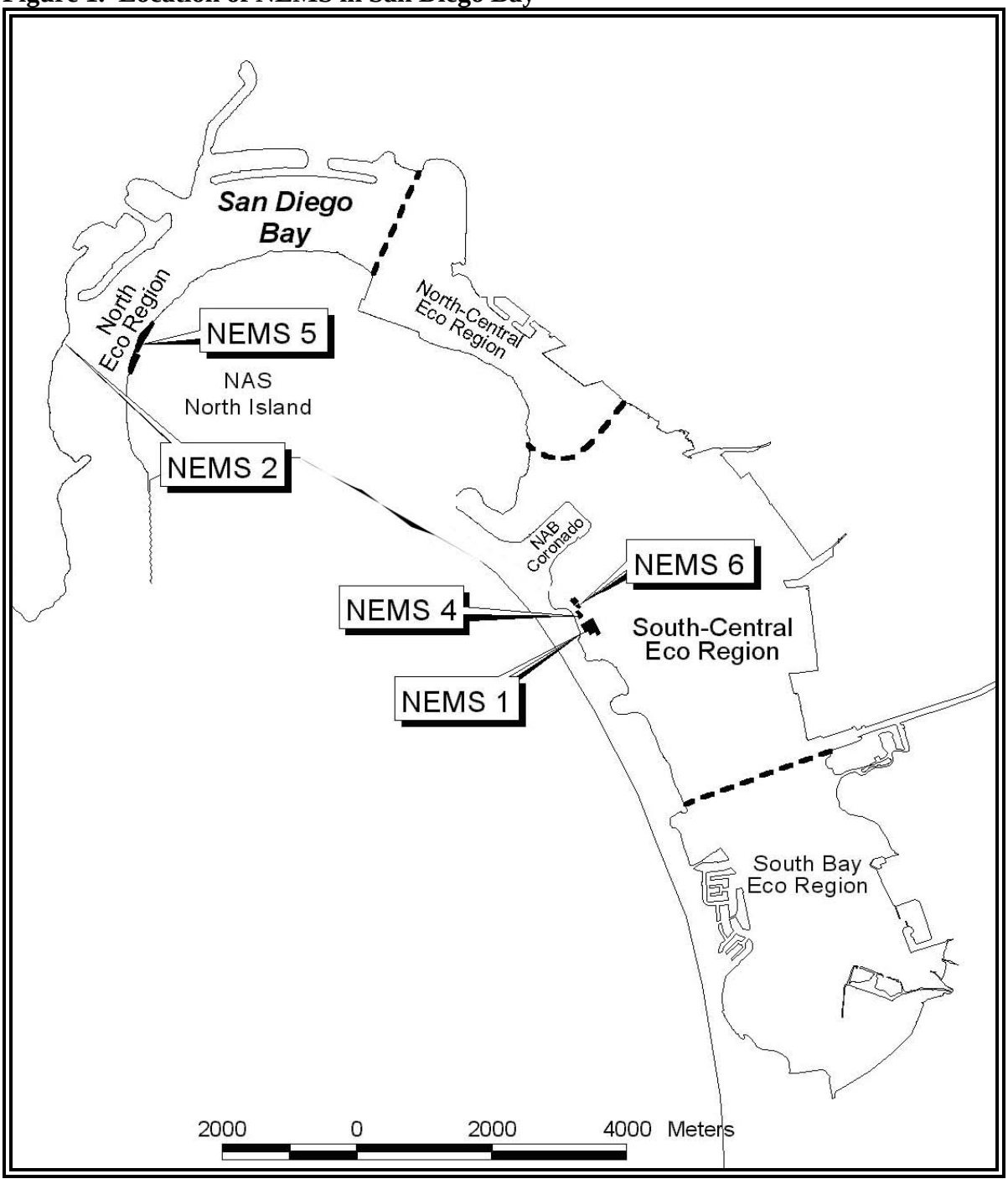
annually and reported in the San Diego Bay Eelgrass Permanent Transect Report. The Control Sites are identified in **Exhibit D** of the Banking Instrument.

- **Mitigation Bank Review Team (MBRT) –** The MBRT is a multi-agency team providing technical expertise in and support for the implementation of this Plan. The team includes U.S. Army Corps of Engineers (ACOE), U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the California Department of Fish and Game (CDFG).
- **Navy Eelgrass Mitigation Sites (NEMS)** – Eelgrass mitigation sites constructed by the Navy, which comprise the assets in the Bank.
- **San Diego Bay Eco-regions** – Four segments of San Diego Bay, which exhibit unique environmental characteristics useful in characterizing ecological communities and are defined as distinct regions within the bay. These regions are termed the North, North-Central, South-Central, and South Eco-regions.
- **Southern California Eelgrass Mitigation Policy, Rev 11 (SCEMP)** – The SCEMP (Exhibit C) is a mutually agreed upon policy between the primary resource agencies tasked with protection of eelgrass and include the NMFS, USFWS, CDFG and ACOE. The SCEMP standardizes transplant, survey, and monitoring methodologies for eelgrass, establishes mitigation ratios, and allows for banking of eelgrass Credits. The SCEMP is identified as **Exhibit C** of the Banking Instrument.

1.4 BANK DESCRIPTION AND LOCATIONS

The Bank consists of five sites located in the North and South – Central Eco-regions of San Diego Bay (Figure 1). Each of the sites is referred to as Navy Eelgrass Mitigation Sites (NEMS) 1-6. The sites consist of excess eelgrass habitat created at specific mitigation site(s) associated with a Navy project. More detailed descriptions of the sites are provided in the Ledger (**Exhibit B** of the Banking Instrument).

Figure 1. Location of NEMS in San Diego Bay



1.5 OWNERSHIP AND ADMINISTRATION OF THE BANK

The NEMS comprising the Bank are owned or controlled by the CNRSW.

The day-to-day operation of the Bank is the responsibility of Naval Facilities Engineering Command Southwest (NAVFACSW), on behalf of the CNRSW. NAVFACSW will be responsible for maintaining the Ledger, serving as monitoring and reporting coordinator, evaluating and providing input for use of Credits, managing funding for ongoing monitoring efforts, and executing monitoring and reporting contracts. CNRSW will evaluate and prioritize requests to utilize Bank Credits, and provide guidance on the application for Credit Release and Transfer.

The Bank will be used for compensatory mitigation for impacts to eelgrass associated with military construction projects, operations and training in San Diego Bay.

Funding to administer and maintain the Bank shall be generated from fees assessed to project proponents requesting use of Credits. Such fees will be based on the size of the area required for mitigation and associated monitoring costs, using the government cost estimate for the NAVFACSW Eelgrass Indefinite Quantity contract.

1.6 BASELINE CONDITION OF THE BANK

The NEMS contributing to this Bank have already been constructed as documented in the Ledger. The Navy has completed the five-year monitoring period and all five sites have met the Success Criteria. NEMS 1, 2, 4, and 6 involved filling deeper mud-bottom bay areas to gain suitable elevations to support eelgrass habitat. At NEMS 5, uplands were excavated to create suitable elevations to support eelgrass habitat. NEMS 2 and 5 occur in the North and North-Central Eco-regions of the bay. These Eco-regions are typified by clearer water, a higher degree of tidal flushing, and species more representative of the open ocean. Eelgrass in this area can grow to a depth of 22 feet mean lower low water (MLLW) and turions can exceed 2 meters in length. NEMS 1, 4 and 6 occur in the South Eco-region of the bay, which consists of warmer water with significantly less clarity than the North Bay. Eelgrass in this Eco-region will typically not grow below 6 feet MLLW and turion length is approximately 1 meter.

2.0 OPERATION OF THE BANK

2.1 GEOGRAPHIC SERVICE AREA

The Geographic Service Area of the Bank includes all of San Diego Bay, which is divided into four Eco-regions (Figure 1). Impacts to eelgrass occurring in the north or north-central part of the Bay may be mitigated through the application of Credits in those Eco-regions, i.e., existing CCredits available in NEMS 2 and 5 may be used to mitigate future impacts within these Eco-

regions. Likewise NEMS 1, 4, and 6 may be applied to mitigate for impacts to eelgrass resources occurring in the South-Central and South Eco-regions.

2.2 METHOD FOR DETERMINING CREDITS

The total number of Credits in the Bank is 4.38 ha. This amount was derived by first calculating the mean of eelgrass coverage mapped during the four most recent monitoring surveys (2003-2007). Survey data used in calculating the mean is provided in the Ledger. The 4-point mean for each NEMS is as follows:

(a) NEMS 1 – 4.02 ha

(b) NEMS 2 – 0.14 ha

(c) NEMS 4 - 0.43 ha

(d) NEMS 5 – 4.40 ha

(e) NEMS 6 - 0.81 ha

This 4-point mean provides a more realistic representation of the long-term viability of an eelgrass site than a single monitoring survey. Next, the Navy's mitigation requirements were subtracted from the 4-point mean. A summary of the mitigation requirements is provided in the Ledger. This resulted in the following Credits at each NEMS:

(a) NEMS 1 – 2.15 ha

(b) NEMS 2 – 0.03 ha

(c) NEMS 4 - 0.04 ha

(d) NEMS 5 – 1.41 ha

(e) NEMS 6 - 0.75 ha

2.3 CREDIT RELEASE

Prior to the bank establishment date, the ACOE allowed 0.17 Credits to be Transferred from NEMS 1 in advance of executing the Banking Instrument. From this point forward, each additional Credit Release must be approved in writing by the ACOE. The actual number of Credits released shall be determined by the ACOE, in consultation with the other MBRT agencies. No additional Credit Transfer shall occur until the applicable Credit Release has occurred. Credits shall be released for Transfer, as described below.

1. For accounting purposes, 0.17 Credits the ACOE allowed to be Transferred from NEMS 1 in advance of executing the Banking Instrument; and

2. 0.17 additional Credits from NEMS 1 upon execution of the Banking Instrument.

Each subsequent Credit Release shall be requested in writing by CNRSW and is contingent upon CNRSW's submission of the annual report(s) described in Section 2.8 and ACOE approval following an MBRT site visit at the appropriate time of year, as determined warranted by the MBRT.

2.4 TRANSFER OF CREDITS

Except for the 0.17 Credits the ACOE allowed to be Transferred in advance of executing the Banking Instrument, additional Transfer of Credits may begin only upon execution of the Banking Instrument. All Credits in the Bank are owned by the CNRSW and CNRSW shall have the exclusive right to determine the price for any and all Bank Credits it offers for sale. The minimum Credit unit that may be Transferred is 0.01 Credit.

In no case shall the number of Credits Transferred or obligated exceed the total number of Credits that have been released for Transfer.

Use of Credits at the Bank to mitigate or compensate impacts to eelgrass must be authorized by the ACOE, in consultation with the other MBRT members, on a case-by-case basis.

First priority for use Credits will be for support of military construction, maintenance and operational training exercises controlled by CNRSW. All other DoD requests for Credits will be at the discretion of CNRSW. Requests for Credits shall be submitted in writing to the CNRSW (Environmental Program Manager N45). Upon approval, NAVFACSW will finalize the location of the area to meet the mitigation requirement and assess a monitoring fee to the requester.

CNRSW will notify all members of the MBRT upon any Credit Transfer in accordance with the reporting requirements of the Banking Instrument.

If the NEMS' are damaged after execution of the Banking Instrument, and such damage materially impairs the eelgrass habitat values on such damaged site(s); then the MBRT may, at its discretion, direct the Navy to suspend the Transfer of Credits and/or reduce the number of Credits allocated to the Bank in proportion to such damaged area unless and until CNRSW has reasonably restored such damaged area pursuant to a remedial action plan approved by the MBRT.

2.5 ACCOUNTING PROCEDURES

Upon the Transfer of each and every Credit, CNRSW will submit to each member of the MBRT:

1. A copy of the transfer agreement or instrument; and
2. An updated Ledger.

2.6 LONG-TERM MONITORING

Prior to Bank closure, CNRSW will monitor the entire Bank on an annual basis. Monitoring will be conducted during the active vegetative growth period and will avoid the winter months of November through February. Monitoring activities will determine the area of eelgrass and density of plants at each NEMS. The Navy shall be responsible for reporting to the MBRT in accordance with Section 2.8 below and the Banking Instrument.

2.7 BANK CLOSURE PLAN

Upon Bank closure, no further Credit Transfer shall take place and the NEMs shall be protected as other similarly situated aquatic sites under applicable laws. Currently this means that CNRSW will have responsibility for them as set out in the current San Diego Bay Integrated Natural Resource Management Plan and its successors, developed in accordance with the Sikes Act of 1960 (16 USC sections 670a-670o).

Credit

The Bank shall be deemed closed upon occurrence of either:

1. The last authorized Credit has been Transferred; or
2. The Navy requests bank closure by written notice to the MBRT and MBRT provides written approval of the closure.

2.8 REPORTING

CNRSW will submit an annual report to each member of the MBRT, in hard copy and in editable electronic format, within 45 days of completion of each field survey. The CNRSW shall be responsible for the reporting tasks described below until Bank closure. The annual report shall address the following:

1. An itemized account of the monitoring conducted during each field survey, including the following:

   i. Site background;

   ii. Survey area;

   iii. Survey methodology;

   iv. Description of prior surveys;

   v. Description of current survey results; and

   vi. Date of field survey.

   2. Any remedial action proposed or performed.

3. An updated Ledger of all Transfer of Credits since execution of the Banking Instrument and an accounting of remainingCredits.

3.0 NOTICES

All formal notices or other communications between the Navy and members of the MBRT shall be in writing and shall be personally delivered or sent by regular mail. Addresses for purposes of giving notice are set forth below:

To the Commander, Navy Region Southwest:

Commander, Navy Region Southwest
937 N. Harbor Drive, Building 1
San Diego, CA 92147-5110

Copies to:

Mr. Mitchell Perdue
NAVFACSW
Coastal IPT.
Code ROPME.MP
2730 McKean St., Bldg 291
San Diego, CA 92136-5198

Mr. JT Hesse
Marine Biologist
Code N40
Commander, Navy Region Southwest
937 N. Harbor Drive, Building 1
San Diego, CA 92147-5110

To the Army Corps of Engineers:

Team Leader
U.S. Army Corps of Engineers
16885 W. Bernardo Dr., Suite 300A
San Diego, CA 92127

To the National Marine Fisheries Service:

Regional Administrator
National Marine Fisheries Service
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802-4213

Bryant Chesney
National Marine Fisheries Service
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802-4213

To the U.S. Fish and Wildlife Service:

Field Supervisor
U.S. Fish and Wildlife Service
Southern California Field Station
6010 Hidden Valley Road
Carlsbad, CA 92009

To the California Department of Fish & Game:

Regional Manager
California Department of Fish & Game
4949 Viewridge Drive
San Diego, CA 92123

Exhibit B

Eelgrass Mitigation Bank Ledger and Asset Report
2007 Eelgrass Surveys
NEMS 1, 2, 4, 5 & 6
San Diego Bay, California

Prepared for

U.S. Navy, Natural Resources Branch

Southwest Division Naval Facilities Engineering Command
Mitchell Perdue
Coastal IPT
2730 McKean St., Bldg 291
San Diego, California 92136-5198

Attn: Mitchell Perdue

Prepared by

Merkel & Associates, Inc.
5434 Ruffin Road
San Diego, California 92123
Ph: (858) 560-5465
Fx: (858) 560-7779

Work performed under

NAVFACSW NAVFACENGCOM
Contract # N68711-97-D-8814
Delivery Order No. 0011

November 30, 2007

Certification

The information contained in this report is believed to be a true and accurate reflection of the conditions present at the project site at the time of the monitoring survey.

Keith W. Merkel
Principal Consultant

Robert C. Mooney
Project Manager

Antonette T. Gutierrez
Project Biologist

Preferred Citation: U.S. Navy, 2007. Eelgrass Mitigation Bank Ledger and Asset Report 2007 Eelgrass Surveys NEMS 1, 4, 5 & 6 San Diego Bay, California. Merkel & Associates, Inc. for U.S. Navy NAVFACSW NAVFACENGCOM Contract No. N68711-97-D-8814, D.O. 0011.

TABLE OF CONTENTS

TABLES

FIGURES

Eelgrass Mitigation Bank Ledger and Asset Report
2007 Eelgrass Surveys
NEMS 1, 4, 5 & 6
San Diego Bay, California

November 30, 2007

INTRODUCTION AND PURPOSE

Merkel & Associates Inc. (M&A) has been retained by the U.S. Navy (Navy) under Contract/Purchase Order No. N68711-97-D-8814, (IDIQ), Delivery Order No. 0011 to annually map and assess the status of eelgrass resources at Navy Eelgrass Mitigation Sites (NEMS) 1, 2, 4, 5, and 6 (Figure 1). NEMS 1, 4, and 6 are located near Delta Beach, south of the Coronado Naval Amphibious Base (NAB), Coronado, California. NEMS 5 is located on the west side of NAS North Island, Coronado, and NEMS 2 is located next to the marine mammal pens at the Space Surveillance and Warfare Command (SPAWAR) on Point Loma. The sites serve as both eelgrass mitigation for various projects and form an eelgrass mitigation bank for the Navy.

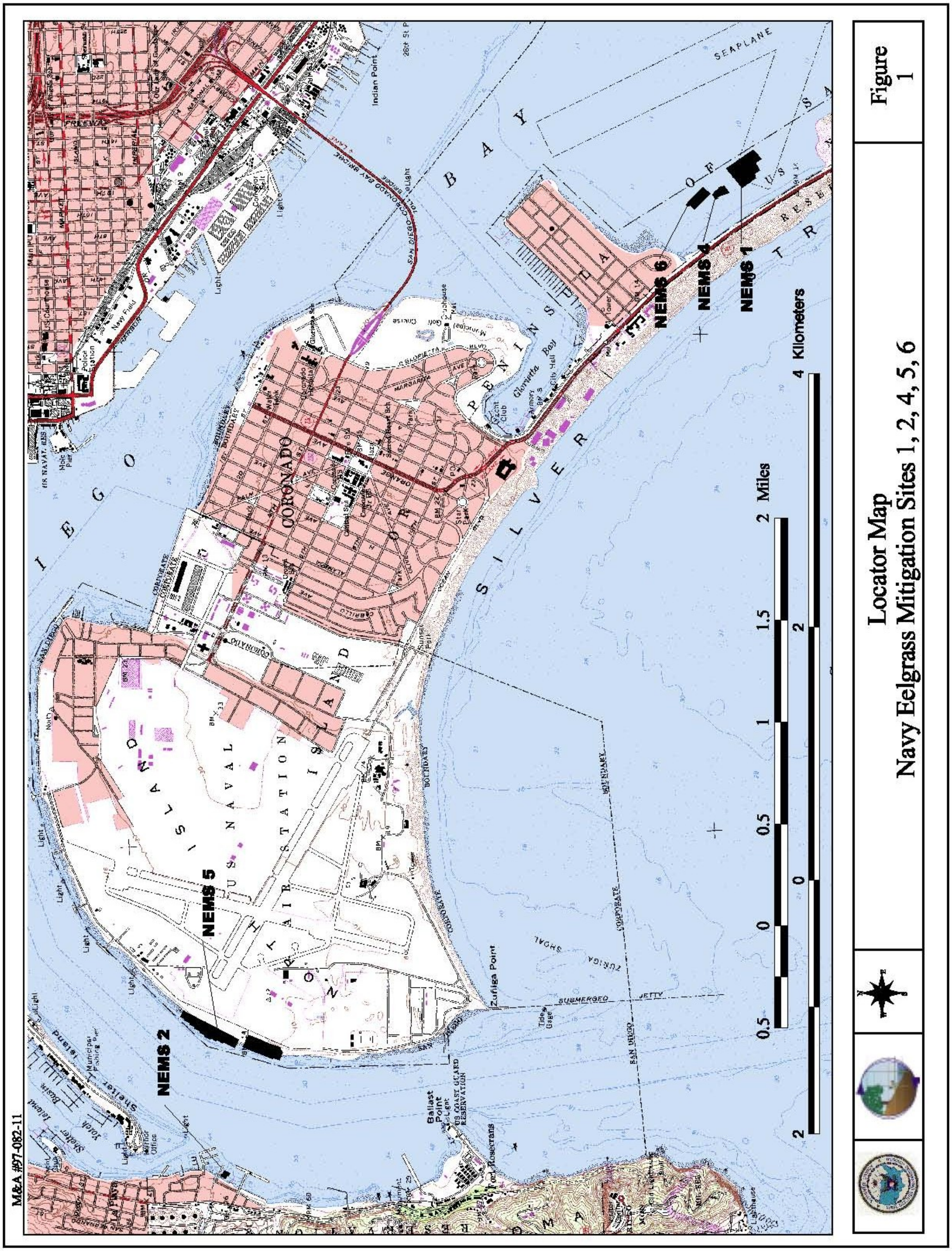
NEMS 1, 2, 4, and 5 completed a 5-year mitigation monitoring period in 2005 and met success milestones required by the Southern California Eelgrass Mitigation Policy (Revision 11) (SCEMP) (Exhibit C). Additional surveys performed at NEMS 1,2, 4, and 5 in 2006 and 2007 show the continued mitigation success. NEMS 6 has undergone 8 years of monitoring surveys, because the placement of additional fill and eelgrass at the site in 2002 resulted in extended mitigation monitoring. The 5-year mitigation monitoring for the NEMS 6 site was completed in September 2007. Success milestones for NEMS 6 have also met SCEMP requirements.

The purpose of this report is to transmit information regarding the survey methods and results for the mitigation monitoring programs at each NEMS site. Additionally, this report provides a summary of Navy Eelgrass Mitigation Bank (Bank) credits and debits to date. The intent of the Bank is to establish the management, administration and accounting for the Commander, Navy Region Southwest (CNRSW) eelgrass mitigation bank in San Diego Bay, California.

NAVY EELGRASS MITIGATION BANKING

The principal goal of the mitigation bank is to establish functional eelgrass habitat qualifying as special aquatic sites, as defined at 40 CFR 230.40-45, within San Diego Bay. The Bank will be used for mitigation, as appropriate, for impacts associated with military construction and maintenance projects and operational training exercises, and to establish credits from surplus habitats for future use. The NEMS Summary Ledger (Table 1) illustrates the history of each NEMS site including deposits and withdrawals of eelgrass and their associated projects. The ledger serves to track the total amount of eelgrass available for banking and will be amended with each monitoring survey.

The calculation of eelgrass available for banking at each NEMS site is based on a mean of eelgrass coverage mapped during the four most recent monitoring surveys. This 4-point mean provides a more realistic estimate of the long-term success of an eelgrass site than a single monitoring survey. The use of the 4-point mean provides that the amount of eelgrass withdrawn from a banking site is not based on either an exceptionally successful or unsuccessful year at that eelgrass bed. Subtracted



Locator Map
Navy Eelgrass Mitigation Sites 1, 2, 4, 5, 6

Figure 1

Table 1. NEMS Banking Summary Ledger

NAVY EELGRASS MITIGATION SITE (NEMS) SUMMARY LEDGER 2007

						EELGRASS (HA.)					
NEMS	Project	ACOE Permit	CCD	Planting Date	Monit. End	Impact	(1.2:1) Mit. Req.	Planted	4 Pt Mean	Withdrawals	Banked
1	P-141/154 Sealift Support Facility	86-013	CD-48-92	Jan-87	Feb-96	1.42	1.70	2.54	4.02		2.15
	LFTC	88-212-LS				0.02	0.03	0.00		0.03	
	Boston Whaler Pier										
	MWR Marina	88-R004				0.05	0.06	0.00		0.06	
	Pier Bravo					0.07	0.08	0.00		0.08	
	CISM	92-010-DZ	CD-84-91			0.00	0.00	0.00		0.00	
	ELCAS 95	95-20066-DZ	CD-5-95			0.00	0.00	0.00		0.00	
2	P-122 Marine Mammal Facility	94-017-DZ		Jul-93	Jul-98	0.09	0.11	0.20	0.14		0.03
4	P-187 COLDS Pier	92-436-DZ	CD-48-92	Jan-94	Apr-00	0.21	0.39	0.45	0.43		0.04
5	P-549/700 CVN	94-2061-DZ	CD-95-95		Sep-03	2.49	2.99	4.82	4.40		1.41
6	P-211 SOF-PC Pier	95-20073-DZ	CD-100-95	Mar-99	Aug-07	0.05	0.06	0.30	0.81		0.75
				Sep-01							
						4.39	**5.42**	**8.31**	**9.80**	**0.17**	**4.38**
						Total Banked at All Sites=			**4.38**		

from the 4-point mean is the mitigation requirement resulting from project impacts as well as any other withdrawals assigned to a banking site from other Navy projects. The resulting "Banked" number for each NEMS site is then the total amount of eelgrass remaining at a site. All the NEMS sites have completed the 5-year mitigation monitoring requirement and those sites that have met the mitigation requirement are available for banking.

SURVEY METHODOLOGY

Eelgrass surveys of NEMS sites 1, 4, 5, and 6 were completed in August 2005 by M&A biologists aboard the 22-foot R/V Merkel Johnson-150 vessel. The NEMS 2 site was surveyed in 1999 also by M&A biologists. M&A conducted monitoring surveys in 2006 for NEMS 1, 4, 5, and 6. M&A biologists performed current monitoring surveys in September 2007 for all 5 mitigation sites. Data were collected using a side-scan sonar operating at 600 kHz scanning out 20 meters on both the starboard and port channels for a 40-meter wide swath. All data were collected in latitude and longitude using the North American Datum of 1983 (NAD 83), converted to the Universal Transverse Mercator system in meters (NAD 83), and plotted on geo-rectified aerial images of the project sites. The surveys were conducted by running parallel transects that were spaced to allow overlap between adjoining side-scan swaths. Transects were performed until the entirety of the surveyed areas were captured in the survey records. Following completion of the surveys, side-scan sonar traces were joined together and geographically registered. Eelgrass was then digitized as a theme over the aerial images of each study area to calculate the eelgrass coverage and show its distribution.

NEMS 1

SITE BACKGROUND

The approximately 4-hectare (9.9-acre) NEMS 1 site (Figure 1) was created in early 1987 to mitigate construction activities associated with MILCON P-141/154 Sealift Support Facility at NAB Coronado in which 1.42 hectares (3.5 acres) of eelgrass was impacted, requiring the creation of 1.70 hectares (4.2 acres) of transplanted eelgrass as mitigation. As required by the project U.S. Army Corps of Engineers (ACOE) Permit 86-013, special condition #V. A., the Navy is responsible for eelgrass mitigation and monitoring as stipulated by the SCEMP (Exhibit C). Specifically, Special Condition V. A. states:

> *You are hereby authorized to:*
> *...e)discharge 172,000 cubic yards of dredged material from Naval Station San Diego Channel Dredge Project P-283 (Corps' Permit No. 85-006) to create a 10 acre[sic] eelgrass transplant site.*

The site was created by filling an area offshore of Delta Beach, using dredge material from a project at Naval Station San Diego. Attempts to transplant the mitigation site were initiated by the Navy. Completion of the mitigation site transplant was then conducted by MBC Applied Environmental Sciences in the fall of 1989 and winter of 1990 (MBC 1990). NEMS 1 consists of two sections designated the "required mitigation area" and the "additional mitigation area" (Figure 2). The required mitigation area was created to mitigate for project impacts. Additional space and resources were subsequently used to create the additional planting area for the purposes of eelgrass banking.

Project Survey Area

The NEMS 1 eelgrass survey area extends along a 260-meter (850 foot) baseline located along the eastern side of the rectangular mitigation area (Figure 2). The study area encompasses approximately 3.82 hectares (9.43 acres) of San Diego Bay and the site ranges in depth from approximately -2.0-feet Mean Lower Low Water (MLLW) to approximately -9.0-feet MLLW.

Prior Surveys

Eelgrass monitoring surveys of the NEMS 1 mitigation transplant site commenced following site restoration in early 1990 (3-month monitoring) through December 1994 (60-month monitoring) to satisfy the 5-year monitoring requirement for the mitigation site. The baseline survey was conducted by MBC Applied Environmental Sciences (MBC 1990), while subsequent surveys were conducted by National Marine Fisheries Service (NMFS) under contract to Southwest Division (NMFS 1990 through 1994). Surveys have been completed by M&A biologists since 1998. The goal of these surveys was to assess the status of the eelgrass at the site annually for mitigation banking.

CURRENT SURVEY RESULTS

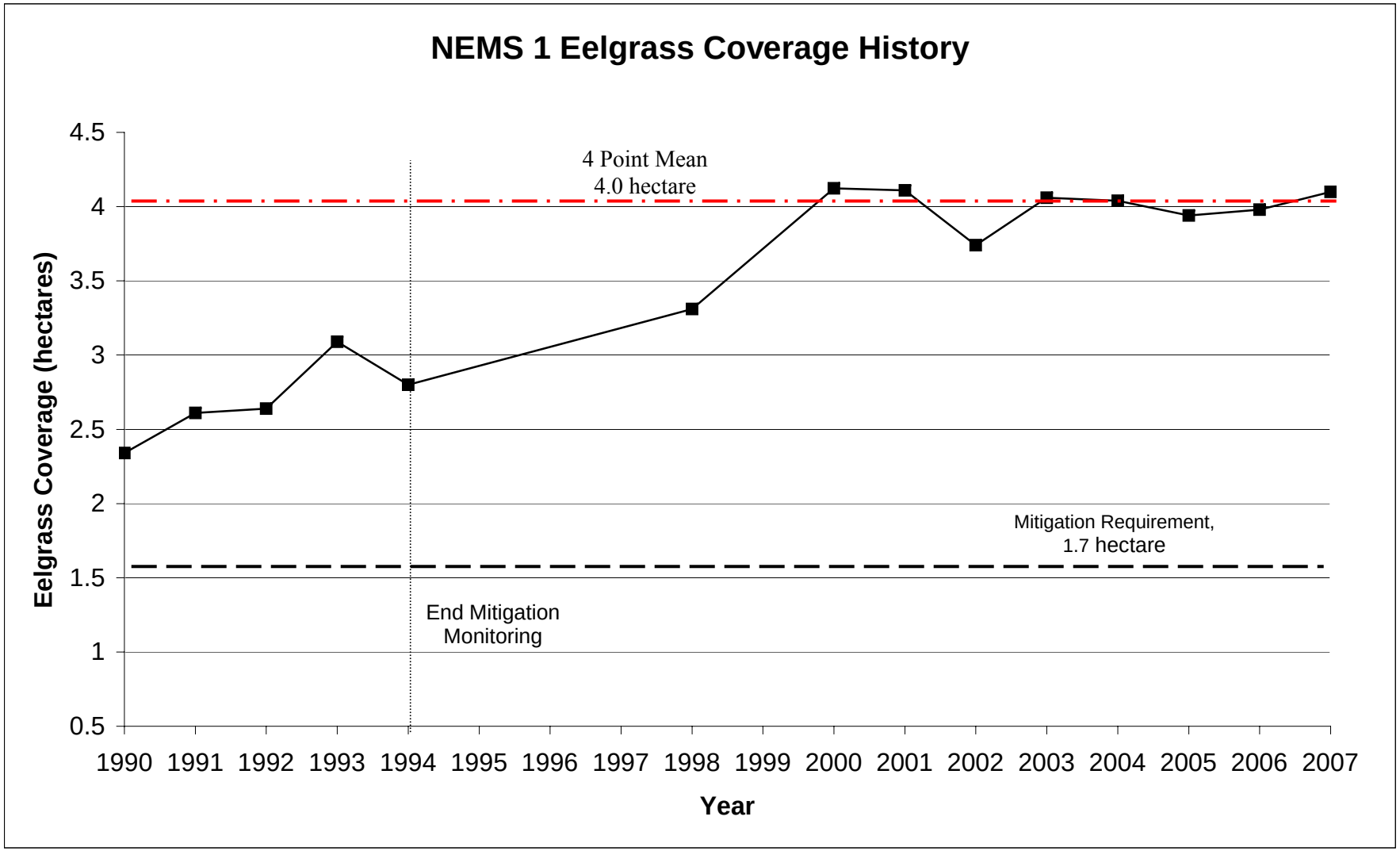
The current NEMS 1 2007 annual survey revealed a total of 4.10 hectares (10.10 acres) of eelgrass growing within the site (Figure 2). The required mitigation area contains 2.80 hectares (6.90 acres) of eelgrass coverage and the additional planting area contains 1.30 hectares (3.20 acres) of eelgrass. A bare area persists in the northeast portion of the mitigation area and has been present in all the monitoring surveys from 2002 to 2007. This bare patch tended to fluctuate yearly, expanding and decreasing in size from 2002 to 2005; however, the bare area has remained relatively consistent in size during the past 2 years. The eelgrass bed within the mitigation area has steadily increased coverage in the bear area, expanding by approximately 3.5% yearly for 2 consecutive years.

DISCUSSION

Given the extensive past monitoring history of the NEMS 1 site and the amount of eelgrass currently present, it appears that the eelgrass bed at NEMS 1 continues to be stable and healthy with slight fluctuations over the last 17 years. Most of the changes in eelgrass coverage have been observed along the eastern and northern borders of the site, where deeper portions of the site exist. This is expected, as changes in eelgrass coverage are typically observed along the upper and lower boundaries of growth, where environmental stresses (light limitation at the lower limit or desiccation at the upper limit) are greatest.

The five-year mitigation monitoring requirement for NEMS 1 was reached in 1994, at which time 2.80 hectares (6.91 acres) of eelgrass was present at the site. This exceeded the mitigation requirement of 1.70 hectares (4.20 acres) by 1.1 hectares (2.71 acres). The entire post-transplant monitoring history is detailed in Figure 3. The next monitoring of the NEMS 1 site will be conducted in the summer of 2008.


M&A #97-082-11
Eelgrass Planting Grid
EELGRASS
4.1 ha
(Within Area Available for
Eelgrass Mitigation and Banking)
San Diego Bay
Required Mitigation Area
2.8 ha
Additional Mitigation Area
1.3 ha
100
0
100
200
300
400 Meters
Eelgrass Distribution, 2007
Navy Eelgrass Mitigation Site 1
Figure
2



Eelgrass areal coverage at NEMS 1 since 1990

Figure 3

MITIGATION SUMMARY NEMS 1

The past 11 monitoring surveys within the NEMS 1 site have reported eelgrass coverage values ranging from 2.34 to 4.12 hectares (5.78 to 10.10 acres). The mean of the last 4 eelgrass survey coverage values is 4.02 hectares (9.93 acres), which is 2.32 (5.73 acres) hectares in excess of the 1.7-hectare (4.20-acre) mitigation requirement (Figure 3). The Navy intends to use this excess as a mitigation bank for on-going and future Navy projects.

NEMS 2

SITE BACKGROUND

The NEMS 2 mitigation site and survey area, is located just offshore (east) of the NCCOSC facilities, immediately south of the marine mammal pens (Figure 1). The 0.20-hectare (0.49-acre) site was planted by MBC Applied Environmental Sciences in July 1993. A small, supplemental transplant was conducted during the 3-month survey in November 1993. NEMS 2 was created to mitigate construction activities associated with MILCON P-122 Marine Mammal Facility at SPAWAR under ACOE Permit 94-017-DZ. Project construction resulted in a mitigation requirement of 0.11 hectare (0.26 acre) of eelgrass. Specifically the ACOE permit states,

4. *That the permittee shall mitigate for the loss of 0.073 acre of eelgrass according to the "Southern California Eelgrass Mitigation Policy" (NMFS, July 1991). Prior to initiation of in-water activities, the permittee shall submit to, and receive approval from, the Corps, USFWS and NMFS an eelgrass mitigation plan that includes: the location of the proposed mitigation site; total acreage of eelgrass impacts and mitigation; source of mitigation material; method of transplanting; and time schedule for implementing mitigation.*
5. *That the permittee shall mitigate for the loss of 0.87 acre of bay surface water area. Prior to initiation of in-water activities, the permittee shall submit a mitigation plan to, and receive approval from, the Corps and USFWS. This may entail further eelgrass mitigation, deployment of bait barges stocked with fish, or creation of intertidal or subtidal habitat.*

Project Survey Area

The eelgrass survey area extends along a 60-meter (197-foot) baseline located along the western side of the site, closest to shore (Figure 4). The baseline is oriented approximately 205° from true north. Planting occurred along transects placed perpendicular to the baseline, terminating at the deeper (eastern) portion of the site. The study area encompasses approximately 0.20 hectare (0.49 acre) of San Diego Bay.

Prior Surveys

Eelgrass monitoring surveys of the site commenced in the fall of 1993 (3-month monitoring interval) and were completed in summer 1996 (36-month monitoring interval) by the Navy and NMFS in accordance with the monitoring requirements for the eelgrass planting at the mitigation site. A 48-month survey was not completed. The 60-month or 5-year monitoring survey was completed in the fall of 1998. A subsequent survey was performed in 1999.


M&A #97-082-11
Eelgrass Planting Grid
EELGRASS
0.1 ha
(Within Area Available for
Eelgrass Mitigation and Banking)
San Diego Bay
100 0 100 200 300 400 Meters
Eelgrass Distribution, 2007
Navy Eelgrass Mitigation Site 2
Figure
4

CURRENT SURVEY RESULTS

The NEMS 2 site was monitored in September 2007. The current survey resulted in 0.10 hectare (0.25 acre) of eelgrass (Figure 4). Bare areas occurred along the periphery of the site. The most exposed areas were found shoreward in the northwestern portion of the site and toward the bay in the southwestern corner of the site.

DISCUSSION

The five-year mitigation monitoring requirement for NEMS 2 was reached in 1998, at that time 0.14 hectare (0.35 acre) of eelgrass was present at the site. This exceeded the mitigation requirement of 0.11 hectare (0.27 acre) by 0.03 hectare (0.07 acre). Although the site met its mitigation requirement, the eelgrass coverage during the fifth and sixth monitoring years was substantially reduced from the first four monitoring surveys. The site was originally planted with 0.20 hectare (0.49 acre) of eelgrass and the eelgrass coverage did not fluctuate greatly from this amount during the following monitoring surveys. The site was not surveyed in 1997. This was an El Niño year, which likely resulted in the lower eelgrass coverage observed during the 1998 and 1999 surveys. The current 2007 surveys indicate that the eelgrass has not recovered from the losses in the late 1990's. The eelgrass bed coverage has decreased slightly showing a minor change of 0.13 hectare (0.32 acre) of eelgrass in 1999 and 0.10 hectare (0.25 acre) in 2007. The monitoring history of NEMS 2 is detailed in Figure 5. An eelgrass survey will be performed at the NEMS 2 site in 2008 and surveys will continue on an annual basis from then.

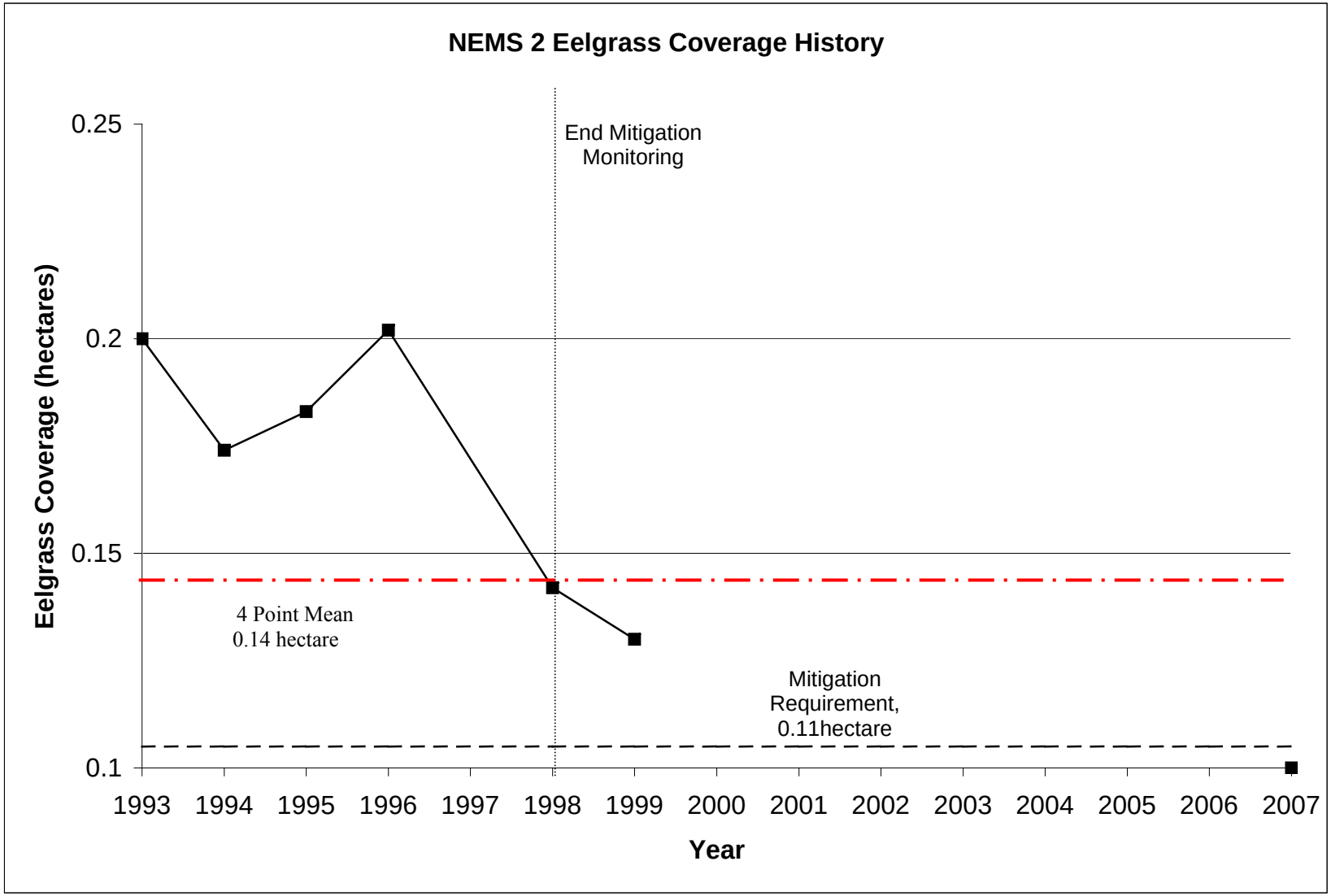
MITIGATION BANK SUMMARY

The past monitoring surveys within the NEMS 2 site have reported eelgrass coverage values ranging from 0.1 to 0.2 hectares (0.25 to 0.49 acres). The mean of the eelgrass coverage during the last 4 monitoring surveys for the NEMS 2 site is 0.14 hectare (0.35 acre) and is comparable to the mitigation requirement of 0.11 hectare (0.27 acre). The additional eelgrass acreage available for banking from the NEMS 2 site is 0.03 hectares (0.07 acre).

NEMS 4

SITE BACKGROUND

The approximately 0.62 hectare (1.53 acres) NEMS 4 site was created in 1993 by filling an area offshore of Delta Beach, using dredge material from the MILCON P-187 COLDS Pier project at NAB Coronado (Figure 1). The mitigation site transplant was conducted by Pacific Southwest Biological Services (PSBS) in the winter of 1994 (Merkel and Cull 1994). NEMS 4 was created to mitigate construction activities associated with MILCON P-187 COLDS Pier at the northeast corner of NAB Coronado in which 0.21 hectare (0.51 acre) of eelgrass was impacted, requiring the creation of 0.25 hectare (0.61 acre) of transplanted eelgrass as mitigation (Perdue and Barbusca 1993). An additional 0.15 hectare (0.36 acre) of eelgrass mitigation was required to offset a 9-month planting delay, bringing the total mitigation requirement to 0.39 hectare (0.97 acre). The work was conducted under ACOE Permit 92-463-DZ. The permit specifically states,



Eelgrass areal coverage at NEMS 2 since 1993 **Figure 5**

> *You are authorized to perform work in accordance with the terms and conditions specified below. Project Description: To construct a small craft berthing pier and two wood-pile dolphins; and to dredge, transport and dispose 9,000 cubic yards of sediment to create an eelgrass mitigation site, as further defined in the General and Special Conditions shown on the attached drawings.*

Project Survey Area

The eelgrass survey area for NEMS 4 extends along a 130-meter (426-foot) baseline located along the western side of the roughly rectangular mitigation area (Figure 6). The baseline is oriented approximately 340° from true north and permanent survey transects, which are 10 meters (33 feet) apart, extend perpendicular from the baseline towards the bay. The study area encompasses approximately 0.62 hectare (1.53 acre) of San Diego Bay and the site ranges in depth from approximately -2.0-feet MLLW to approximately -10.0-feet MLLW. The study area is marked by a PVC pole with "NEMS 4" affixed to it and placed at the southwestern corner of the site.

Prior Surveys

Eelgrass monitoring surveys of the mitigation transplant site for NEMS 4 were started in the spring of 1994 (3-month monitoring) and were continued through April 2000 (72-month monitoring) to satisfy the 5-year monitoring requirement for the mitigation site. The five-year monitoring program was extended an additional year because of major fluctuations in eelgrass coverage at the site, specifically the region-wide dieback observed during the 48-month survey (October 1998). The initial monitoring (0- and 3-month survey) was conducted by PSBS (Merkel and Cull 1994) under the implementation contract, while subsequent surveys (6-, 12-, 24-, 36-month) were conducted by National Marine Fisheries Service under contract to Southwest Division (NMFS data 1994 through 1996). M&A has conducted the 48-, 60-, and 72-month monitoring surveys required as part of the initial mitigation monitoring requirement under contract with Southwest Division. Additional annual surveys were completed from 2001 to 2007 to assess the status of the eelgrass at the site for Navy mitigation banking.

CURRENT SURVEY RESULTS

During the current 2007 annual survey eelgrass coverage totaled 0.50 hectare (1.24 acres) within the NEMS 4 mitigation site (Figure 6). This represents a steady increase of approximately 0.10 hectare (0.25 acre) of eelgrass coverage per year since 2005 (Figure 6). Although coverage has increased, an area denude of eelgrass persist along the eastern edge of the site.

DISCUSSION

The NEMS 4 site has experienced a high level of eelgrass coverage fluctuation since its creation in 1994. Eelgrass coverage at the site has ranged from 0.02 to 0.51 hectare (0.05 to 1.30 acres) with an average coverage of 0.32 hectare (0.79 acre). Due to a tremendous die-back of eelgrass observed throughout the site during the 48-month post-transplant survey a supplemental eelgrass transplant was conducted by M&A on October 28 and 29, 1998 to hasten and assist the recovery process. This supplemental amount created 0.16 hectare (0.40 acre) of planted eelgrass. An additional monitoring interval was added to the original 5-year monitoring program, thereby extending the post-transplant monitoring program an additional year (for a total of 72 months). That survey was conducted in April 2000 and eelgrass coverage exceeded the mitigation requirement at that time.


M&A #97-082-11
Eelgrass Planting Grid
EELGRASS
0.5 ha
(Within Area Available for
Eelgrass Mitigation and Banking)
San Diego Bay
100 0 100 200 300 400 Meters
Eelgrass Distribution, 2007
Navy Eelgrass Mitigation Site 4
Figure
6

Good initial growth following the original transplant was observed the first year after planting. The second and third years were marked by slight declines in eelgrass coverage as the transplant stabilized in portions of the site. Then, during the fourth year of monitoring, a sharp decline in eelgrass coverage was observed most likely due to the El Niño-driven die-back of 1997-1998. Recently, the eelgrass coverage has been steadily increasing and bare areas in the eastern portion of the site have filled in supporting the additional eelgrass. The entire post-transplant monitoring history for the NEMS 4 site is detailed in Figure 7.

While the performance history of the NEMS 4 site suggests that eelgrass can be supported over long periods at the site, concern still remains that the project site is slightly deeper along its eastern extents than is optimal for eelgrass growth. This area will likely continue to be susceptible to intermittent declines in coverage where greater fluctuations in eelgrass coverage would be expected to occur due to environmental conditions. However, the site should continue to remain as a viable eelgrass mitigation site. Future eelgrass monitoring at NEMS 4 will be conducted to document eelgrass coverage and monitor the eelgrass for the eelgrass mitigation bank credits for the U.S. Navy. No additional transplant work is needed nor expected at the NEMS 4 site. The next monitoring is tentatively scheduled for the summer of 2008.

MITIGATION BANK SUMMARY

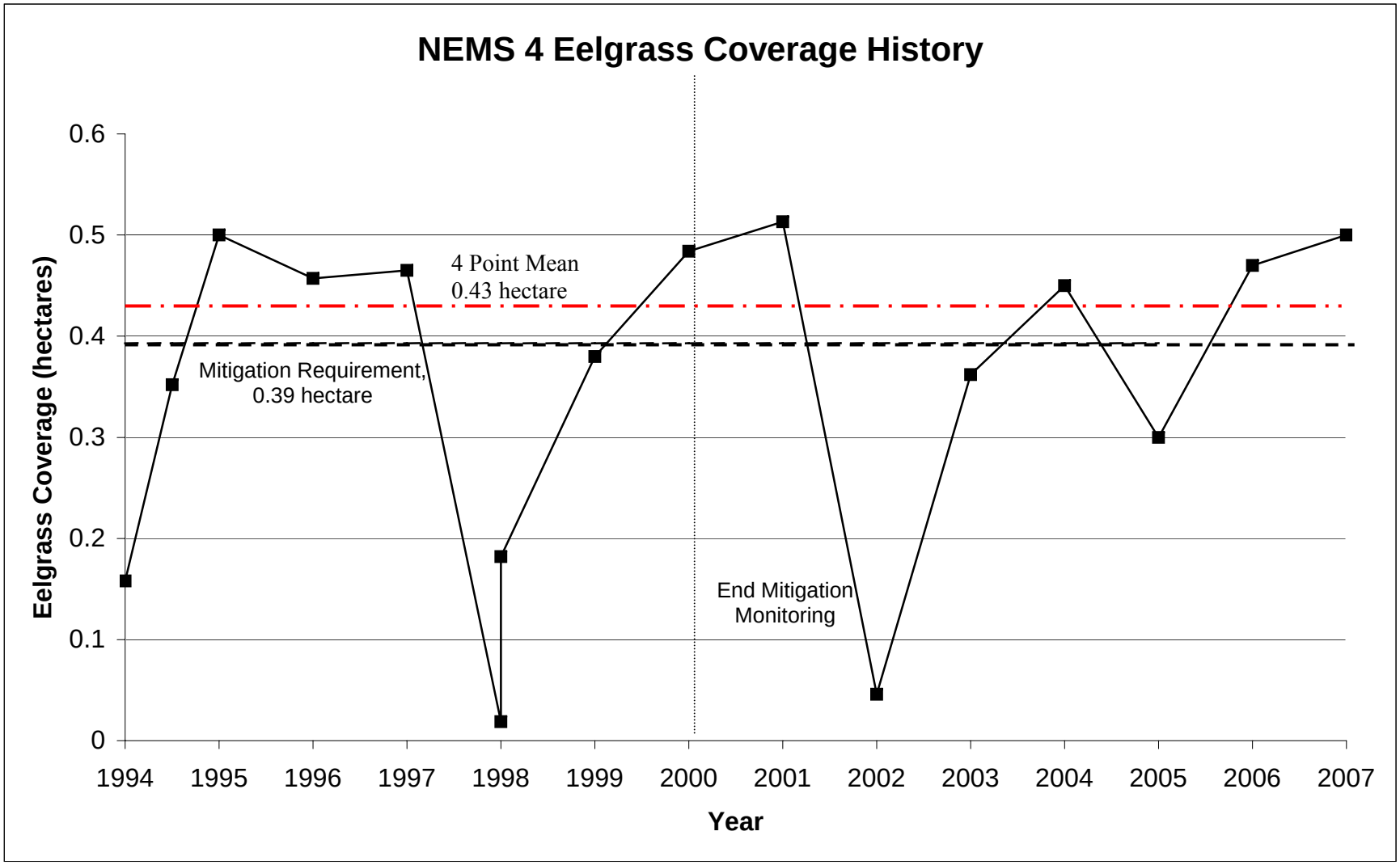
The NEMS 4 mean eelgrass coverage value for the last 4 monitoring surveys is 0.43 hectare (1.06 acres). This mean reflects an excess of 0.04-hectare (0.09 acre) total coverage of the required0.39-hectare (0.96-acre) mitigation. The NEMS 4 site supports 0.04 hectare (0.09 acre) of eelgrass for banking.

NEMS 5

SITE BACKGROUND

The NEMS 5 site was created in August 1997 to mitigate construction activity impacts to eelgrass resources associated with MILCON P-549-700 project. The mitigation site was designed to offset project impacts to 2.49 hectares (6.20 acres) of eelgrass habitat, including 1.01 hectares (2.50 acres) of eelgrass, due to construction of the mitigation site itself. As stipulated in the SCEMP, a mitigation ratio of 1.2:1 was used to determine that 2.99 hectares (7.40 acres) of new eelgrass habitat would be necessary to mitigate losses associated with the project and mitigation site construction. The ACOE permit specifically states,

> *The permitee shall mitigate the loss of 1.5 acres of the U.S. (Waters) that include inter/subtidal habitat that would be permanently lost as a result of the CVN 2 wharf construction. This area will be known as the Wharf Site. The loss shall be offset by the creation of a minimum 1.5 acres of Waters intertidal habitat through excavation of existing uplands (i.e. land areas above +7.8 feet Mean Lower Low Water (MLLW)) along the west shore of the Naval Air Station North Island. This area will be known as the Mitigation Site. Any excess of Waters created at the Mitigation Site will be applied to the Navy's proposed North San Diego Bay Mitigation Bank.*



Eelgrass areal coverage at NEMS 4 since 1994

Figure 7

At the mitigation site, 5.67 hectares (14.00 acres) of upland habitat (above +2.38-m (+7.8-feet) MLLW) was converted by excavation into intertidal and subtidal habitat. M&A initiated the eelgrass transplant work within the north basin in March 1998 and completed work in July 1998, while transplant work within the south basin was conducted in August and September 1998.

Project Survey Area

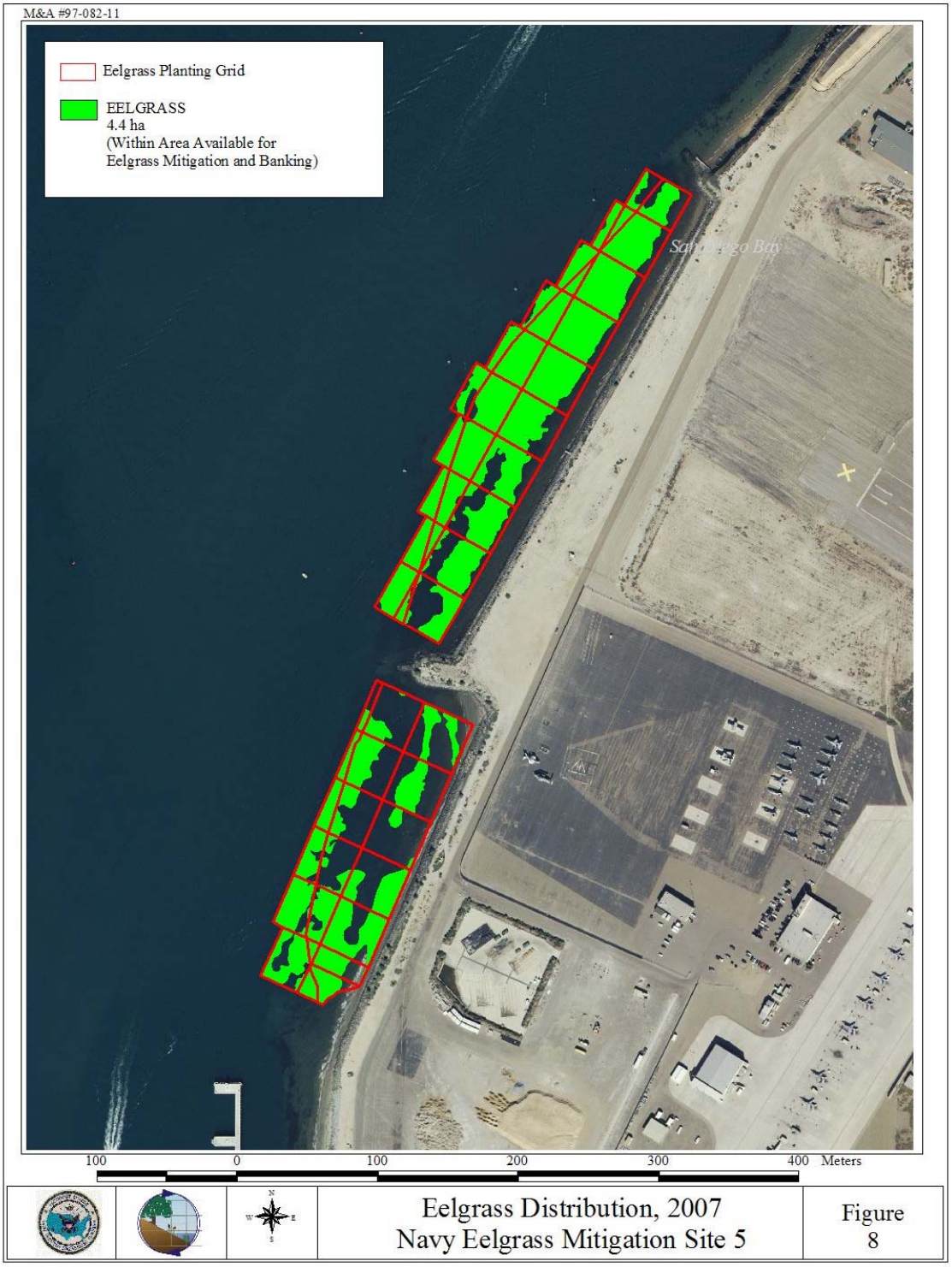
To mitigate the construction impacts for the new CVN wharf, the NEMS 5 intertidal mitigation site was created on the northwest portion of North Island, between wharf Bravo and wharf Echo, near the west end of Runway 29 (Runway 11), west of Moffett Road (Figure 1). The site consists of a north and south basin notched out of previously filled uplands. The two basins are separated by a peninsula of land protecting a fuel pipeline crossing San Diego Bay from the U.S. Navy's fuel depot at Point Loma. The basins are surrounded on three sides by sloping rip-rap. Tidal elevations range from +2-feet MLLW at the base of the rip-rap shore to approximately –5-feet MLLW, where the sandy bottom meets with the previously existing slope of the main navigation channel. Within the north basin, 3.91 hectares (9.7 acres) of plantable substrate were prepared while 3.14 hectares (7.8 acres) were prepared in the south basin. This "area available for eelgrass mitigation and banking" was identified during the NEMS 5 post-construction survey and was the result sections of the site becoming unplantable due to sand accumulation producing elevations unsuitable for eelgrass growth.

Prior Surveys

M&A has conducted monitoring surveys at the NEMS 5 site, 0-, 6-, 12-, 24-, 36-, 48-, and 60-months post-transplant. The last 72-month survey was completed in July 2004 and the site has continued to be monitored yearly since. The current 2007 monitoring survey is intended to assess the status of the eelgrass for Navy mitigation banking.

CURRENT SURVEY RESULTS

During the current NEMS 5 2007 annual survey, eelgrass coverage totaled 4.40 hectares (10.87 acres) within the mitigation site (Figure 8). Eelgrass coverage has increased covering most of the seaward edges. Eelgrass along the shoreline remains patchy throughout the site as documented in previous surveys. The results of past and current monitoring surveys have provided eelgrass coverage values within the area available for eelgrass mitigation and banking, although eelgrass within this area has joined with and expanded into the natural eelgrass bed farther out into the channel.


M&A #97-082-11
Eelgrass Planting Grid
EELGRASS
4.4 ha
(Within Area Available for
Eelgrass Mitigation and Banking)
San Diego Bay
100 0 100 200 300 400 Meters
Eelgrass Distribution, 2007
Navy Eelgrass Mitigation Site 5
Figure
8

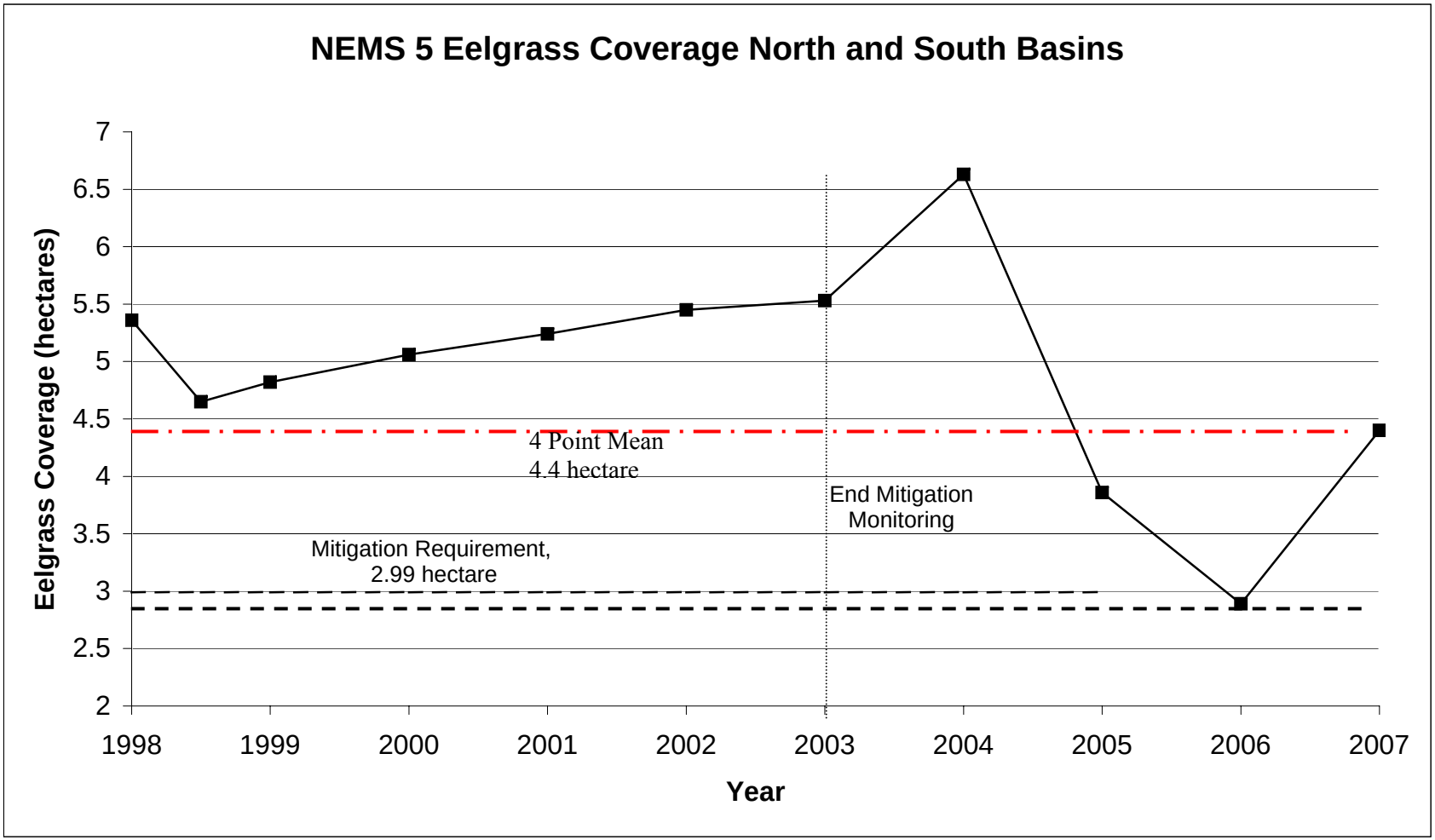
DISCUSSION

Eelgrass coverage within the NEMS 5 mitigation and banking area has increased by approximately 34% from the previous years' dramatic decline (Figure 9). During the 2004 survey, the eelgrass formed a solid bed within both basins at the site. In 2005 and 2006, bare areas which are considered natural bare-spots, characteristic of eelgrass beds, appeared; however, eelgrass coverage along the entire length of the south basin shore decreased. Although it is not clear why eelgrass coverage had undergone such a substantial decrease, notable bare areas have been present at the site previously and were observed within the south basin, near the middle portions of the grid closer to shore during some of the earliest surveys. Bare areas have been consistently recorded along the spit that protects the fuel pipe and that divides the two basins. These bare areas are likely the result of high wave energy around the point and the occupancy of the non-native seaweed *Sargassum muticum*, typically observed on the artificial rock reef structures placed there during the eelgrass transplant. Higher wave energy and sand accumulation in the northeast corner of the south basin have acted to limit the amount of eelgrass growing within this corner in past surveys and continues to do so. Previous declines in eelgrass coverage were most notable in the north basin along the seaward edge of the southern portion of the site. Currently, this area has recovered and shows a contiguous bed of eelgrass connecting from the seaward edge toward the shore.

The NEMS 5 eelgrass mitigation site has performed well in the past. The transplant rapidly expanded into previously unvegetated portions of the site and areas around the edge of the planting grid. For both the north and south basins, 80% of the entire eelgrass transplanting grid lies within the eelgrass mitigation and banking area (area above the old 0.0 m-MLLW elevation). The 2.99-hectare (7.39-acre) mitigation requirement was met and exceeded by a total of 2.54 hectares (6.28 acres) at the time of the 60-month or 5 year mitigation milestone in 2003. The entire post-transplant monitoring history for the NEMS 5 site is detailed in Figure 9. The next monitoring survey will be the annual 2008 monitoring survey, scheduled for summer and will continue annually to keep the Navy's eelgrass mitigation bank status current.

MITIGATION BANK SUMMARY

The mean of eelgrass coverage reported for the last 4 monitoring surveys at the NEMS 5 site is 4.40 hectares (10.87 acres) and is 1.41 hectares (3.48 acres) in excess of the 2.99-hectare (7.39-acre) mitigation requirement. The excess 1.41 hectares will be regarded as "eelgrass credits" for the NEMS 5 Eelgrass Mitigation Bank which will be used by the U.S. Navy for projects in the northern portion of San Diego Bay, and as necessary in the event of impacts to eelgrass habitat as a result of future in-water construction activities in the area.



Eelgrass areal coverage at NEMS 5 since 1998

Figure 9

NEMS 6

SITE BACKGROUND

The NEMS 6 site was created in 1998 by filling a 0.17 hectare (0.42 acre) area offshore of the northeast shore of Delta Beach, using dredge material from the MILCON P-211 SOF-PC Pier Project at NAB Coronado. The eelgrass transplant was conducted by M&A in March 1999 during which 0.30 hectare (0.74 acre) of eelgrass was transplanted. NEMS 6 was created to mitigate construction activities associated with the project on the north side of NAB in which 0.05 hectare (0.12 acre) of eelgrass was impacted, requiring the creation of 0.06 hectare (0.15 acre) of transplanted eelgrass as mitigation (USACOE 1995). As required by the project ACOE Permit 95-20073-DZ, special condition #V. A., the Navy is responsible for eelgrass mitigation and monitoring as stipulated by SCEMP (Exhibit 2). Specifically, Special Condition V. A. states:

> *V. Other Conditions to Meet Environmental Concerns*
>
> *A. The permittee shall mitigate the loss of 0.12 acre of eelgrass habitat according to the 'Southern California Eelgrass Mitigation Policy (NMFS 1991), by creating 0.15 acre of eelgrass at the Delta Beach mitigation site. A current eelgrass survey/impact assessment must be performed as stipulated in the NMFS policy. That assessment may change the acreage of eelgrass mitigation required. A final mitigation plan shall be submitted to Corps, USFWS and NMFS for approval at least 15 days prior to initiating project construction authorized by this permit. Mitigation site construction shall occur prior to, or concurrent with, project construction. As-built drawings of the mitigation site shall be submitted to the Corps, USFWS and NMFS for review within 60 days of completing mitigation site construction.*

In January 2001, the Navy added an additional 40,000 cubic yards of material creating 0.75 hectare (1.85 acres) that would be available for mitigation banking. The total potential area for the site was then increased to 1.42 hectares (3.51 acres). The additional fill area was planted with 0.61 hectares (1.51 acres) of eelgrass in September 2001. This new addition of material extended the success criteria monitoring out until 2007.

Project Survey Area

The NEMS 6 site is located north of NEMS 4 immediately to the south, and NEMS 1 further to the south (Figure 1). A 0.30-hectare (0.74-acre) rectangular grid was established over the original NEMS 6 transplant site. There were 7 monitoring transects spaced 10 meters (32.81 feet) apart and 50 meters (164.04 feet) in length, bearing 45° from true north. The transects were extended perpendicular from a 60 meter (196.85 feet) baseline, which was bearing 315° from true north, along the southwestern edge of the grid. The original mitigation site resembles an underwater mound and was created by filling and raising the bay bottom up to an elevation suitable to receive and support transplanted eelgrass. The additional fill was placed as a second mound to the northwest of the original site. A grid was established and planted using similar methods to the original planting. Currently the entire NEMS 6 site may be described as approximately rectangular shaped and aligned in a northwest to southeast direction. Tidal elevations for the site range from -2 to –9-ft MLLW.

Prior Surveys

Monitoring surveys for NEMS 6 began with the 0-month post transplant survey in March 1999. M&A conducted the 3-, 6-, 12-, 24-, 36-, 48-, 60-, and 72-month surveys. The current survey marks 96 months and the completion of the mitigation monitoring requirement.

CURRENT SURVEY RESULTS

During the current NEMS 6 2007 survey, 0.88 hectare (2.17 acres) of eelgrass was mapped within the NEMS 6 site (Figure 10). Eelgrass coverage totaled 0.19 hectare within the NEMS 6 mitigation or original planting area (Figure 2).

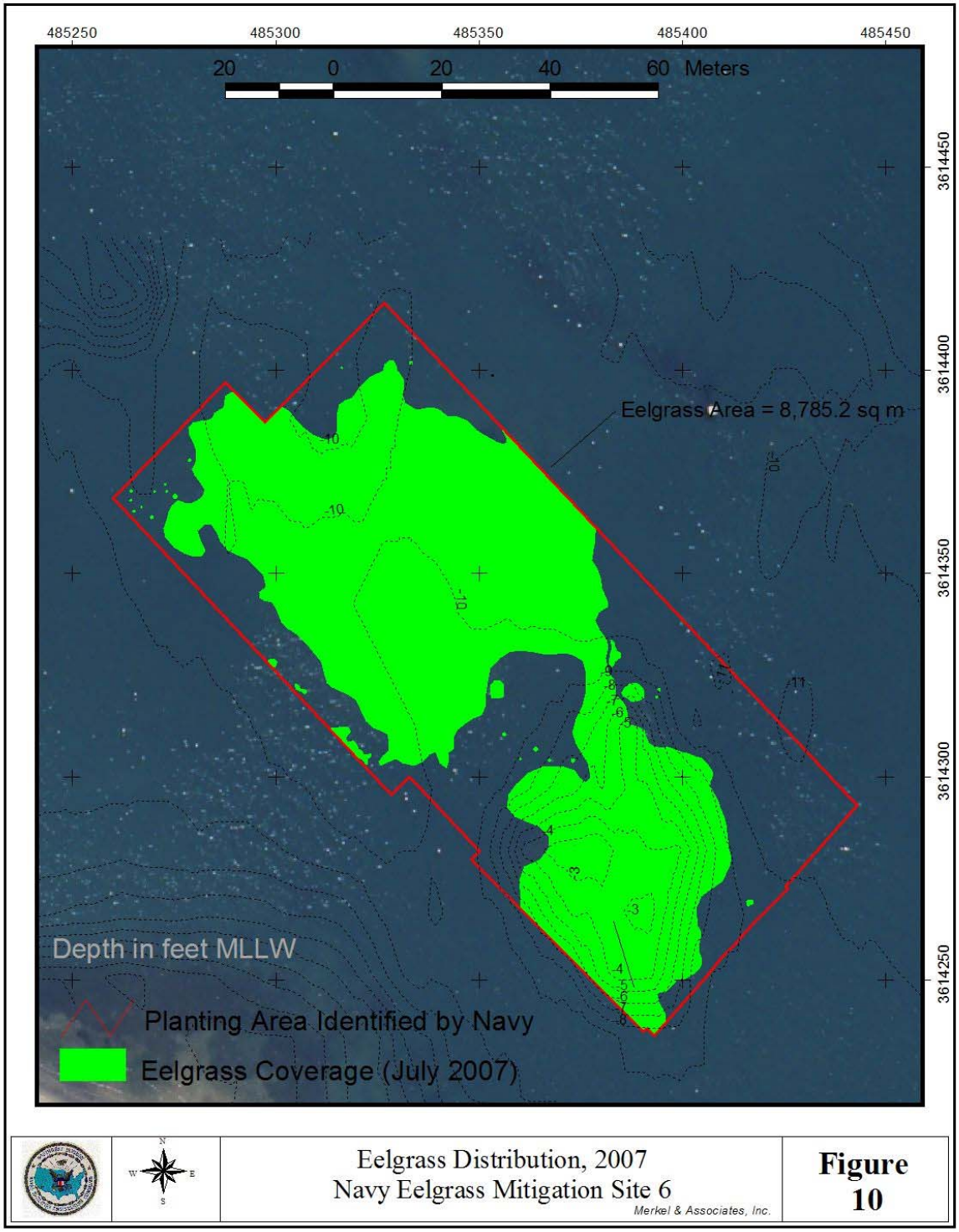
DISCUSSION

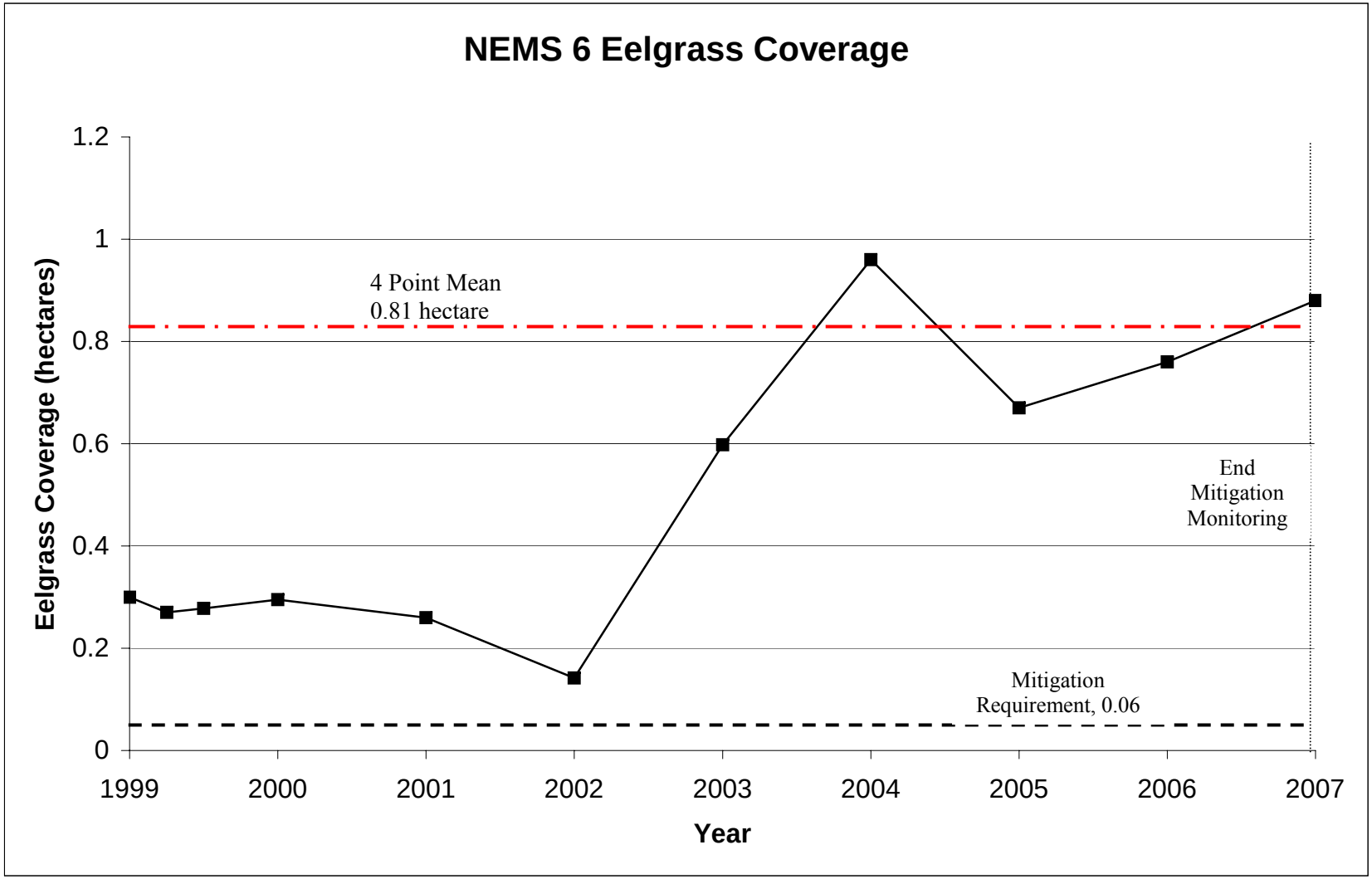
Eelgrass coverage within the NEMS 6 site has slowly increased in the last couple of years, nearing the peak eelgrass growth spike observed in 2004 (Figure 11). The eelgrass at the site appears to be influenced by the bathymetry of the NEMS 6 site. The original and additional planting areas are separated by a deeper trough that currently supports eelgrass growth. Both planting areas have decreased in eelgrass coverage since 2004 but have steadily increased coverage yearly by approximately 0.10 hectare (0.25 acre) per year. Decreased coverage occurs at the fringing or deeper edges of the beds.

Although the additional eelgrass planting took place in September 2001, regular monitoring and inclusion of the additional coverage did not occur until 2003. The increase in overall coverage resulting from the additional planting is seen in Figure 12. The overall eelgrass coverage increased steadily between 2005 and 2007. Although this eelgrass bed experienced a decline between 2004 and 2005, the site appears generally stable and fluctuation in the areal coverage remains above the mitigation requirement. The entire post-transplant monitoring history for the NEMS 6 site is detailed in Figure 11. The 2007 survey marked the completion of the 5 year mitigation monitoring program as required by permit conditions for NEMS 6. Yearly monitoring will continue to provide current mitigation bank status for this site.

MITIGATION BANK SUMMARY

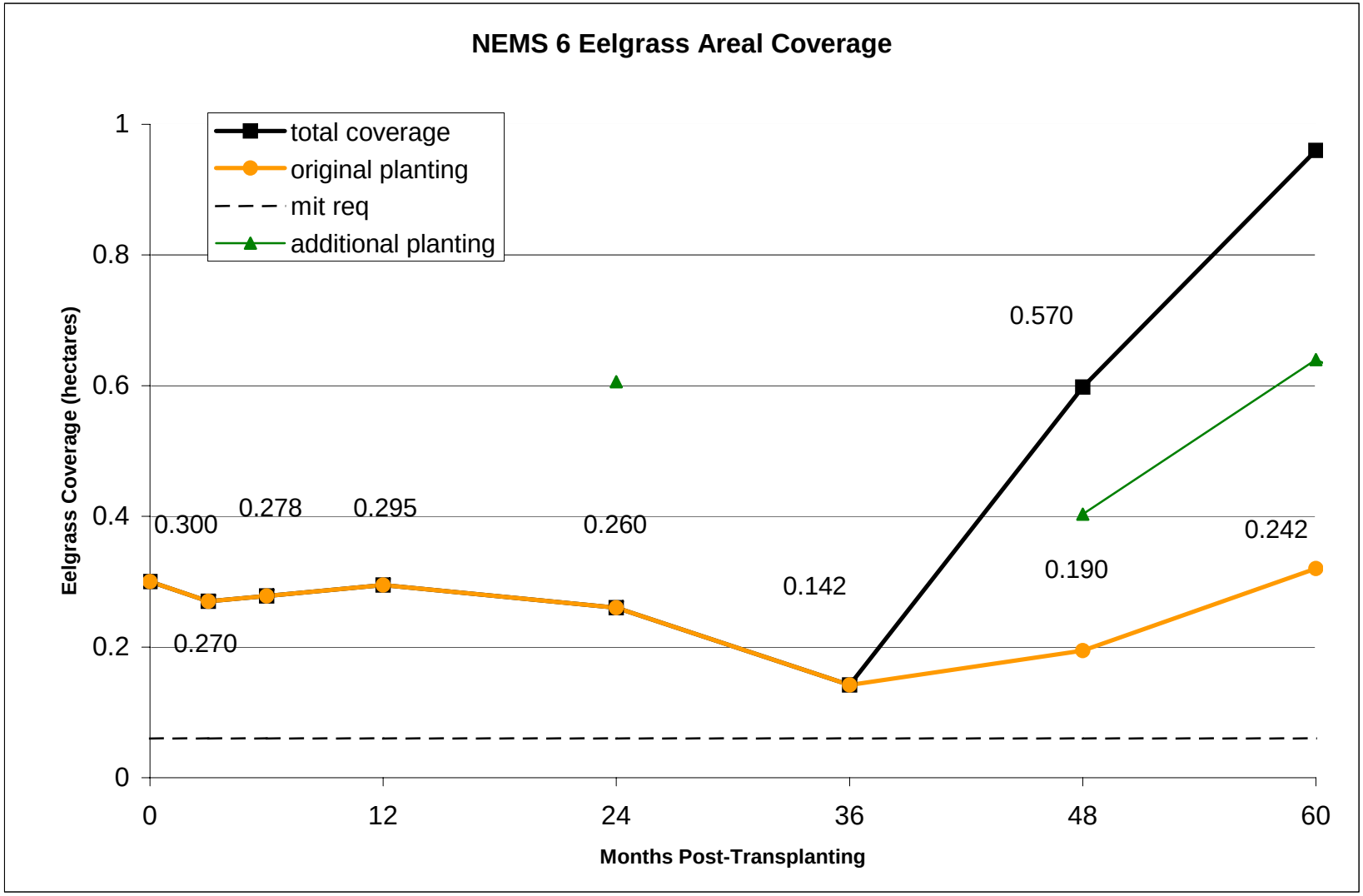
The mean of eelgrass coverage reported for the last 4 monitoring surveys at the NEMS 6 site totaled 0.81 hectare (2.0 acres). The mean coverage exceeds the 0.06-hectare (0.15-acre) mitigation requirement by 0.75 hectare (1.85 acres). The excess balance is available for banking.


485250
485300
485350
485400
485450
20 0 20 40 60 Meters
3614450
3614400
3614350
3614300
3614250
Eelgrass Area = 8,785.2 sq m
Depth in feet MLLW
Planting Area Identified by Navy
Eelgrass Coverage (July 2007)
Eelgrass Distribution, 2007
Navy Eelgrass Mitigation Site 6
Merkel & Associates, Inc.
Figure 10



Eelgrass areal coverage at NEMS 6 since 1999

Figure 11



			Eelgrass Transplanting at NEMS 6	**Figure 12**

REFERENCES

Fonseca, M.S. and J.S. Fisher 1986. A comparison of canopy friction and sediment movement between four species of seagrass with reference to their ecology and restoration. *Mar.Ecol. Prog. Ser*. 29:15-22

MBC Applied Environmental Sciences. 1990. NAB Eelgrass Transplant, final letter report. For U.S. Navy Natural Resources Branch, Naval Facilities Engineering Command.

Merkel, K. W. and K. J. Cull. 1994. 3-Month Monitoring Report NEMS 4 Eelgrass Mitigation Area Delta Beach, NAB Coronado For U.S. Navy Natural Resources, Southwest Division, Naval Facilities Engineering Command.

National Marine Fisheries Service, NOAA. 1991, revision 11. Southern California Eelgrass Mitigation Policy. R.S. Hoffman, ed.

National Marine Fisheries Services. 1991-1996. Unpublished NEMS 1 survey data.

Perdue M. and M. Barbusca. 1993. Eelgrass Mitigation and Planting Plan at NEMS 4 for P-187

U.S. Army Corps of Engineers. 1995. Department of the Army Permit 95-020073-DZ, for MILCON P-211 and NEMS 6.

U.S. Navy, 2003. 2002 Eelgrass Surveys NEMS 1 & 4 at NAB Coronado, California. Merkel & Associates, Inc. for U.S. Navy SWDIV NAVFACENGCOM Contract No. N68711-97-D-8814, D.O. 0008.

U.S. Navy. 1998. Eelgrass Survey and Mitigation Implementation Plan in Support of The Navy CVN Homeporting (MILCON P-700) Project At NAS North Island, Coronado, CA. Contract No. N68711-97-D-8814, D.O. 0002.

Exhibit C

SOUTHERN CALIFORNIA EELGRASS MITIGATION POLICY

(Adopted July 31, 1991)

Eelgrass (Zostera marina) vegetated areas are recognized as important ecological communities in shallow bays and estuaries because of their multiple biological and physical values. Eelgrass habitat functions as an important structural environment for resident bay and estuarine species, offering both predation refuge and a food source. Eelgrass functions as a nursery area for many commercially and recreational important finfish and shellfish species, including those that are resident within bays and estuaries, as well as oceanic species that enter estuaries to breed or spawn. Eelgrass also provides a unique habitat that supports a high diversity of non-commercially important species whose ecological roles are less well understood.

Eelgrass is a major food source in nearshore marine systems, contributing to the system at multiple trophic levels. Eelgrass provides the greatest amount of primary production of any nearshore marine ecosystem, forming the base of detrital-based food webs and as well as providing a food source for organisms that feed directly on eelgrass leaves, such as migrating waterfowl. Eelgrass is also a source of secondary production, supporting epiphytic plants, animals, and microbial organisms that in turn are grazed upon by other invertebrates, larval and juvenile fish, and birds.

In addition to habitat and resource attributes, eelgrass serves beneficial physical roles in bays and estuaries. Eelgrass beds dampen wave and current action, trap suspended particulates, and reduce erosion by stabilizing the sediment. They also improve water clarity, cycle nutrients, and generate oxygen during daylight hours.

In order to standardize and maintain a consistent policy regarding mitigating adverse impacts to eelgrass resources, the following policy has been developed by the Federal and State resource agencies (National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the California Department of Fish and Game). While the intent of this Policy is to provide a basis for consistent recommendations for projects that may impact existing eelgrass resources, there may be circumstances (e.g., climatic events) where flexibility in the application of this Policy is warranted. As a consequence, deviations from the stated Policy may be allowed on a case-by-case basis. This policy should be cited as the Southern California Eelgrass Mitigation Policy (revision 11).

For clarity, the following definitions apply. "Project" refers to work performed on-site to accomplish the applicant's purpose. "Mitigation" refers to work performed to compensate for any adverse impacts caused by the "project". "Resource agencies" refers to National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (CDFG).

1. **Mitigation Need.** Eelgrass transplants shall be considered only after the normal provisions and policies regarding avoidance and minimization, as addressed in the Section 404 Mitigation Memorandum of Agreement between the Corps of Engineers and Environmental Protection Agency, have been pursued to the fullest extent possible prior to the development of any mitigation program. Mitigation will be required for the loss of

existing vegetated areas, loss of potential eelgrass habitat, and/or degradation of existing/potential eelgrass habitat. Mitigation for boat docks and/or related work is addressed in section 2.

2. **Boat Docks and Related Structures**. Boat docks, ramps, gangways and similar structures should avoid eelgrass vegetated or potential eelgrass vegetated areas to the maximum extent feasible. If avoidance of eelgrass or potential eelgrass areas is infeasible, impacts should be minimized by utilizing, to the maximum extent feasible, construction materials that allow for greater light penetration (e.g., grating, translucent panels, etc.). For projects where the impact cannot be determined until after project completion (i.e., vessel shading, vessel traffic) a determination regarding the amount of mitigation shall be made based upon two annual monitoring surveys conducted during the time period of August to October which document the changes in the bed (areal extent and density) in the vicinity of the footprint of the boat dock, moored vessel(s), and/or related structures. Any impacts determined by these monitoring surveys shall be mitigated per sections 3-12 of this policy. Projects subject to this section must include a statement from the applicant indicating their understanding of the potential mitigation obligation which may follow the initial two-year monitoring.

3. **Mitigation Map.** The project applicant shall map thoroughly the area, distribution, density and relationship to depth contours of any eelgrass beds likely to be impacted by project construction. This includes areas immediately adjacent to the project site which have the potential to be indirectly or inadvertently impacted as well as potential eelgrass habitat areas. Potential habitat is defined as areas where eelgrass would normally be expected to occur but where no vegetation currently exists. Factors to be considered in delineating potential habitat areas include appropriate circulation, light, sediment, slope, salinity, temperature, dissolved oxygen, depth, proximity to eelgrass, history of eelgrass coverage, etc.

Protocol for mapping shall consist of the following format:

1) Bounding Coordinates

   Horizontal datum - Universal Transverse Mercator (UTM), NAD 83, Zone 11 is the preferred projection and datum. If another projection or datum is used, the map and spatial data must include metadata that accurately defines the projection and datum.

   Vertical datum - Mean Lower Low Water (MLLW), depth in feet.

2) Units

   Transects and grids in meters.

   Area measurements in square meters/hectares.

3) File format

   A spatial data layer compatible with readily available geographic information system software must be sent to NMFS and any other interested resource agency when the area mapped has greater than 10 square meters of

eelgrass. For those areas with less than 10 square meters, a table must be provided giving the bounding x,y coordinates of the eelgrass areas. In addition to a spatial layer or table, a hard-copy map should be included within the survey report. The projection and datum should be clearly defined in the metadata and/or an associated text file.

All mapping efforts must be completed during the active growth phase for the vegetation (typically March through October) and shall be valid for a period of 60 days with the exception of surveys completed in August - October. Surveys completed after unusual climatic events (i.e., high rainfall) may have modified requirements and surveyors should contact NMFS, CDFG, and USFWS to determine if any modifications to the standard survey procedures will be required. A survey completed in August - October shall be valid until the resumption of active growth (i.e., in most instances, March 1). After project construction, a post-project survey shall be completed within 30 days. The actual area of impact shall be determined from this survey.

4. **Mitigation Site.** The location of eelgrass transplant mitigation shall be in areas similar to those where the initial impact occurs. Factors such as, distance from project, depth, sediment type, distance from ocean connection, water quality, and currents are among those that should be considered in evaluating potential sites.

5. **Mitigation Size.** In the case of transplant mitigation activities that occur concurrent to the project that results in damage to the existing eelgrass resource, a ratio of 1.2 to 1 shall apply. That is, for each square meter adversely impacted, 1.2 square meters of new suitable habitat, vegetated with eelgrass, must be created. The rationale for this ratio is based on, 1) the time (i.e., generally three years) necessary for a mitigation site to reach full fishery utilization and 2) the need to offset any productivity losses during this recovery period within five years. An exception to the 1.2 to 1 requirement shall be allowed when the impact is temporary and the total area of impact is less than 100 square meters. Mitigation on a one-for-one basis shall be acceptable for projects that meet these requirements (see section 11 for projects impacting less than 10 square meters).

Transplant mitigation completed three years in advance of the impact (i.e., mitigation banks) will not incur the additional 20 percent requirement and, therefore, can be constructed on a one-for-one basis. However, all other annual monitoring requirements (see sections 8-9) remain the same irrespective of when the transplant is completed.

Project applicants should consider increasing the size of the required mitigation area by 20-30 percent to provide greater assurance that the success criteria, as specified in Section 10, will be met. In addition, alternative contingent mitigation must be specified, and included in any required permits, to address situation where performance standards (see section 10) are not likely to be met.

For potential eelgrass habitat, a ratio of 1 to 1 of equivalent habitat shall be created.

Degradation of existing eelgrass vegetated habitat that results in a reduction of density greater than 25 percent shall be mitigated on a one-for-one basis. For example, a 25

percent reduction in density of a 100 square meter (100 turions/meter) eelgrass bed to 75 turions/meter would require the establishment of 25 square meters of new eelgrass with a density at or greater than the pre-impact density. All other provisions of the Policy would apply.

6. **Mitigation Technique.** Techniques for the construction and planting of the eelgrass mitigation site shall be consistent with the best available technology at the time of the project. Donor material shall be taken from the area of direct impact whenever possible, but also should include a minimum of two additional distinct sites to better ensure genetic diversity of the donor plants. No more than 10 percent of an existing bed shall be harvested for transplanting purposes. Plants harvested shall be taken in a manner to thin an existing bed without leaving any noticeable bare areas. Written permission to harvest donor plants must be obtained from the California Department of Fish and Game.

Plantings should consist of bare-root bundles consisting of 8-12 individual turions. Specific spacing of transplant units shall be at the discretion of the project applicant. However, it is understood that whatever techniques are employed, they must comply with the stated requirements and criteria.

7. Mitigation Timing. For off-site mitigation, transplanting should be started prior to or concurrent with the initiation of in-water construction resulting in the impact to the eelgrass bed. Any off-site mitigation project which fails to initiate transplanting work within 135 days following the initiation of the in-water construction resulting in impact to the eelgrass bed will be subject to additional mitigation requirements as specified in section 8. For on-site mitigation, transplanting should be postponed when construction work is likely to impact the mitigation. However, transplanting of on-site mitigation should be started no later than 135 days after initiation of in-water construction activities. A construction schedule which includes specific starting and ending dates for all work including mitigation activities shall be provided to the resource agencies for approval at least 30 days prior to initiating in-water construction.

8. **Mitigation Delay.** If, according to the construction schedule or because of any delays, mitigation cannot be started within 135 days of initiating in-water construction, the eelgrass replacement mitigation obligation shall increase at a rate of seven percent for each month of delay. This increase is necessary to ensure that all productivity losses incurred during this period are sufficiently offset within five years.

9. **Mitigation Monitoring.** Monitoring the success of eelgrass mitigation shall be required for a period of five years for most projects. Monitoring activities shall determine the area of eelgrass and density of plants at the transplant site and shall be conducted at initial planting, 6, 12, 24, 36, 48, and 60 months after completion of the transplant. All monitoring work must be conducted during the active vegetative growth period and shall avoid the winter months of November through February. Sufficient flexibility in the scheduling of the 6 month surveys shall be allowed in order to ensure the work is completed during this active growth period. Additional monitoring beyond the 60 month period may be required in those instances where stability of the proposed transplant site is questionable or where other factors may influence the long-term success of transplant.

The monitoring of an adjacent or other acceptable control area (subject to the approval of the resource agencies) to account for any natural changes or fluctuations in bed width or density must be included as an element of the overall program.

A monitoring schedule that indicates when each of the required monitoring events will be completed shall be provided to the resource agencies prior to or concurrent with the initiation of the mitigation (see attached monitoring and compliance summary form).

Monitoring reports shall be provided to the resource agencies within 30 days after the completion of each required monitoring period and shall include the summary sheet included at the end of this policy.

10. **Mitigation Success.** Criteria for determination of transplant success shall be based upon a comparison of vegetation coverage (area) and density (turions per square meter) between the **adjusted project impact area** (i.e., original impact area multiplied by 1.2) and **mitigation site(s)**. Extent of vegetated cover is defined as that area where eelgrass is present and where gaps in coverage are less than one meter between individual turion clusters. Density of shoots is defined by the number of turions per area present in representative samples within the original impact area, control or transplant bed. Specific criteria are as follows:

a. the mitigation site shall achieve a minimum of 70 percent area of eelgrass and 30 percent density as compared to the adjusted project impact area after the first year.

b. the mitigation site shall achieve a minimum of 85 percent area of eelgrass and 70 percent density as compared to the adjusted project impact area after the second year.

c. the mitigation site shall achieve a sustained 100 percent area of eelgrass bed and at least 85 percent density as compared to the adjusted project impact area for the third, fourth and fifth years.

Should the required eelgrass transplant fail to meet any of the established criteria, then a Supplementary Transplant Area (STA) shall be constructed, if necessary, and planted. The size of this STA shall be determined by the following formula:

$$STA = MTA \times (|A_t + D_t| - |A_c + D_c|)$$

MTA = mitigation transplant area.
A_t = transplant deficiency or excess in area of coverage criterion (%).
D_t = transplant deficiency in density criterion (%).
A_c = natural decline in area of control (%).
D_c = natural decline in density of control (%).

The STA formula shall be applied to actions that result in the degradation of habitat (i.e., either loss of areal extent or reduction in density).

Five conditions apply:

1) For years 2-5, an excess of only up to 30% in area of coverage over the stated criterion with a density of at least 60% as compared to the project area may be used to offset any deficiencies in the density criterion.
2) Only excesses in area criterion equal to or less than the deficiencies in density shall be entered into the STA formula.
3) Densities which exceed any of the stated criteria shall not be used to offset any deficiencies in area of coverage.
4) Any required STA must be initiated within 120 days following the monitoring event that identifies a deficiency in meeting the success criteria. Any delays beyond 120 days in the implementation of the STA shall be subject to the penalties as described in Section 8.
5) Annual monitoring will be required of the STA for five years following the implementation and all performance standards apply to the STA.

11. **Mitigation Bank.** Any mitigation transplant success that, after five years, exceeds the mitigation requirements, as defined in section 10, may be considered as credit in a "mitigation bank". Establishment of any "mitigation bank" and use of any credits accrued from such a bank must be with the approval of the resource agencies and be consistent with the provisions stated in this policy. Monitoring of any approved mitigation bank shall be conducted on an annual basis until all credits are exhausted.

12. **Exclusions.**

1) Placement of a single pipeline, cable, or other similar utility line across an existing eelgrass bed with an impact corridor of no more than 1 meter wide may be excluded from the provisions of this policy with concurrence of the resource agencies. After project construction, a post-project survey shall be completed within 30 days and the results shall be sent to the resource agencies. The actual area of impact shall be determined from this survey. An additional survey shall be completed after 12 months to insure that the project or impacts attributable to the project have not exceeded the allowed 1 meter corridor width. Should the post-project or 12 month survey demonstrate a loss of eelgrass greater than the 1 meter wide corridor, then mitigation pursuant to sections 1-11 of this policy shall be required.

2) Projects impacting less than 10 square meters. For these projects, an exemption may be requested by a project applicant from the mitigation requirements as stated in this policy, provided suitable out-of-kind mitigation is proposed. A case-by-case evaluation and determination regarding the applicability of the requested exemption shall be made by the resource agencies.

(last revised 08/30/05)

Southern California Eelgrass Mitigation Policy
Monitoring and Compliance Reporting Summary

PERMIT DATA:

Permit (Type, Number)	Issuance Date	Expiration Date	Agency Contact
ACOE:_____			
CDP:_____			
Other:_____			

EELGRASS IMPACT AND MITIGATION REQUIREMENTS SUMMARY:

Permitted Eelgrass Impact Estimate	(m^2)	
Actual Eelgrass Impact,	(m^2)	(post-const. survey date)
Eelgrass Mitigation Requirement	(m^2)	(mitigation plan ref.)
Impact Site Location		(location)
Impact Site Center Coordinates		(define projection and datum)
Mitigation Site Location		(location)
Mitigation Site Center Coordinates		(define projection and datum)

PERMITTEE CONTACT INFORMATION:

Project Name	(same as permit ref.)
Permittee Information	(permittee name)
	(mailing address)
	(city, state, zip)
	(permittee contact)
	(phone, fax., e-mail)
Mitigation Consultant	(consultant contact)
	(phone, fax., e-mail)

PROJECT ACTIVITY DATA:

Activity	Start Date	End Date	Reference Info.
Eelgrass Impact			
Installation of Eelgrass Mitigation			
Initiation of Mitigation Monitoring			

MITIGATION STATUS DATA:

Mitigation Milestone	Scheduled Survey	Survey Date	Area (m^2)	Density (turions/m^2)	Reference Info.
Requirement					
0-month					
6-month					
12-month					
24-month					
36-month					
48-month					
60-month					

FINAL ASSESSMENT:

Was mitigation met?	
Were mitigation and monitoring performed timely?	
Was delay penalty required or were supplemental mitigation programs necessary?	

Exhibit D

San Diego Bay Eelgrass (*Zostera marina*) Permanent Transects

Prepared for:
Mitchell Perdue
Naval Facilities Engineering Command Southwest
2730 McKean St. Bldg 291, San Diego, California 92136-5198
Point of Contact: Mitch Perdue

Prepared by:
Tierra Data Inc.
10110 W. Lilac Road
Escondido, California 92026
Points of Contact: Jim Kellogg and Derek Lerma

January 2007

1.0 Introduction

San Diego Bay has historically contained expansive Eelgrass (*Zostera marina*) beds. Eelgrass meadows are recognized as an important ecological community within shallow bays and estuaries due to their multiple biological and physical values. Biological benefits of Eelgrass habitat have been well documented as important sources of food, protection and nursing areas for an abundance of fish, invertebrates and birds. Eelgrass beds also provide physical benefits to bay and estuarine habitats by minimizing wave and current actions, and also by trapping suspended particulates and reducing erosion. Eelgrass primarily grows within a limited depth range, a particular sediment type and high water clarity. Primary habitat for Eelgrass in Southern California is typically restricted to protected coastal areas, large bays, and estuaries and in turn has conflicted with development and usage of waterfront areas. Currently regulatory agencies have a well-defined Southern California Eelgrass Mitigation Policy (SCEMP) to evaluate and mitigate impacts to Eelgrass habitat. In order to effectively understand impacts to Eelgrass habitat it is important to identify natural variations in Eelgrass bed size, health and recruitment.

Several state, federal and private agencies have collected data delineating Eelgrass beds and potential habitat throughout San Diego bay for the past 25 years. The implementation of permanent transects sampled on regular intervals would enhance the understanding of temporal and spatial variations within San Diego Bay eelgrass beds. The ability to tract fluctuations in coverage extent and health (turion density) of specific eelgrass transects will provide valuable long term data for identifying effects from catastrophic, as well as seasonal, natural and anthropomorphic events.

2.0 Methods

Utilizing existing data collected by Naval Facilities Engineering Command Southwest (NAVFAC) five permanent transects were selected within each of the five zones of San Diego Bay (Figure 1). Transects were selected based on historical baseline data and the

ability to resample those areas. Transects varied in length, exposure and depth. There was five transects placed in each region: Outer Bay (OB), North Bay (NB), North Central Bay (NC), South Central Bay (SC) and South Bay (SB). Biannual samples took place during high slack tides in the winter between November and March and in the summer between June and September.

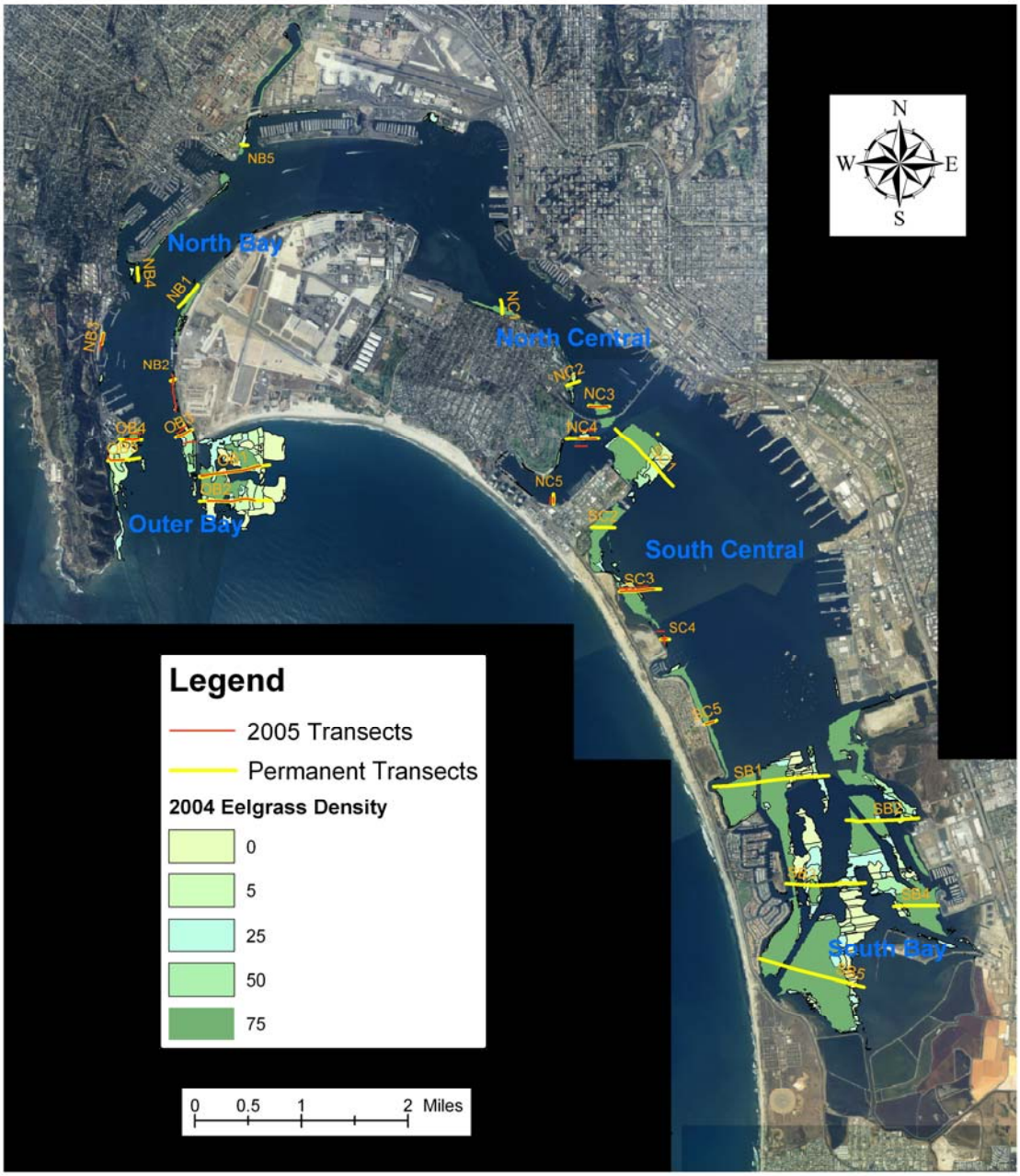
The surveys were performed using a 15-foot Boston Whaler and a *BioSonics DT4000* portable echosounder with a 420 kHz, 6-degree single beam transducer that generates monotone pulses (pings) at a user-set rate (5 pings/sec) and duration (0.1ms) was used to acquire the hydroacoustic data. The echosounder was connected to a laptop computer, which ran *Biosonics Visual Acquisition* software.

Real time Geo-referencing of the boat and sonar track was acquired using a *Trimble AG 122*. Differential correction was provided through the Trimble unit utilizing the *Coast Guard COORS DGPS* signal.

3.0 Site Overviews

Site selection for permanent transects within each bay zone utilized existing eelgrass occurrences, densities and transect directions from single beam sonar surveys performed in the winter of 1999/2000 and 2005. Additional data from other studies included long term eelgrass monitoring performed by U.S. Fish and Wildlife Services (USFWS) and/or the National Oceanographic Atmospheric Administration. These studies were taken into account to provide the most comprehensive overlap of documented eelgrass habitat in the greater San Diego Bay.

Figure 1. Permanent Eelgrass Transects



3.1 Outer Bay *ADD LAT LON for each trans, direction in degrees, summary table*

3.1.1 Transect Outer Bay 1 (OB1) a persistent and variable eelgrass bed was located in the outer bay east of the Zuniga Jetty. The transect proceeds from west to east and was approximately 1100 meters (m) in length. Densities ranged seasonally and spatially based on the intensity of the annual long shore sand movement and the occurrence of substantial wave events. Eelgrass transect data was collected for the years 1999/2000 and 2005.

3.1.2 Transect Outer Bay 2 (OB2) was located offshore of OB1 within the same expansive eelgrass bed and proceeds from east to west. The OB2 transect was approximately 1100 m in length and transect data was gathered in 1999/2000 and 2005.

3.1.3 Transect Outer Bay 3 (OB3) was located west of the Zuniga jetty at the entrance of San Diego Bay and was 280 m in length. Transect OB3 runs from west to east and perpendicular to shore. The eelgrass bed associated with this transect was constrained by the break wall to the east and the deep channel to the west. Transect data was collected in 1999/2000 and 2005.

3.1.4 Transect Outer Bay 4 (OB4) was located on the northwestern boundary to the entrance of San Diego Bay and was 340 m in length. The eelgrass bed was persistent along the shoreline and fluctuated seasonally moving east towards the shipping channel. OB4 transect was sampled from east to west and transect data was collected in 1999/2000 and 2005.

3.1.5 Transect Outer Bay 5 (OB5) was just offshore (south) of OB4. OB5 was approximately 480 m in length and was sampled in 1999/2000 and 2005. OB 5 was sampled running west to east. The eelgrass bed became patchy on the channel side and was likely sculpted by wave action from ship traffic and sediment deposition.

3.2 North Bay

3.2.1 Transect North Bay 1 (NB1) was located well within the bay nearest to the jet runway on north island and across from Shelter Island boat launch. Transect NB1 was 450 m in length and was sampled parallel to shore in a north to south direction. The eelgrass bed was compressed along the shore but well documented and persistent. Transect density data was collected in 1999/2000

and presence absence data collected in 2004 by a collaborative study.

3.2.2 Transect North Bay 2 (NB2) was located just inside the bay along the eastern shoreline just south of the fuel piers. Transect NB2 was only 80 m long and was sampled in an east to west direct. Transect density data was collected in 1999/2000 and presence absence data collected in 2004 by a collaborative study.

3.2.3 Transect North Bay 3 (NB3) was located on the western shore of the bay shoreward of the marine mammal pens and parallel to one of the few sandy beaches in this portion of the bay. Transect NB3 was 170 m in length and was sampled parallel to shore in a south to north direction. Transect density data was collected in 1999/2000 and in 2005.

3.2.4 Transect North Bay 4 (NB4) was located at the entrance of Shelter Island yacht basin and was approximately 200 m in length. Transect NB4 was sampled in a north to south direction and represents a variable eelgrass bed in a bathymetrically diverse area well traveled by various vessels. Density data was only collected in 1999/2000 and presence absence data collected in 2004 by a collaborative study.

3.2.5 Transect North Bay 5 (NB5) was located far up the North Bay near on the western shore of the entrance Naval Training Center (NTC) boat channel across from the fuel dock. Transect NB5 was 105 m in length situated in a west to east configuration. Density data was collected in 1999/2000 and presence absence data collected in 2004 by a collaborative study.

3.3 North Central Bay

3.3.1 Transect North Central 1 (NC1) was located on the southern shore just east of the Naval aircraft carrier piers and across from the convention center. Transect NC1 was 210 m in length and sampled in a north to south direction. The eelgrass bed was perpendicular to shore and transect data was gathered in 1999/2000.

3.3.2 Transect North Central 2 (NC2) was located on the southwestern shore just north of the Coronado bridge and inshore of the yacht moorings. Transect NC 2 was 205 m in length and sampled in a west to east direction. Transect data was collected in 1999/2000.

3.3.3 Transect North Central 3 (NC3) was located southeast of NC2 outside the yacht moorings and was 315 m in length. Transect NC3 was sampled in a west to east direction and transect data was collected in 1999/2000.

3.3.4 Transect North Central 4 (NC4) was located south of NC 3 on the south side of the Coronado bridge and just offshore of the golf course on Coronado Island. Transect NC4 was 485 m in length and sampled in an east to west direction. This eelgrass bed has been well documented and was divided into an inshore and offshore section by an old shipping channel. Transect data was collected in 1999/2000 and in 2005.

3.3.5 Transect North Central 5 (NC5) was located in Glorietta Bay perpendicular to the naval controlled beach just south of the boat launch. Transect NC5 was 162 m in length and sampled in a south to north direction. Transect data was collected in 1999/2000 and in 2005. This area has undergone several development projects over the years and should be interesting to review in the coming sampling events.

3.4 South Central Bay

3.4.1 Transect South Central 1 (SC1) was located on the south side of the Coronado Bridge offshore for the Naval amphibious landing facility. Transect SC1 was 1225 m in length and sampled in a north to south direction. The associated eelgrass bed was expansive and robust covering a substantial area. Transect data was collected in 1999/2000 and presence absence data collected in 2004 by a collaborative study.

3.4.2 Transect South Central 2 (SC2) was located south west of SC1 and inshore of the enhancement island. Transect SC2 was 350 m in length and sampled in a west to east direction. This eelgrass bed has been well studied by the USFWS/NOAA and was serves as a long term monitoring location. Transect data was collected in 1999/2000 and presence absence data collected over multiply years by various studies.

3.4.3 Transect South Central 3 (SC3) was located south of SC2 and adjacent to the Least Tern colonies at north/south delta. Transect SC3 was 615 m in length and was sampled in an east to west direction. Transect data was collected in 1999/2000 and in 2005.

3.4.4 Transect South Central 4 (SC4) was located just south of SC3 at the head of the south delta Least Tern area and north of Fiddler's Cove Marina. Transect SC4 was 135 m in length and was sampled in an east to west direction. Transect data was collected in 1999/2000 and in 2005.

3.4.5 Transect South Central 5 (SC5) was located on the eastern shore just south of Fiddler's Cove Marina. Transect SC5 was 170 m in length and sampled in an east to west direction. The eelgrass beds associated with this transect forms a narrow band along the shoreline and was sampled for density in 1999/2000 and in 2005.

3.5 South Bay

3.5.1 Transect South Bay 1 (SB1) was located on the western shore south of SC5 near the state beach camping area. Transect SC1 was 1760 m in length and sampled in a west to east direction. The eelgrass bed was most dense insure and crosses a boat channel near its midpoint. Transect data was collected in 1999/2000 and in 2005.

3.5.2 Transect South Bay 2 (SB2) was located on the eastern shore across the bay and south from SB1. SB2 originates in shallow waters near the commercial boat yard, was 1100 m in length, and sampled in an east to west direction. Transect SB2 crosses two channels and terminates at the main channel in the center of the southbay. Transect data was collected in 1999/2000 and in 2005.

3.5.3 Transect South Bay 3 (SB3) was located on the western shore near the south entrance to Coronado Keys. The transect was perpendicular to shore, was 1200 m in length, and sampled from west to east. The transect crosses two channels with the second channel being the main channel in the center of the bay. Transect data was collected in 1999/2000 and in 2005.

3.5.4 Transect South Bay 4 (SB4) was located just south of the entrance to Chula Vista Marina aligned perpendicular to shore. Transect SB4 was 680 m in length and was sampled in a west to east direction. Transect data was collected in 1999/2000 and in 2005.

3.5.5 Transect South Bay 5 (SB5) was located in the southern most portion of the bay near Emory Cove. Transect SB5 was 1640 m in length, almost perpendicular to shore, and sampled in an east to west direction. Transect data was collected in 1999/2000 and in 2005.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

JUN 20 2005

In Reply Refer To:
FWS-SDG-3908.4

Captain Townsend G. Alexander
Commanding Officer
Naval Base Coronado
P.O. Box 357033
San Diego, California 92135-7033

Captain Anthony J. Gonzales
Assistant Chief of Staff for Environment
Commander Navy Region Southwest
140 Sylvester Road
San Diego, California 92106-3521

Attn: Tammy Conkle, Wildlife Biologist

Dear Captain Alexander and Captain Gonzales:

This letter constitutes an amendment to the April 1, 2005 Biological Opinion on the Navy's proposed and ongoing operations and 2005 management strategy for the western snowy plover (*Charadrius alexandrinus nivosus,* snowy plover) and California least tern (*Sterna antillarum browni*) at Naval Air Station, North Island (NASNI)/Naval Base Coronado (NBC) located in San Diego County, California. The Fish and Wildlife Service (Service) received electronic -mail communication from Commander, Navy Region Southwest (Navy) on April 25 indicating that the level of incidental take associated with the proposed action had reached fifty percent of that anticipated in the Biological Opinion 3908.3. The Service met with Navy staff on May 13, 2005 and discussed the need to re-initiate consultation to address the unanticipated level of take and continued Navy concerns regarding Terms and Conditions included in the Biological Opinion 3908.3. At issue are the effects of ongoing airfield operations, military training activities, and associated management strategies on the threatened western snowy plover (*Charadrius alexandrinus nivosus*, snowy plover) at NASNI.

This document is based on information outlined in Biological Opinion 3908.3 and on weekly reports from the Navy documenting the status of the western snowy plover during the 2005 breeding season.

Consultation History

The Service finalized Biological Opinion FWS-SDG-3908.3 on April 1, 2005. On April 4, 2005 the Service delivered a transmittal memo for the Opinion and conducted a site visit at the proposed location of the Navy Lodge expansion project on Naval Air Station, North Island. On April 13, 2005 the Service received a letter from the Navy expressing disagreement with the necessity of three Terms and Conditions to minimize the impacts of the exempted incidental take associated with the proposed action. Terms and Conditions at issue included: Term and

Condition 1(a), a requirement to discontinue beach raking from March 1- May 31; Term and Condition 2(c), a requirement to prohibit dog use of the NAS North Island Beach; and Term and Condition 2(a), a requirement to protect 16.8 acres of plover habitat from foot traffic during the breeding season. The Service responded to the Navy letter on April 22, 2005. On April 25, 2005 the Navy e-mailed a weekly report to the Service indicating that five (5) nests had already been documented on the airfield. On May 13, 2005 the Navy and Service met to discuss the Navy's continued concern regarding plover management on Naval Air Station North Island. The Service agreed to address Navy concerns regarding Terms and Conditions 1(a), 2(a), and 2(c), by excluding these conditions in from an amended Opinion. The Service and Navy agreed to attempt to conserve the existing snowy plover population on NASNI with measures amenable to Navy management, but to implement additional measures if the approach is ineffective at conserving the plover population. As a follow up Ms. Sandy Vissman on May 25, 2005 the Service conducted a site visit at NASNI, May 25, 2005 NASNI.

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is described in Biological Opinion 3908.3 and is incorporated herein by reference.

STATUS OF THE SPECIES

Information regarding the status of the western snowy plover through 2004 is provided in Biological Opinion 3908.3 and is incorporated herein by reference.

Information collected to date during the 2005 breeding season, both range-wide and within the action area indicates that plover nest numbers are lower than in 2004 (Jim Watkins, Kevin Clark, Elizabeth Copper pers. comm.). Within the San Diego Bay area, nest numbers are significantly lower than in 2004. The minimum pair estimate to date in the San Diego Bay area (derived by assessing the number of simultaneous active nests) is 26 pairs, compared to 43 pairs for the same area in 2004 (Figure 1).

Since 2003, an unusually high number of sick or dead western snowy plovers have been recovered off of beaches in the San Diego Bay area during the breeding season. This season the number of sick or dead plovers recovered off of San Diego Bay area beaches has exceeded 2003 (6 plovers) and 2004 (19 plovers), as 25 adult western snowy plovers have been recovered between February and May 29, 2005. The number of plovers recovered to date represents approximately 20-30 percent of the local breeding population. Although the cause of the mortality is unknown, it is likely that this significant reduction in the local population size is, in part, responsible for the lower number of nests observed to date.

ENVIRONMENTAL BASELINE

Though Western snowy plovers are present on NASNI during the 2005 breeding season, but removal of nests on the airfield precludes an immediate assessment of the number of simultaneous active nests, and thereby an estimate of the number of breeding adults present. The number of simultaneous active nests may be estimated by back-calculating once all chicks in captivity hatch, but is not available at this time. Based on monitor observations of the area, fewer plovers are present than in 2004 (Elizabeth Copper, pers. comm.). However, two sick plovers were recovered from the NASNI beach during May 2005. Of these, one died and one survived, was released, and has returned to NASNI. One dead plover and one injured plover have also been recovered from NASNI.

Hazing of snowy plovers and removal of plover nests has been conducted on the airfield, as exempted under Biological Opinion 3908.3. Hazing efforts, which included general harassment and the use of pyrotechnics, does not seem to be effective although its use was delayed due to the issuance date of the Biological Opinion 3908.3. To date, 14 nests have been detected on the airfield. Of these, 10 nests have been brought into captivity, one (1) nest has failed due to predation, and one (1) has been run over or otherwise crushed. Twenty-eight eggs have been removed from North Island and taken to Project Wildlife as of May 29, 2005. Eighteen chicks have successfully hatched from these eggs to date, and are now being raised in captivity by Project Wildlife. More eggs are expected to hatch in the near future.

A total of six (6) snowy plover nests have been initiated on the NASNI Beach as of May 31, 2005. As noted in Opinion 3908.3, the western end of the NASNI Beach is eroded and reduced in size compared to the recent past and one nesting attempts at this end of the beach have failed due to tidal activity. A second other nest in this area was brought into captivity because as the adults tending the nest were found sick or dead.

During the beginning of the plover breeding season, raking was conducted regularly across the NASNI beach in front of the Navy Lodge, Building 710, and cabana area. The level of activity on the beach may have contributed to the low number of plover nest initiations observed in this area. Raking, however, was not done in areas that were marked off for plover management. In addition, any scrapes or nests that were found during regular monitoring were marked and avoided. Raking was discontinued between approximately April 25 and May 31, 2005 pursuant to Terms and Conditions prescribed in Biological Opinion 3908.3. In addition, dogs have been precluded from the NASNI Beach since April 1, 2005, but will be allowed on leash after issuance of this Opinion (3908.4).

Several large mounds of soil and crushed pavement are present to the north east of the beach adjacent to the 4.19 acre area prepared to accommodate snowy plover nesting. The piles of debris are of significant height and were noted as corvid perches in April. This has reduced the suitability of this area for plover nesting, and may have contributed to the lack of plover nest

initiations observed in this area. Plover nests, however, were not observed in this area in 2003 or 2004, prior to establishment of the debris piles, so other variables may contribute to the absence of plover nests. The soil and crushed pavement mounds are scheduled for removal on July 17, 2005 (Tammy Conkle, pers. Comm.).

EFFECTS OF THE ACTION

The anticipated effects of airfield operations, the BASH program, and NASNI Beach activities were evaluated in Biological Opinion 3908.3, but the number of plover nests that could occur on the airfield was however we underestimated the number of plover nests that could occur on the airfield. In addition, the local status of the western snowy plover has declined during the 2005 breeding season.

We had anticipated that efforts to haze plovers from the airfield combined with management of adjacent areas to render them attractive to breeding plovers would result in only 10 western snowy plover nests on the airfield, with subsequent nesting efforts in adjacent suitable areas. Thirteen nests have already been constructed on the airfield. As noted in Biological Opinion 3908.3, plovers will re-nest after nest failure and after successful nesting attempts. The higher rate of nesting observed on the airfield may be resulting from pairs re-nesting on the airfield instead of relocating to nearby suitable habitat. This could occur due to insufficient suitability of habitat nearby or non-responsiveness to hazing. Plovers attempting to nest on the airfield after failure elsewhere (for example on Zuniga Beach) could also contribute to the nesting observed on the airfield in 2005.

We do not yet have a basis for estimating the number of pairs/birds using the airfield during the 2005 breeding season because nests are currently removed when a clutch is complete which precludes immediate calculation of a maximum active nest number. We assume that the same resident plovers that used the airfield for nesting in 2003 and 2004 were attempting to nest are once again nesting on the airfield at the beginning of the 2005 breeding season. The number of simultaneous active nests during 2005 may be estimated by back-calculating once all chicks in captivity hatch, but is not available at this time. Based on the number of plovers estimated nesting on the airfield in 2004 (8 pairs), and the observed likelihood of persistent re-nesting (plovers can re-nest 3 to 6 times in a season), it is possible that between 24 and 48 nests could be initiated on the NASNI airfield. Since the local status of the plover is declining, however, and fewer birds are present in the general area, it is likely that fewer plovers are also present on the airfield. It is also likely that repeated hazing will eventually displace these plovers and result in fewer than 48 nests on the airfield. Based on the 2004 distribution and re-nesting potential combined with the observed reduction in the local population size and likelihood that repeated hazing will eventually force relocation of plovers, we anticipate that a maximum of 30 nests could be initiated on the NASNI airfield.

Due to the unexplained mortality in the San Diego Bay area and reduced nest numbers during the 2005 breeding season, we are concerned about the status of the western snowy plover in this area. In addition to a lower rate of nest establishment in the area, some nests have been abandoned by sick/dead adults. Removal of nests from the airfield could have greater consequences to the population than originally anticipated since local plover numbers are lower than in 2004 and the number of nests that may be constructed on the airfield is greater than expected. Alternatively, removal of eggs for captive rearing nests from the airfield could increase the local productivity. Plover nest numbers are very low in the San Diego Bay area and removing nests stimulates results in re-nesting and results in increased egg production. Planned release of the captive reared chicks may contribute to the overall population, although the potential success of captive reared birds is unknown. Whether continuing to remove nests from the airfield will result in significant adverse effects to the remaining local population or whether it would actually provide some benefit to the population, given the unexplained mortality in the local population, is unknown. It is likely that continued removal of nests from the airfield will reduce the distribution of snowy plovers in the area as birds discontinue nesting on the airfield and are displaced.

Plover abundance and distribution is being adversely affected on NASNI during 2005. Although some habitat is being protected from disturbance that theoretically could support the existing NASNI population, based on plovers persistent attraction to the airfield, sufficient amounts of suitable habitat may no longer exist to support the displaced birds. If the number of adult plovers falls below 20 breeding adults on NASNI, then the breeding population will not meet the numerical management objectives prescribed in the draft Western Snowy Plover Recovery Plan.

Creating conditions conducive to plover nesting in appropriate habitat adjacent to the airfield remains an important means of achieving successful deterrence of plovers from the airfield and is important to minimize the impacts of the proposed action. It is likely that continued harassment from the airfield and associated egg removal will result in the displacement of these birds. That birds appear to be renesting repeatedly on the airfield raises questions whether sufficient alternative habitat remains available without more intensive management of plover habitat elsewhere in the vicinity.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future non-federal (State, tribal, local, or private actions) activities 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 consultation pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended. We anticipate that non-Federal actions, such as the prevalence of contaminants in San Diego Bay waters associated with certain marine activities (e.g., marinas and shipyards), the continued development of nearshore ocean and bay waters for commercial and recreational purposes, and the disturbance of nesting areas by humans

and feral mammals, are expected to cumulatively contribute to adverse effects to the snowy plover. These effects magnify the importance of secure, well-managed sites for the snowy plover.

CONCLUSION

After reviewing the current status of the western snowy plover, the environmental baseline for the action area, effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the western snowy plover. The effects of the proposed action, however, will likely be magnified by the unexplained plover mortality in the San Diego Bay area and resulting local decline in the plover population. We draw this conclusion for the following reasons:

1. Based on the 2004 minimum plover population estimated for NASNI, approximately 12-13 pairs of western snowy plovers are/have been affected by the proposed action. This represents approximately one (1) percent of the range-wide population and ten (10) percent of the Recovery Unit 6 population (based on 2004 data).

2. The Navy proposes to continue a comprehensive predator management program and protect area on NASNI that may provide suitable conditions for reproduction for 12-13 pairs of snowy plovers. In addition, the Navy has agreed to reevaluate the need for additional conservation measures should the current approach prove ineffective at conservation of the NASNI population.

3. At least 42 percent of the eggs collected on the airfield are expected to survive and produce chicks for release into the wild population during the summer of 2005. With 258 eggs in captivity to date from the NASNI airfield this would result in 101/112 chicks. The survival rate of released chicks is not known, but introduction of 10 or 11 fledglings into the population would approximate productivity of .83-.91 fledglings/pair.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations issued pursuant to section 4(d) of the Act prohibit take of endangered and threatened species without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing potential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral 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, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2) of the Act, such incidental take is not considered to be a prohibited taking under the Act, provided that such taking is in compliance with this incidental take statement.

The measures described below are nondiscretionary and must be undertaken by the Navy so they become binding conditions of any permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity covered by this incidental take statement. If the Navy (1) fails to adhere to the terms and conditions, (2) fails to require the enforceable terms that are added to the permit, and/or (3) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impacts of incidental take, the Navy must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

Amount or Extent of Take Anticipated

Based on our discussion in the effects analysis, we anticipate the following take may occur on the airfield and training beaches at NASNI in the form of harm or harassment.

1. We anticipate that all western snowy plovers that frequent the NASNI airfield may be subject to harassment during efforts to prevent nest construction on the airfield. Efforts to deter nesting may result in failed nesting attempts or abandonment of the area. Based on the population estimates for NASNI up to 10 pairs of western snowy plovers could be subject to harassment if these individuals are on the NASNI airfield.

2. We anticipate that up to 30 snowy plover nests or 90 eggs, if laid within the boundaries of the NASNI airfield, would be subject to capture (collection, incubation, captive rearing, and release). We expect the number of nests that occur on the airfield to be minimized by efforts to prevent nesting on the NASNI airfield.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the impact of incidental take anticipated in this biological opinion on least tern and snowy plover.

1. The Navy must implement the Proposed Avoidance and Minimization Measures subject to modifications described below, to increase the measures' effectiveness in avoiding and minimizing impacts of incidental take.

2. The Navy shall protect sufficient area from disturbance at an off-airfield site(s) to encourage snowy plovers that currently inhabit NASNI to initiate nesting efforts outside of the airfield boundaries. This measure is necessary to reduce the impact displacing nesting plovers.

3. The Service and Navy have agreed to attempt to conserve the existing plover population on North Island with measures amenable to Navy management, but to implement additional measures if the approach is ineffective at conserving the plover population. Accordingly, the Navy and Service should evaluate the success of the reasonable and prudent measures provided herein based on the ongoing status of the plover population on NASNI, and develop additional measures if the plover population on NASNI declines. If the plover population on NASNI falls below an estimated 20 breeding adults for two years, the Navy and the Service should develop additional measures to conserve snowy plovers at NASNI.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Endangered Species Act, the Navy must ensure that their military personnel, including all agents and contractors anticipated herein, comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline the required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure one, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

The Navy shall implement the Avoidance and Minimization Measures in the "Description of the Proposed Action" above, subject to the following modifications:

a. Stakes that delineate plover nests shall remain in place for 7 days post-hatch or as long as plovers are detected within 15 meters of the staked area during monitoring visits to provide refuge from foot/vehicle traffic to plover chicks on the beach and to protect the nest, in the event of re-use. The Navy shall place a Mammalian Exclosure or Mini Exclosure (ME) over plover nests on NASNI in such instances where an ME would potentially benefit the nest/ nesting pair. This may be necessary to protect nests from gull-billed tern predation, dogs, or other mammalian predators. Placement of an ME may also help reduce the potential for inadvertent destruction from foot traffic. This term and condition modifies the current proposal for maintaining protective stakes for 7 days post-hatch.

b. The Navy shall assure that the future hatching, fledging and release potential of any eggs collected from the NASNI airfield will be conducted in a manner and with sufficient resources and oversight to maximize the likelihood of success. In so doing, the Navy shall assure that Project Wildlife, or other cooperators, as necessary, are supplied with

adequate resources to successfully implement this term and condition. Collection of eggs shall occur after the clutch is complete (typically after 3 eggs are laid), except in a circumstance where an incomplete clutch poses an immediate and imminent threat to aircraft safety. Eggs shall be collected and moved in a brooder box, or other suitable means that will maximize potential for success, by a qualified professional contracted by the Navy (Zoological Society of San Diego). Incubation, rearing, and release of fledglings shall follow previously successful protocols. All fledglings released shall be uniquely banded to allow future identification and assessment of success. Release of fledglings shall occur soon after fledging when fledglings have developed feeding and flight skills necessary for survival. Release of fledglings shall be planned for beach segments near San Diego Bay or Mission Bay in areas that benefit from predator management, or have low documented levels of predation. The Navy shall not preclude the release of chicks on lands administered by Naval Base Coronado (NBC) if these sites evidence the lowest levels of predation and maximum opportunities for survival for snowy plover chicks.

c. The Navy shall prepare an end of the year report that documents, at a minimum, the locations of nests collected, number of nests/eggs collected, the hatch date of each egg collected, the unique band combination given each captive-reared chick, the approximate fledging date and the release date/location of each fledgling, and suggestions to improve the efficacy of this process if used in future years. This information is necessary to assess the amount of incidental take, and the effectiveness of using this approach to minimize impacts.

d. The Navy shall contact the Service and report the circumstance that necessitates movement of any plover nest. This will be done with submittal of the Navy's weekly reports to the Service. If relocation is necessary, nests moved shall be relocated the shortest distance possible into suitable habitat within the boundaries of NASNI to increase the chances for nest success.

e. The Navy shall implement a comprehensive biological monitoring program that ensures the identification of snowy plover nesting locations and the overall number of adult breeding pairs and fledglings produced on the NASNI beach. The Navy shall prepare reports for the Service at a minimum of twice a month. In addition, the monitoring results shall be submitted to the Service when a draft report for 2005 least tern and snowy plover breeding season is received by the Navy. The biological monitors shall also include in their report: (a) an evaluation of the effectiveness of the 30-meter buffer surrounding each snowy plover nest and the wooden stakes or tongue depressors used to mark least tern nests; (b) when the first adult birds arrive, number and location of nests, number of individual nests, estimated number of fledglings produced, number of relocated nests, success of all relocation efforts, level of incidental take associated with training at NASNI, and when discernible the amount and type of predation events that

occur; (c) an evaluation of the success of the 4.13 acre site that was enhanced adjacent to the rifle range in 2005; (d) when possible, any observations of captive-reared plovers or least terns in the wild, especially as relating to the condition and survival of these birds (e.g., data on the interaction of fledglings with wild least terns or snowy plovers, foraging behavior of captive birds compared to wild birds, mortality and cause of death of captive birds when it can be determined, and locations where captive-reared least terns are observed); and (e) the interactions of gull-billed terns and peregrine falcons with least tern and snowy plover nesting colonies.

f. The Navy shall assure that all personnel who stay at the Navy Lodge between March 1 and August 31 receive or are shown a map delineating plover protection areas as well as basic information concerning plover status and biology.

2. To implement reasonable and prudent measure two, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

a. To reduce the impact of harassment from the NASNI airfield, disturbances on the recreational beach, the Navy shall provide conditions conducive to nesting for the approximately 12-13 pairs of plovers that have nested on NASNI since 2002. Based on plover densities at NAB, densities cited in the Birds of North America species account, and the density of plovers that have previously nested on the airfield and in the protected area in front of Building 710, plovers nest territories occupy area ranging from .5 to 1 ha (1.2-2.4 acres/pair). Approximately 14.4-33.6 acres of undisturbed habitat is likely necessary to encourage breeding behavior and nest initiation by the 12-13 pairs of plovers breeding at NASNI. Using the minimum territory size estimate (1.2 acres pair), and the maximum pair estimate (13 pairs), 15.6 acres of undisturbed habitat should be adequate to provide conditions conducive to nesting for the breeding plovers at NASNI, though greater acreage consistent with the lower nesting densities cited above may be needed if the acreage provided does not support 12-13 pairs. The beach area at NASNI, most notably the western end of the beach, is limited in size/width due to unusually high tides, storms, and beach erosion during 2005 and is unlikely to support successful plover nests. The Navy has identified 14.9 acres of beach and adjacent habitat that can be protected from foot traffic and is consistent with Navy management. Accordingly, the Navy shall:

(1) Protect (from foot/vehicle traffic) and symbolically fence (using staking and signage) at least 14.9 acres of appropriate plover habitat (measured above the mean high tide line) in the vicinity of the airfield (including beach and/or upland areas) from disturbance from at least March 1 to August 15. This acreage may include the area west of the pistol range, and the marked area directly in front of Building 710. Although Zuniga Beach once comprised an area of approximately

15 acres, it is currently very narrow due to sand loss associated with winter storms, and may not be considered as part of the protected habitat since it is unlikely to support successful plover nests.

(2) Discontinue vehicle use on the NASNI beach except in instances where vehicle use is conducted as part of military training or for health and human safety needs. If lifeguards require vehicle use, they shall be educated about the snowy plover biology and conservation needs on NASNI, and encouraged to designate and use fixed routes to minimize beach disturbance.

(3) Enforce the existing NASNI leash instruction on the NASNI Beach.

(4) Assure that future uses of areas adjacent to those designated for plover nesting are conducive to plover nesting. This may include establishment of height, noise, or lighting guidelines on future projects. It is not considered possible to reduce the height of the current soil/debris mounds adjacent to the pistol range at this time due to the current contract under which the work is being conducted (Tammy Conkle, pers. comm.). This material will, however, be removed on July 17, 2005. This date follows the majority of the plover breeding season.

The Service believes that no more than the anticipated incidental take for least terns and snowy plovers identified above will result from the proposed action. The reasonable and prudent measures, with the implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Navy must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

If 50 percent of the anticipated take to snowy plover nests is reached, we recommend that the Service and the Navy meet to discuss the potential for reaching the incidental take limits set in this biological opinion. At such a meeting we could identify other appropriate conservation measures that may prevent reaching the incidental take limit, and could begin the process to modify the incidental take statement, if appropriate. Such a meeting would help reduce the potential for disruption to training that could occur should the incidental take limits is reached.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act 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.

a. The Navy should explore the potential for dune restoration of the dune area north/east of the recreational beach. Such restoration may provide additional habitat for snowy plovers that would not be in conflict with recreational beach use.

b. The Navy should experiment with the application of shade cloth or other visual deterrent to the lower segment of the fence that separates the Navy beach from Dog Beach. Providing a visual barrier between the Navy beach and Dog beach may make this segment of Navy beach more attractive to plovers for nesting.

c. The Navy should work with the Service to develop a comprehensive conservation strategy for Snowy plovers on Naval Base Coronado that is consistent with the recovery objectives for the species. This strategy is needed to address the conservation needs of the snowy plover in the face of increasing use intensity on NASNI and surrounding areas. A comprehensive strategy to address snowy plover conservation needs should be included in the next iteration of the Naval Base Coronado Integrated Natural Resources Management Plan.

REINITIATION NOTICE

This concludes formal consultation on the Military Training Operations on the Silver Strand Naval Facilities. 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 if exceeded; (2) new information reveals effects of the proposed 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 listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this biological opinion, please contact Sandy Vissman of this office at (760) 431-9440 extension 274.

Sincerely,

Therese O'Rourke
Assistant Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

FACSIMILE TRANSMITTAL FORM

Date Sent:	*No. of Pages:*	*Time Sent: (Pacific Time)*
6/21/05	13	1320

TO: ***Fax No.:***

Tammy Conkle 619-545-3489

FROM: ***Fax No: (760) 431-5902***
Phone No.: (760) 431-9440

Sandy Vissman

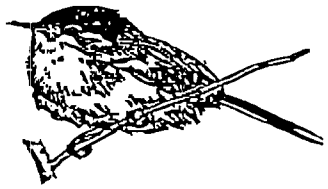
SUBJECT:

3908.4 BO

COMMENTS:

If you have any have problems receiving this fax, please call (760) 431-9440, extension 284. Thank you.

California Gnatcatcher



The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.

TAKE PRIDE IN AMERICA

ATTN: CMDR ARMSTRONG
21426 3 PAGES

FROM: EDIE JACOBSEN
532-3618

MEMORANDUM OF UNDERSTANDING BETWEEN THE NAVAL AIR STATION, NORTH ISLAND AND THE U.S. FISH AND WILDLIFE SERVICE RELATING TO THE PROTECTION OF NATURAL RESOURCES WITHIN THE TIJUANA MARSH NAVAL OUTLYING LANDING FIELD, IMPERIAL BEACH, CALIFORNIA

The Commanding Officer, Naval Air Station, North Island (NASNI) and the Regional Director, U.S. Fish and Wildlife Service (USFWS): ACTING in furtherance of the purposes of the Fish and Wildlife Act of 1956 (16 USC 742(a)-754 et. seq.); the Sikes Act (74 Stat. 1052; P.L.06-797); and the Endangered Species Act of 1973 (P.L. 93-205) as amended and

RECOGNIZING that: (1) the Tijuana Marsh is a unique and valuable coastal salt marsh containing habitat for three endangered species, a large variety of migratory birds, and other terrestrial and marine life in unusual ecological relationships; (2) the preservation, study and educational use of this unique marsh would be in the national public interest; (3) the NASNI and the USFWS currently participate in cooperative management of the Marsh as members of the Tijuana River National Estuarine Sanctuary Management Authority and (4) the USFWS being a neighboring land owner and being experienced in the preservation and management of such outstanding resources, should assume lead responsibility for the protection of these priceless national possessions,

DO HEREBY AGREE, that the following shall govern the protection and management of 606.42 acres of the above mentioned resources at the Tijuana Marsh, Naval Outlying Field, Imperial Beach, California, as shown on attached map, as part of the National Wildlife Refuge System.

ARTICLE I. The U.S. Fish and Wildlife Service hereby agrees:

a. to prepare an inventory of and a management plan for the Fish and Wildlife resources on Navy lands within the Tijuana Marsh and to administer biological programs relative thereto;

b. to be responsible for the preservation and recovery of endangered or threatened plants and animals and to implement appropriate management measures;

c. to enforce current Federal and State laws and regulations on Navy lands consistent with the operation of a National Wildlife Refuge in order to protect the natural resources; and

d. to provide to NASNI copies of reports on the resources of the Tijuana Marsh as they become available.

ARTICLE II. Naval Air Station, North Island hereby agrees:

a. to permit USFWS personnel and persons authorized by the USFWS to conduct management and research activities within the Tijuana Marsh;

b. to assist in the preservation and management of such resources; and

c. to permit the USFWS to enforce all rules, regulations and laws within its power which will assist in the operation of Tijuana Marsh as part of the National Wildlife Refuge System;

ARTICLE III. It is further understood and agreed that:

a. the Department of the Navy, which purchased the Tijuana Marsh lands to ensure protection of aircraft overflight, will continue use of the area for NASNI based squadrons;

b. the Tijuana Marsh will be managed for the preservation of coastal wetlands and for the protection of endangered species. Planned research and management programs conducted by and in behalf of the USFWS shall have prior approval of NASNI through annual program reviews to occur on or before November 30;

c. the future use of the Tijuana Marsh may include other military undertakings, and in such event, it is understood that all activities conducted by or in behalf of the USFWS shall recognize the priority of such undertakings. However, because of the high national ecological value of the area, NASNI will fully consider all feasible and prudent alternatives before proposing any uses that would adversely affect natural resources. Regardless, such activities must be in conformance with Section 7 of the Endangered Species Act of 1973, as amended (P.L. 93-205);

d. the USFWS may enter into agreements with educational, research, scientific organizations, and governmental agencies in carrying out its responsibilities under this agreement, and shall coordinate the activities of such institutions; and

e. the USFWS will coordinate with and obtain written approval from NASNI prior to altering physical features or adding improvements of any kind within the Tijuana Marsh. Upon termination of this agreement, the premises shall be restored to its original condition, to the extent directed by NASNI. Any USFWS improvements approved by NASNI for abandonment within the Tijuana Marsh shall become the property of the Navy without payment therefore;

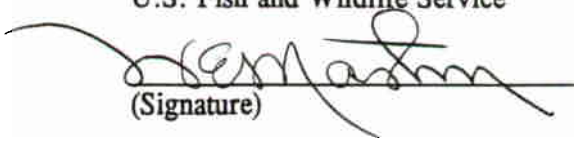
f. the implementation of the understanding reached in this agreement is subject to the availability of funds and personnel for such purposes;

g. NASNI will make maximum use of the technical services, liaison, and other assistance available from Southwest Division, Naval Facilities Engineering Command in planning and implementing this cooperative agreement.

ARTICLE IV.

This Memorandum of Understanding (MOU) shall remain in effect until terminated or modified by mutual agreement, and shall be reviewed every five years during the anniversary month of its establishment. This MOU is effective upon the later date of signing by the Commanding Officer, Southwest Division, Naval Facilities Engineering Command; the Commanding Officer, Naval Air Station, North Island or the Regional Director, U.S. Fish and Wildlife Service.

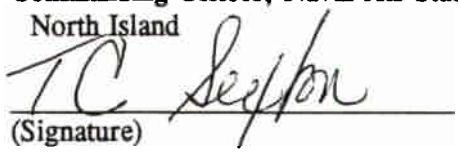
Acting Regional Director
U.S. Fish and Wildlife Service



(Signature)

SEP 27 1991
(Date)

Commanding Officer, Naval Air Station,
North Island



(Signature)

2/18/92
(Date)

Commanding Officer, Southwest Division,
Naval Facilities Engineering Command

(Signature)

4/13/92
(Date)

Memorandum of Understanding
between the
Department of the Navy
and the
U. S. Fish and Wildlife Service
relating to the
Designation and Management of a Preserve
for the
California Least Tern
at the
Naval Amphibious Base, Coronado, California

The Commanding Officer, Naval Amphibious Base, Coronado, (NAVPHIBASE Coronado) and the Regional Director, U. S. Fish and Wildlife Service (USFWS);

ACTING in furtherance of the purposes of the Endangered Species Act (P.L. 93-205) as amended and as determined and agreed during Formal Consultations with USFWS regarding impacts to the endangered California least tern from construction of the LAMPS MK III program at the Naval Air Station (NAS), North Island;

RECOGNIZING THAT that portion of NAVPHIBASE Coronado known as Delta Beach (1) has in the past been utilized as a nesting area by the endangered California least tern, (2) serves as a valuable potential nesting habitat for future years, and (3) has been heavily impacted in the past by human recreational activity that had degraded the site for use by nesting California least terns;

FURTHER RECOGNIZING THAT the preservation of the California least tern, its habitats, and the other habitats on Delta Beach would be in the national public interest;

AND THAT the elimination of the disruptive recreational activity, along with the proper management of Delta Beach will:

1. Improve the habitat for the California least tern and other indigenous flora and fauna,

2. Serve to partially mitigate for impacts to the California least tern from LAMPS MK III, and

3. Contribute to the protection of the California least tern and the attempts to increase its population to allow for delisting of the species.

DO HEREBY AGREE that Delta Beach is to be designated as a California Least Tern Preserve and is to be fully protected and adequately managed for such use by the Department of the Navy in accordance with the agreements described below;

Article I. The Department of the Navy, acting through the Commanding Officer of NAVPHIBASE Coronado hereby agrees to:

1. Designate Delta Beach as a California Least Tern Preserve.

2. Manage the Preserve in accordance with an official California Least Tern Preserve Management Plan, which has been reviewed and approved by the USFWS Endangered Species Office.

3. Carry out the activities of the Management Plan, including but not limited to:

a. Vegetation control and manipulation
b. Enhancement of the soil substrate
c. Predator control
d. Accomplishment of yearly monitoring surveys and banding programs
e. Maintenance of the fence and other facilities and appurtenances required for the protection of the colony

4. Provide funds and personnel as necessary to ensure proper and timely implementation of the management activities required by the Management Plan,

5. Prohibit recreational activity and all other public (non-military) access except that which may be required to carry out management activities for the California least tern.

6. Provide yearly reports of the management activities accomplished and provide these reports to the USFWS Endangered Species Office.

7. Cooperate with other Naval activities in the San Diego region at which California least tern nesting colonies occur, through sharing information, materials, personnel, and technical assistance,

8. Allow access to USFWS personnel or such other personnel duly authorized by USFWS for the purpose of conducting any surveys or research determined to be necessary to determine the status of the California least tern population or the condition of its habitat and other factors relating to proper protection and management of this species on Delta Beach.

9. Sponsor a Preserve Committee which will meet annually for the purpose of evaluating current management techniques, reviewing management activities on the Preserve and updating the Management Plan for the Preserve. The Preserve Committee is to be comprised of representatives of NAVPHIBASE Coronado, WESTNAVFACENGCOM and the USFWS Endangered Species Office with optional representation by other least tern experts or representatives of conservation agencies or groups as may be appropriate.

Article II. The Department of Interior, acting through USFWS, hereby agrees to:

1. Provide technical assistance and advice to NAVPHIBASE Coronado in development and implementation of a California Least Tern Management Plan and in further ensuring the proper protection and adequate management of the California least tern at NAVPHIBASE Coronado.

1. Provide technical assistance and advice to NAVPHIBASE Coronado in development and implementation of a California Least Tern Management Plan and in further ensuring the proper protection and adequate management of the California least tern at NAVPHIBASE Coronado.

Article III. It is further understood and agreed that:

1. Designation of Delta Beach on NAVPHIBASE Coronado as a California Least Tern Preserve, the elimination of public recreational activity thereon, and the proper management and protection of the California least tern and its habitat on the Preserve will serve to partially mitigate for impacts to the California least tern on NAS North Island.

2. Designation of the Preserve will in no way inhibit use of the Delta Beach for military maneuvers and that the primary purpose of Delta Beach is for the accomplishment of such beach and underwater training maneuvers.

3. NAVPHIBASE Coronado will recognize the value of Delta Beach as a Preserve and will restrict its maneuvers insofar as possible to the northern and eastern perimeters.

This Memorandum of Understanding, shall remain in effect until terminated or modified by mutual agreement. This Memorandum of Understanding becomes effective upon the date of the last signature below.

Commanding Officer
Naval Amphibious Base, Coronado

1/3/84
Date

Regional Director
U. S. Fish and Wildlife Service

3/12/84
Date

United States Fish and Wildlife
Service
Department of the Interior
Portland, Oregon 97232

in Reply Refer To: AFA—SE

Y

March 2, 1983

1-1-82--F-123

Captain Robert B. Watts
Commanding Officer
Naval Air Station North Island
San Diego, California 92135

Dear Captain Watts~

Subject: Formal Endangered Species Consultation on the MAT Repair/Lamps MKIII Project at Naval Air Station North Island (NASNI), San Diego County, California

This responds to your request of July 30, 1982, for formal consultation pursuant to the Endangered Species Act of 1973, as amended (ESA). In question are the effects of completing MAT repairs and construction of the Light Airborne Multipurpose System (LAMPS MKIII) facilities (on the MAT) on the endangered California least tern (CLT) (Sterna antillarum (albifrons) browni). The MAT is an area of open asphalt used primarily for helicopter parking, landing, and takeoff operations.

Our original, related Biological Opinion of Maich 5, 1980, (1-1-80--F-18) concluded that NAT repair only, with compensation provided, would not jeopardize the continued existence of the CLT. Since that time, however, the MAT repair project has undergone substantive change, the compensation measures (alternate nesting sites) have not benefitted CLT, and the LAMPS MXIII project has been added to the development plans for the NAT. Information obtained during the course of meetings and correspondence, field investigations of the project site, in conversations with CLT biologists, meetings with CLT Recovery Team members, and data in our Service files, and the Biological Assessment of the Impact of the MAT Development Program at NASNI on the California Least Tern, July 23, 1982, (BA), provides the basis for writing this Opinion.

Biological Opinion

Based on the analysis given below, it is our Biological Opinion that the subject project, with compensation provided, is not likely to jeopardize the continued existence of the California least tern.

Project Description

LAMPS MKIII facilities planned on the MAT include construction of aircraft hangars, data processing buildings, training and maintenance facilities, helicopter pads, parking lots, equipment shops, and associated utilities.

Figure 1 illustrates the site plan of the LAMPS MKIII program through FY—85 with the limit lines of the pavement repair phases superimposed. Figure 2 delineates the past and future phases of the MAT pavement repairs. The BA provides a more detailed description of the subject project.

As a part of the subject project, the BA proposes the following to compensate for the loss of least tern nesting habitat on the MAT:
1) preserve, indefinitely, a 21.55 acre portion of existing MAT nesting area (Figure 2); 2) enhance the 21.55 acre area by creating 300 nest depressions in the existing pavement; 3) paint the 21.55 acre asphalt surface a sand color to reduce sometimes excessive heat and to enhance camouflage protection; 4) conduct an annual, intensive predator control program around the permanent nest area and elsewhere on NASNI during the CLT nesting season; 5) establish an intensive tern monitoring and banding program on the MAT nesting area; 6) fence the west and south sides of the MAT nesting area to protect terns from disturbance; 7) continue, annually, preparing 29.2 acres on NASNI as alternate nest sites, including predator and vegetation control (Figure 3); 8) exclude 75 acres of land at Delta Beach from public access by fencing for least terns under the terms of a Memorandum of Understanding between the FWS and Naval Amphibious Base (NAB), Coronado; 9) prohibit construction access for P—455 on the NAT nesting site until after the 1982 nesting season; 10) prevent establishment of potential predator perches over 4 feet high within 200 feet of the nesting area; and 11) prohibit construction access for P—261 until after the 1983 nesting season.

Species Account

The BA contains a comprehensive account of CLT biology/ecology, status and distribution, and nesting history in the San Diego area and at NASNI. Please refer to the BA and to our earlier Biological Opinion (March 5, 1980) for detailed information on CLT life history.

The North Island least tern colony is important for several reasons. Terns have nested there since 1977, and may have also nested on the base 10 to 18 years prior to 1977. From a historical and regional perspective, North Island is one of the oldest and most consistently used contemporary nesting sites in San Diego County. In relation to statewide and San Diego Bay CLT breeding populations, North Island has in various years supported from 5 to 10 percent of the state breeding population and 27 to 40 percent of the San Diego Bay breeding population. A majority of the 23 different nesting sites that have been used by least terns in the San Diego Bay area during the last 10 years are no longer suitable for nesting due to urban development or other human disturbance. Those sites that are used often suffer extraordinarily high predation rates and other forms of disturbance, In contrast, NASNI, over the years, has provided relatively stable nesting conditions that have fostered the production of a significant percentage of least terns fledged in California.

Impact Analysis

The proposed MAT resurfacing and construction of the LAMPS MKIII facilities would eliminate 63.45 acres of the original 85 acre MAT area once used by least terns as nesting habitat. (Some of the NAT area has already been eliminated as nesting area due to the resurfacing project.) This 75 percent reduction in acreage would leave 21.55 acres available for tern nesting on the NAT indefinitely in the future. This represents a reduction of adverse impacts as envisioned in our original Biological Opinion of March 5, 1980, wherein the entire MAT was proposed for resurfacing and would have been lost as a nesting area,

The four new large structures (P—455, P—457, P—458, P—540 in Figure 1) proposed around the remaining NAT nesting area will undoubtedly influence nesting patterns, if not preclude nesting altogether. Some of the more obvious results of these changes to the MAT nesting environment include the following:

1) 27.45 acres (56 percent) of the MAT area currently available for nesting would be eliminated;
2) an increased human presence and possibly disturbance during and after construction;
3) the new structures proposed on the NAT and the fence around the MAT nesting area would reduce site "openess" (view of the horizon) from 117 degrees to approximately 30 degrees, a 75 percent reduction;
4) the new structures would obstruct least tern flyways used in foraging and courtship, and generally encircle any nesting tenis with intense human activity associated with base operations;
5) proximity of new buildings may increase predator presence on the MAT.

We can only speculate about how least terns might respond to or be affected by these changes. The possibilities are numerous and include:

1) numbers of nesting terns may continue almost unchanged compared to the past;
2) nesting numbers could be unaffected but nesting success could suffer;
3) terns could cease nesting at NASNI, or continue nesting in reduced numbers;
4) terns might abandon the MAT altogether and nest on the prepared alternate nesting sites (29.2 acres);
5) terns might abandon the 21.55 acre MAT preserve and, rather than nesting on the prepared alternate nesting sites, scatter throughout unprotected, undesignated areas on NASNI, causing conflicts with Navy operations and increased mortality to terns;
6) terns might nest both on the 21.55 acre MAT preserve as well as elsewhere on base;

Captain Robert B. Watts, Naval Air Station North Island -1—1--82—F—123

7) denser nesting on the MAT could render terns more vulnerable to predators and increase intra-colony conflicts and chick harassment by adults;
8) the observed pattern of terns renesting at NASNI following the failure of other colonies around San Diego might not continue in the future, which could force terns to other less desirable sites, or reduce overall nesting levels county-wide.

Clearly, the potential for adverse impact out-weighs the potential beneficial effects. In our opinion, these effects could, in a worst case analysis, result in the complete loss of the NASNI colony site that is very important to the least tern breeding population in California. Given the multitude of other threats facing most of the other tern colonies in California it is highly unlikely that the CLT could recover to a non-endangered status from such an impact.

Our best estimate of effects is that CLT will continue to try to nest on the 21.55 acre NAT site. While nesting attempts might be high, predation will increase and fledging success will be low. Banding will probably show some nesting displaced to other San Diego sites but overall survival and reproduction will be reduced because of predation and other disturbance problems at most of the other local tern colonies.

The project proposal, however, entails a compensation program which could offset the potential for significant adverse impacts and could result in net beneficial effects to CLT. The most significant aspect of the compensation proposal is the maintenance of alternate, protected nesting areas on NASNI, and the establishment of a 75-acre nesting preserve at Delta Beach. We believe that securing the Delta Beach area for least terns is important because it provides real habitat compensation in the event that tern nesting at NASNI is significantly affected by the adverse potentials discussed above. Given proper management (vegetation and predator control, protection from human disturbance, etc.) and then subsequent acceptance of the site for nesting by least terns, Delta Beach could represent the largest least tern nesting sanctuary in the San Diego area. The possibility seems promising in that terns nested at Delta Beach in 1978 and 1979 under conditions less favorable than those which would be expected in the future with proper management. We know that CLT will return to nest sites where they have nested, fledged young or even attempted to nest in prior years. Once established, the number of nesting terns at a given colony sometimes increases over the years, especially, if the colony is usually successful. There is no guarantee that NASNI terns will relocate to Delta Beach just as they have not relocated to the alternate sites prepared at NASNI since 1980 or earlier.

Even though habitat compensation proposed by NASNI at Delta Beach would fence about 75 acres and officially establish it as a CLT nesting area, arrangements to provide long-term management of the site have not yet

been completed. Real compensation hinges on agreements by the Navy to provide for vegetation and predator control, enhancement of nesting substrate where necessary, and monitoring the site to exclude human disturbance. Under current arrangements, these details will be established in an agreement between NAB-Coronado and the FWS. Without such management, the mere fencing of 75 acres would likely accomplish little for the CLT. We expect, as discussed at our December 8 meeting with Navy representatives from NASNI and NAB-Coronado, that commitments to provide effective management will be forthcoming. Thus, we expect that if necessary, NASNI will lend its support to NAB Coronado, to complete a long-term management plan for CLT at Delta Beach. This should not be difficult since the Naval Facilities Engineering Command in San Bruno has already prepared a CLT plan for Delta Beach. Should these necessary agreements not be forthcoming from the Navy, under the terms of an agreement developed under informal coordination, reinitiation of formal consultation would be necessary to complete satisfactory compensation arrangements for CLT nesting losses at NASNI.

The other proposed compensation measures outlined under the Project Description would enhance least tern productivity if terns continue nesting at NASNI. However, these other measures would not offset the loss of nesting habitat on the MAT unless enhancement of the MAT fosters continued nesting and successful fledging and/or terns begin nesting in comparable numbers on the 29.2 acres of prepared alternate nesting habitat. The likelihood of terns eventually accepting any of the alternate nesting sites is not known. However, judging from the results of past attempts to encourage nesting at alternate sites (on-going since about 1978) the probability does not appear high. Nevertheless, we believe that continuing to encourage tern nesting on the alternate nesting habitat is justified and necessary for several reasons. These include—i) offsetting nesting habitat loss that was the subject of and recommended in our March 5, 1980 Biological Opinion; 2) offsetting additional habitat loss resulting from the LAMPS MKIII project; 3) the Runway 11 and Zuniga Beach sites have the potential to be enlarged, which could make the sites more attractive to least terns; 4) given time and continuing effort, we might discover the factors that have led to the rejection of these sites by least terns in the past; and 5) these sites, if colonized in the future, would provide the opportunity to expand nesting above existing levels at NASNI and could contribute to the eventual recovery of the least tern.

The proposed compensation plan, including continuing vegetation and predator control, colony site enhancement, censusing and banding, together with the habitat compensation at Delta Beach and at NASNI, constitute the most intensive and well org tempt to date at preserving least tern habitat values in response to a project which otherwise could catastrophically affect CLT. Nevertheless, the possibility remains that despite these efforts, CLT could still abandon nesting at NASNI because of the subject project and fail to colonize Delta Beach. However, we believe that given sufficient management effort, this eventuality could be overcome.

Biological Opinion

Based on the impact analysis given above, it is our Biological Opinion that the subject project, with compensation provided, is not likely to jeopardize the continued existence of the California least tern. However, in that the Navy has not yet completed arrangements for long-term management at Delta Beach, full compensation for impacts from the subject project has not been provided. Thus, we reserve the right to reassess the subject project in the future.

In furtherance of the purposes of the Endangered Species Act (Sections 2 (c) and 7(a)(i)) which mandates Federal agencies to utilize their authorities to carry out programs for the conservation of listed species, we recommend the following to augment the proposed compensation

program.

General

1) NASNI should actively assist in the development of an agreement between the FWS and the Navy on perpetual protection and management of Delta Beach for the CLT. All efforts should be made to complete at least an interim agreement before the 1983 least tern nesting season (April 1, 1983). A final agreement should be completed prior to the 1984 tern nesting season (April 1, 1984).

2) NASNI should use LAMPS MKIII project funds to clear vegetation and create a suitable nesting substrate at Delta Beach, and construct a chain-link fence separating Delta Beach from the highway to preclude human disturbance. Fence installation should be completed before the major beach recreation season starts to offset the potential for problems which could arise if the fence was built during the midst of the recreation season. If this is not possible prior to April 1983, fencing should be delayed until the following winter.

3) NASNI should encourage a regional approach to solving CLT problems on Navy lands in the San Diego Bay area. Given the interrelatedness of tern nesting colonies, where impacts to one colony may result in different nesting patterns at another, there has been a long-standing need for inter-base cooperation. This could be accomplished by cooperatively sharing monies, personnel, materials, and technical assistance. NASNI, the Naval Training Center and NAB-Coronado, at a minimum, should be involved in this effort.

4) NASNI should continue to furnish annual reports to the FWS on the results of its CLT management activities at NASNI and at Delta Beach.

5) NASNI should expand its feral cat trapping efforts to include yearlong trapping throughout the entire base. If predator problems arise at Delta Beach cooperative arrangements with NAB-Coronado should be established.

6) NASNI should investigate all feasible techniques of lowering predator populations, including vegetation manipulation to reduce prey populations.

7) NASNI should establish a base regulation making it illegal to release or harbor stray cats on base and prior to each CLT nesting season (April 1), issue a base memorandum reminding personnel of regulations for all prepared nesting sites.

8) NASNI should hire two seasonal assistants each year so that adequate field work and observation time is allotted to provide effective on-the-ground management for least terns.

9) "Nixalite" should be installed on all structures over 4 feet high and on the tops and edges of all buildings that could serve as predator perches within 300 feet (or another such distance mutually agreed upon by the Navy and FWS) of the MAT nesting area and the 29.2 acres of prepared alternate nesting habitat on NASNI.

21.55 Acre MAT Nesting Preserve

1) The Navy should intensively monitor the MAT during construction of the LAMPS MKIII facilities to ensure that least terns are not unnecessarily disturbed. Operations should be altered or halted if conflicts are identified.

2) It may be useful to approach the creation of nesting depressions on the MAT in an experimental fashion, testing tern preferences regarding the size, shape, density, and distribution of depressions. Depressions should probably be distributed randomly over as wide an area as possible to encourage dispersed nesting so that predator attraction is alleviated.

3) The Navy should consider using a night-scope and time-lapse photography to learn more about predation problems.

4) On the north and east sides of the NAT preserve, it could be helpful to install signs, traffic cones or other barriers to prevent human disturbance to the colony. Along these boundaries a low fence made of hardware cloth (or other suitable material) designed to keep tern chicks out of unprotected areas might also alleviate problems. If these measures are not effective, a fence around the entire 21.55 acre colony may be necessary.

6) Designate the MAT colony site in appropriate base regulations and any base Master Plan as permanent open space dedicated for exclusive use as a CLT nesting site. If terns cease using the area in the future, the site could be considered for alternate purposes, subject to consultation with the FWS.

Prepared Alternate Nesting Sites on NASNI

1) In that the potential exists to expand the size of the Zuniga Beach and Runway 11 alternate sites, and since this has been informally agreed to in correspondence between our respective staffs, we recommend that these two sites be made as large as possible to enhance the chances of tern nesting (see Figure 3).

2) We also recommend that all feasible efforts be continued to encourage tern nesting on NASNI alternate CLT nest sites, including vegetation and predator control, signs, barricades and other means to prevent human disturbance, and use of decoys and spanish tiles.

3) If nesting is reduced on the MAT and terns fail to colonize the 29.2 acres (and expanded areas) of alternate habitat, NASNI should seriously consider preparing the Taxiway 9 site for nesting (Figure 3). Assuming that conflicts with air safety can be allayed, this site may represent the last potentially suitable nesting area on NASNI that would not interfere with Navy operations. It may be more attractive to least terns because it is not as linear as the Zuniga Beach and Runway 11 (beach) sites.

This concludes formal consultation on this project. However, we request your continued cooperation to complete the necessary arrangements to provide effective least tern management as regards the compensation agreement for Delta Beach. If the proposal is significantly modified in

Captain Robert B. Watts, Naval Air Station North Island -1-1-82-F-123

a manner not discussed above or if the compensation plan as discussed herein is modified, reinitiation of formal consultation with this Service may be necessary. Should you have any questions, please contact Peter Sorensen or Ralph Swanson at FTS 448-2791.

Sincerely yours,

Sanford R. Wilbur
Acting for William F. Shake
Assistant Regional Director
Federal Assistance

Acting for
Assistanc

Enclosur
e

11015

United States Department of the Interior

FISH AND WILDLIFE SERVICE
LLOYD 500 BUILDING, SUITE 1692
500 N.E. MULTNOMAH STREET
PORTLAND, OREGON 97232

March 5, 1980

In reply refer to:
AFA-SE (1-1-80-F-18)

Captain Warren E. Aut
Commanding Officer
Naval Air Station, North Island
San Diego, California 92135

Dear Captain Aut:

This letter responds to your request of November 26, 1979, for formal consultation pursuant to Section 7 of the Endangered Species Act of 1973 as amended (P.L. 95-632) on repairs on the helicopter mat area at North Island Naval Air Station (NASNI). At issue are the effects the proposed repairs will have on the endangered California least tern (Sterna albifrons browni) which nests, during the spring, on the mat surface.

The mat is about 85 acres in size and near the intersection of the main air station runways. It is an area of open asphalt used primarily for helicopter parking, landing, and takeoff operations. Six 200- by 200-foot landing pads are the major focus of helicopter activities. The asphalt surface of the mat is cracked and deteriorating, producing debris that may be sucked into the helicopter engines or blown onto taxiways and runways to be drawn into jet aircraft engines. This foreign object damage (FOD) problem can result in major engine damage or failure and represents a safety hazard to NASNI operations.

The Navy proposes to treat the mat area with a 1/2-inch thick asphalt-sand slurry that will seal the surface and halt the breakup of the asphalt. Deep cracks will be filled to surface level prior to sealing. The mat area has been divided roughly into thirds and the work is to be accomplished in three stages over a period of 3 years (see Figure 1). The westernmost portion of the mat, comprising 40 percent of the area, will be treated beginning in March 1980. Moving eastward, another 31 percent of the mat will be treated in 1981, with the final 29 percent to be completed in 1982. Each increment of work takes 2 to 3 weeks (barring delays). All work is to be conducted between September and March of each year. Treating the western area first, seals the mat closest to the runways and taxiways as well as five of the six helicopter pads and contributes substantially to reduction of the FOD problem.

20

Concurrent with initiating work on the mat, the Navy proposes to prepare three suitable alternative nesting areas for least terns as compensation for the expected loss of the mat as a nesting area. The colonies are in nonoperational areas of NASNI. Sites will be prepared by removal of vegetation, placement of tern decoys, installation of artificial feeding ponds, predator control, and placement of exclusionary signs. Hopefully, phased treatment of the mat area, together with the presence of attractive, alternative nesting locations, will induce the terns to relocate their nesting activities to more secure environs without significant impacts to the colony.

On November 20, 1979, Service representatives met with NASNI staff Civil Engineer personnel to discuss the project and the alternative tern nesting concept. On that same date, we participated in a field review of the mat and four potential alternative nesting sites. During the meeting, we suggested that the Staff Civil Engineer prepare a written document describing, in detail, the program to prepare and protect alternative nesting localities to better assess the impacts of the proposed project. On February 7, 1980, "A Preliminary California Least Tern Management Plan for Naval Air Station North Island, San Diego, California" was submitted to our Service for review. The document describes and endorses the mat repair and alternative nest preparation as presented herein. Alternative approaches to the problem are also discussed. We have relied on this document as well as contact with recognized authorities and pertinent literature, as cited, in the preparation of this Biological Opinion.

Species Account

The California least tern is a migratory shore bird that occupies its breeding grounds along the southern California coast from April through August. Terns arrive in San Diego County about April 15 of each year (Jorgensen, pers. comm.). The terns nest in loose colonies on relatively flat expanses of sand, salt flat, or dry mud that support little or no vegetation.

Nesting colonies always seem to be located in close proximity to shallow waters (fresh or saline) which support an abundance of small fishes, the major component of the tern's diet.

No reliable estimates of original numbers of the least tern are available, but they were once abundant and widely distributed along the southern California coast. Several colonies of 600 to 1,000 nesting pairs are recorded in the literature (Draft California Least Tern Recovery Plan, 1977).

Human pressure to develop the beaches for recreational (beach homes) and commercial (Pacific Coast Highway) purposes has steadily reduced the number of suitable nesting areas for the least tern. Few remaining

sites are secure from human impacts. The breeding population has been estimated at about 600 pairs in 1973 rising to only 775 pairs by 1977 (Jurek, 1977a., 1977b).

The terns appear to be responding to loss of traditional nesting areas by pioneering new sites that possess attributes similar to their preferred native habitat. Unfortunately, these are often in developed areas that conflict with the plans of man. We see examples of this not only in the present instance but in the Los Angeles Harbor Industrial Zone and the parking lot at San Diego Aquatic Park.

Nevertheless, the California Least Tern Recovery Team has identified a number of these areas, including NASNI, as essential habitat for the least tern in the Draft Recovery Plan. Our Service will review and may designate the essential habitat areas as Critical Habitat pursuant to Section 4 of the Endangered Species Act.

Tern nesting on the mat area of the NASNI has been documented since 1977. While the number of nesting pairs has increased every year since 1977, the production of young has been variable (U.S. Navy, 1980). However, in 1979, 60 to 100 young were produced from about 68 nests (U.S. Navy, 1980), ranking the mat area as the third most productive nesting site in California (Craig, pers. comm.). We believe this striking success over previous years was due to the initiation of predator control practices at NASNI in 1979.

In 1979, the terns were widely distributed over 38 acres of the helicopter mat (U.S. Navy, 1980). Eggs were laid in the crack depressions where wind blown sand had accumulated. The sparse vegetation provided necessary cover for newly hatched chicks. Given the past history, we can safely assume that least terns will again attempt to nest at NASNI probably beginning with courtship displays and nest site selection the first week of May (Jorgenson, pers. comm.).

Discussion of Impacts

Mat resurfacing, according to the proposed schedule, is expected to preclude tern nesting on an area encompassing 28 percent of the 1979 nests during the first phase of work (U.S. Navy, 1980). In 1981, following the second proposed increment of work, a total of 85 percent of 1979 tern nest sites will be lost. In the third year, the remaining nest sites will be covered. The asphalt-sand slurry will alter the color and texture of the mat and eliminate the sparse vegetation, all of which are presently attractive to the terns.

Exclusion of the entire mat area for nesting would represent a loss of 10 to 15 percent of all least tern nesting in California. In our opinion, this would be catastrophic to the population. Given the

multitude of other pressures facing virtually every other known nest site in California, it is highly unlikely that the species could recover from such an impact to nonendangered status.

The proposed compensation, that of preparing three alternative nesting sites, has attractive advantages. The areas proposed are infinitely better suited for tern nesting. They would be secure from human pressure, a vital element widely lacking through the State at present. They would provide the opportunity to expand nesting above existing levels at NASNI and, if successful, greatly contribute to the conservation of the species.

On the other hand, our Service must necessarily view this manipulation of an endangered species with a high degree of skepticism. At least one alternative site was prepared for tern nesting in 1978 but did not successfully attract terns. The birds have consistently chosen the mat area for nesting over other, more natural sites at NASNI.

Furthermore, our Service, together with the California Department of Fish and Game, has documented a number of disheartening failures in past attempts to attract nesting terns away from areas of proposed development. This is largely an unproven science, one that appears logical, even ideal, on paper but has met with only varying success in the field.

In all fairness, we believe the causes underlying past failures relate to procedural errors - lack of predator control, poor location of the site, inadequate control of vegetation, human disturbance - and not to failings inherent in the concept. With these factors under better control in 1979, a few notable successes in establishing new tern colonies were reported (Craig, pers. comm.).

The compensation plan, as proposed by the Navy, constitutes the best organized attempt to date at fostering alternative nesting. The inclusion of predator control, decoys, and the installation of feeding ponds are, in our opinion, absolutely vital to the success of the effort. Continuing these features throughout the life of the mat repair project will undoubtedly be necessary. Above all, the biological staff support at NASNI, who will be continually working to make this program a success, renders this effort superior to any previously attempted.

The phased approach to the work on the mat has significant advantages in our opinion. Unlike previous projects where entire nesting sites have been destroyed, 72 percent of 1979 nest sites would remain after the first increment of work. In this regard, we believe that alternative 4d described in the Navy report (U.S. Navy, 1980), has merit.

It would pave the mat in three 1-year increments similar to the proposed plan, leaving the central one-third section until last (Figure 1). The advantage is that if the alternative nesting sites are not successful after 2 years, there is still a chance for significant tern production from 57 percent of the 1979 nest sites (versus 15 percent) while the Navy and our Service have a chance to reevaluate the program. In addition, this provides for an additional year to identify and to correct unforeseen problems with the alternative nesting areas, before a majority of 1979 nest sites are lost.

We would also like to suggest a slightly modified alternative whereby the first-year increment of work is completed as proposed. In 1981, the FOD problem would be reevaluated, and a decision made at that time whether to proceed with repair of the central area, as presently proposed, or the easternmost area, as in alternative 4d. We do not believe such a course of action would require reinitiation of formal consultation as the evaluation is essentially embodied in this Biological Opinion. Rather, coordination at the field level between our agencies and the California Department of Fish and Game would suffice.

In conclusion, it is the opinion of our Service that repairs to the mat area as proposed including compensation by preparation of alternative least tern nesting sites is not likely to jeopardize the continued existence of the California least tern.

In furtherance of the purpose of the Endangered Species Act and to contribute to the conservation and recovery of least terns, as mandated in Section 7(a)(1) of the Act, we propose the following recommendations regarding the conduct of the program.

1. Implement alternative 4d as described in the "Preliminary Least Tern Management Plan for NASNI," or consider a modified approach entailing the first-year increment of repair work and preparation of alternative least tern nesting areas as proposed. In 1981, the Navy would evaluate the FOD problem and make a decision, at that time, whether to proceed as currently proposed or implement alternative 4d.

2. If the availability of personnel allows, install a fish feeding pond at the Zuniga Beach nesting area.

3. Tern feeding ponds should be installed along the edges of the nesting areas in close proximity to vehicle access points to minimize the disturbance to nesting terns associated with restocking of the ponds.

4. Ponds need only be about 1½ feet deep at the centers tapering to a few inches at the edges. This design will minimize construction time and costs.

5. Map least tern nesting on the mat area in 1980. If nesting should occur on the repaired area, near helicopter pads, suspend operations on the pads in accordance with past NASNI practices.

6. Alert NASNI security personnel to be particularly alert to human disturbances in and around the alternative nesting areas.

This concludes formal consultation on the project. Should the project be modified beyond that discussed in this letter, reinitiation of consultation may be appropriate. We would like to compliment the Navy on this and past efforts to plan for the conservation of endangered species within the operations of the North Island command.

Sincerely yours,

Bill Meyer

William H. Meyer
Acting Regional Director

Enclosure

Bibliography

California Least Tern Recovery Team. 1977. Draft California Least Tern Recovery Plan. U.S. Fish and Wildl. Serv.: Portland, OR. 22 pp. and appendixes.

Craig, A. Wildlife Biologist, Calif. Dept. of Fish and Game, California Least Tern Recovery Team Leader.

Jorgensen, P. Biologist, Staff Civil Engineer, Naval Air Station, North Island.

Jurek, R.M. (ed). 1977a. California least tern census and nesting survey, 1976. 5 pp.

Jurek, R.M. 1977b. California least tern census and nesting survey, 1977 (in preparation).

Kelley, P. Wildlife Biologist, Calif. Dept. of Fish and Game.

U.S. Navy. 1980. "A Preliminary California Least Tern Management Plan for Naval Air Station, North Island, San Diego, California 92135." 8 pp.

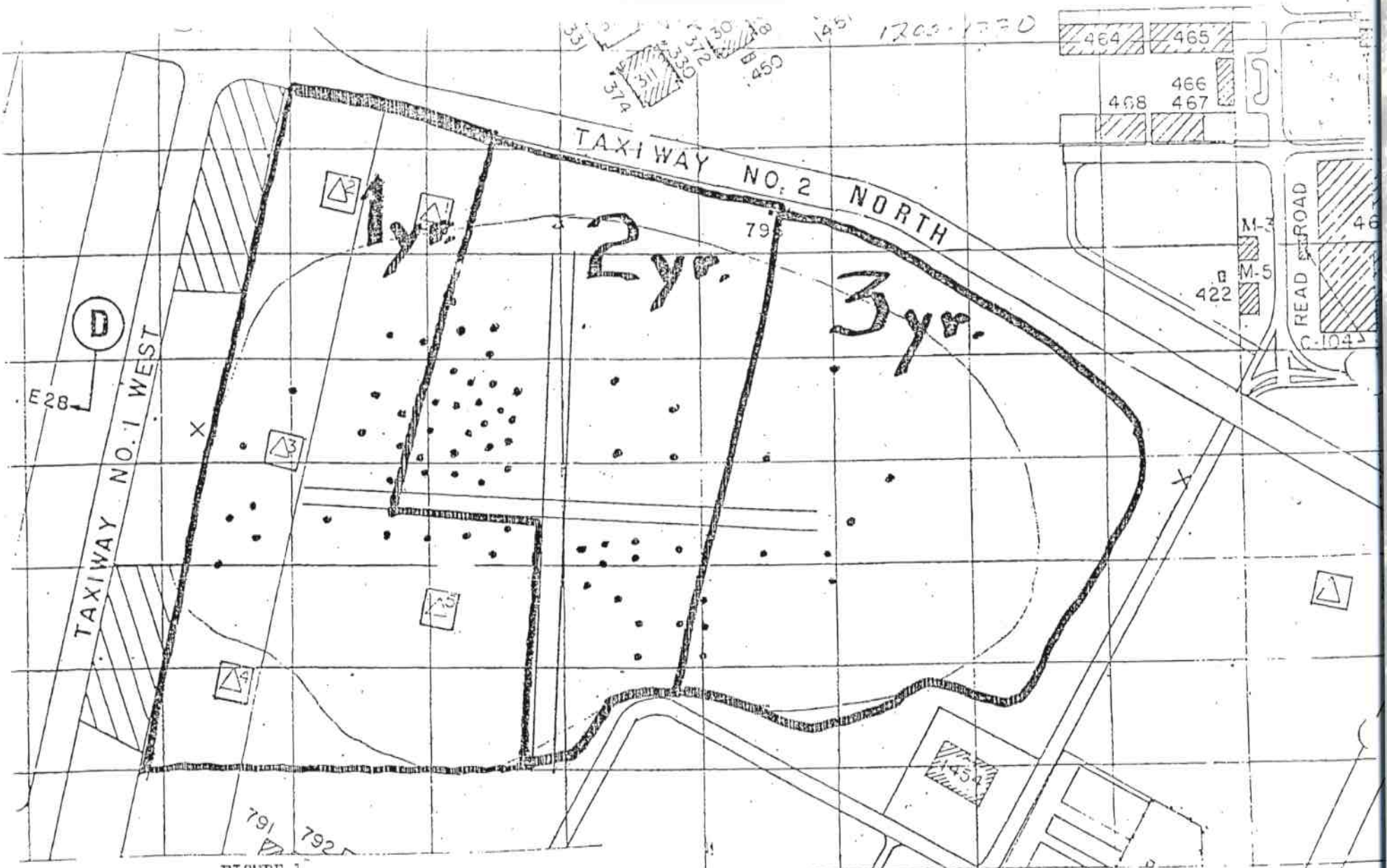


FIGURE 1

PAVING INCREMENTS AND DISTRIBUTION OF LEAST TERN NESTS.

1st YEAR	2nd YEAR	3rd YEAR
40% of the area	31% of the area	29% of the area
28% of nests	57% of nests	15% of nests
36 acres	19 acres	30 acres
● least tern nest locations		

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

In Reply Refer To:
FWS-SD-11B0338-11F0507

AUG 23 2011

Captain Yancy B. Lindsey
Commanding Officer
Naval Base Coronado
P.O Box 357033
San Diego, California 92135-7033

Attention: Bryan Munson

Subject: Amendment to the Biological Opinion (FWS-SDG-4452) for the Land Withdrawal, Facilities Construction, and Operations at Naval Special Warfare, La Posta Mountain Training Facility (a.k.a. Camp Michael Monsoor), Campo, California

Dear Captain Lindsey:

On April 20, 2007, we issued a biological opinion (FWS-SDG-4452.1, "Opinion") to address the potential effects of the subject project on the federally listed Quino checkerspot butterfly (*Euphydryas editha quino*, "Quino"). We subsequently received communication via telephone conversation (Munson 2011a) requesting an amendment to the Opinion. Fish and Wildlife Service (Service) staff participated in a site visit on June 17, 2011, to review the planned changes in project design and provided comments on the draft *Quino Checkerspot Butterfly Enhancement Plan for Camp Michael Monsoor* (HDRe^2m 2011) on July 6, 2011. Information regarding the proposed project changes was provided in the electronic mail correspondences (Koler 2011a,b) and in the draft *Supplement to the Biological Assessment of Land Withdrawal and Operations at Naval Special Warfare La Posta Mountain Warfare Training Facility* (Merkle 2011, "BA Supplement") received on July 26, 2011.

The BA Supplement and additional information provided by U.S. Navy (Navy) staff indicate that the overall size of the construction footprint will be reduced from 61.5 acres to 41.3 acres; however, training use in the area will remain as described in the Opinion. Based upon the information available to us, the revised construction footprint will result in 23.2 acres of permanent impacts, 14.1 acres of temporary impacts, and a 4-acre construction buffer. The revised footprint includes 1) road improvements (e.g., road widening); 2) above-ground power poles extending from the "Existing Withdrawal" to the proposed development in Parcel C; 3) structures that comprise the Multi-Structure Training Complex (MTC); and 4) a fire suppression system consisting of an access road, two 50,000-gallon water tanks, and above-ground water pipes. The revised project footprint includes approximately 26.2 acres that lie adjacent to, but outside the boundaries of the original footprint, of which 10.8 acres will be permanently

modified and 15.4 acres will be temporarily disturbed. A site restoration plan to re-establish vegetation consistent with the baseline vegetation community will be prepared and implemented in all areas of temporary disturbance.

No Quino were detected in the revised project footprint during protocol surveys conducted during 2007, 2008, and 2010 (Merkle 2011); however, host plants and nectar plants were present. Three Quino were detected at La Posta Mountain Warfare Training Facility (MWTF) during surveys conducted in 2004 (Merkle 2011): two within the Existing Withdrawal parcel less than 0.06 miles south of the project footprint and one detected in Parcel C within the revised project footprint. An individual Quino was also detected in Parcel C approximately 0.3 miles southwest of the revised project footprint during surveys conducted in 2010 (Merkle 2011). Quino host and nectar plants are scattered within the project footprint in between the locations where Quino were observed. Based on the distribution of Quino host and nectar resources and the use of 0.6-mile (1-kilometer) buffers around Quino observations (Service 2003), we estimate that the extent of occupied Quino habitat to be the entirety of the revised project site (42.1 acres).

In general, the revised project footprint supports similar habitat to the original footprint. However, the new water tank location will be located outside the previously delineated project footprint on a hill top where a limited number of host plants [white snapdragon *(Antirrhinum coulterianum)* and Chinese houses *(Collinsia concolor)*] have been detected. Although the inclusion of a hill-top water tank and associated infrastructure may result in impacts to Quino and Quino host plants, the overall extent of the construction impacts to the sub-species' habitat will be reduced.

Based on the reduction in the size of the construction footprint, we anticipate that the level of incidental take associated with the revised project will be less than that analyzed in our previous Opinion. However, quantifying the precise number of Quino that may be incidentally taken is not possible because the butterfly's small body size and diapause life stage make the observance or detection of mortality highly unlikely. In addition, numbers will fluctuate on a seasonal and annual basis. Because we cannot reasonably identify or predict the number of Quino likely to be taken, we have established a take threshold that, if exceeded, will trigger reinitiation of formal consultation. Accordingly, we hereby amend the incidental take statement for the revised development and new facility expansion footprint as follows:

> Death or injury of eggs, larvae, and pupae from crushing, trampling, or removal of host plants during construction within up to 42.1 acres of Quino occupied habitat. The take threshold will be met if more than 42.1 acres of Quino occupied habitat are impacted during construction.

Therefore, Terms and Conditions 1a, 2.a., and 3.a. have been revised as follows. Modifications to the original conditions of the Opinion are underlined.

> 1a.. <u>A biological monitor(s) will be on site during each vegetation clearing, and at least once per week during all phases of construction to regularly monitor construction</u>

activities and ensure construction is proceeding in compliance with the conservation measures committed to by the Navy. The biological monitor will provide a report to the Navy and CFWO at least monthly, identifying construction activities and the results of compliance monitoring related to implementation of the project's conservation measures. The biological monitor(s) will be approved by the CFWO and have knowledge of the biology and ecology of the Quino.

2a. Construction personnel shall use existing roads or existing parking lots for staging areas whenever possible. Habitat that is temporarily disturbed/modified as a result of equipment/materials staging or other construction impacts will be re-vegetated using plant species and techniques identified in the *Quino Checkerspot Butterfly Enhancement Plan for Camp Michael Monsoor* (HDRe^2m 2011).

3a. Identify one or more sites that support Quino habitat and manage this habitat under the guidance of the *Quino Checkerspot Butterfly Habitat Enhancement Plan for Camp Michael Monsoor.* Habitat enhancement within the identified Quino management sites must include enhancement of Quino habitat at a 1:1 ratio to the acreage of habitat permanently or temporarily modified as a result of facilities construction and improvements at La Posta MWTF (estimated to include 41.3 acres). Management sites may be within the boundaries of La Posta MWTF (preferably in areas that currently receive no use to reduce conflict), or may be located off of the installation (in parcels that are acquired and encumbered for conservation), but must be within dispersal distance/ flight distance of Parcel C and/or the Exiting Withdrawal. Occupation of proposed management areas may be confirmed based on previous surveys or surveys conducted in support of identification of such sites.

In summary, this letter constitutes an amendment of the incidental take statement and terms and conditions of biological opinion 4452.1 to address a change in the subject project construction footprint. Based on the overall reduction of impacts to the Quino checkerspot butterfly, we have determined that the above modifications will not change the conclusion of our April 20, 2007, Opinion in which we determined that the proposed action is not likely to jeopardize the continued existence of the Quino checkerspot butterfly.

We would also take this opportunity to add the following discretionary action to the Conservation Recommendations identified in FWS-SDG-4452.1 to maximize the conservation potential of fire management zones on La Posta MWTF.

4. The Navy should retain low lying native vegetation within fire management zones to the maximum extent consistent with fire protection needs. The Navy should use Quino host and nectar plants, to the extent consistent with fire protection needs, to vegetate the fire management zones.

In conclusion, the interagency consultation requirements of section 7 of the Act have been satisfied. All other conservation measures and terms and conditions will be implemented as

written in the Opinion previously issued for the proposed action. 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 proposed 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 listed species or critical habitat that was not considered in this opinion; or 4) a new species is listed or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please contact Sandy Vissman, of this office for further coordination or if you have any questions regarding this amendment. We appreciate your continued efforts to avoid and minimize impacts to federally listed species

Sincerely,

Karen A. Goebel
Assistant Field Supervisor

LITERATURE CITED

EDAW Inc. 2005. Biological Assessment of Land Withdrawal and Operations at Naval Special Warfare La Posta Mountain Warfare Training Facility. 55 pp.

HDRe^2m. 2011. Quino Checkerspot Butterfly Enhancement Plan for Camp Michael Monsoor. 89 pp.

Merkle and Associates Inc. 2011. Supplement to the Biological Assessment of Land Withdrawal and Operations at Naval Special Warfare La Posta Mountain Warfare Training Facility, Campo, California. June 2011. Report Number 09-035-08. 25 pp.

U.S. Fish and Wildlife Service (Service). 2003. Recovery plan for the Quino checkerspot butterfly (*Euphydryas editha quino*). Portland, Oregon.

Personal Communications

Coler, K.. 2011a. Biologist, Naval Engineering Command, Southwest Division, San Diego, California. Electronic mail dated July 29, 2011, outlining anticipated impacts associated with revised project footprint. 2 pp.

Coler, K.. 2011b. Biologist, Naval Engineering Command, Southwest Division, San Diego, California. Electronic mail dated July 29, 2011, outlining anticipated impacts associated with revised project footprint. 2 pp.

Munson, B. 2011. Botanist, Naval Base Coronado, San Diego, California. Phone conversation on May 12, 2011, with Sandy Vissman, Carlsbad Fish and Wildlife Office, requesting amendment to Biological Opinion.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

In Reply Refer To:
FWS-SDG-11B0284-11F0424

JUN 3 2011

Captain Yancy B. Lindsey
Commanding Officer
Naval Air Station, North Island
P.O. Box 357033
San Diego, California 92135-7033

Attention: Tiffany Shepherd

Subject: Amendment to Section 7 Consultation addressing Ongoing Operations and Management Strategies at Naval Air Station, North Island, San Diego, California

Dear Captain Lindsey:

This letter constitutes an amendment to the 2005 *Biological Opinion on Ongoing Operations and Management Strategies at Naval Air Station, North Island* ("2005 Biological Opinion"; FWS-SDG-3908.3) [U.S. Fish and Wildlife Service (Service) 2005]. We have reviewed information recently submitted by the U.S. Navy (Navy) regarding collisions between aircraft and birds at Naval Air Station, North Island (NASNI) (Navy 2010). Based on the information, aircraft periodically strike birds, including the federally endangered California least tern (*Sternula (Sterna) antillarum browni*; "least tern") and federally threatened western snowy plover (*Charadrius alexandrinus nivosus*; "snowy plover") as a result of routine airport operations, including the operation of military aircraft.

According to the Navy's records, no collisions between aircraft and least terns or snowy plovers were detected between 1981 and 2001 (Navy 2010). Between 2001 and 2010, collisions between aircraft and five least terns and two snowy plovers were recorded or estimated, based on recovery of avian carcasses. The Navy plans to increase the level of helicopter traffic at NASNI by approximately 30 percent over the next 5 years (Navy 2010). The Navy anticipates a decrease, however, in the level of fixed wing air traffic during the same time period, resulting in a net increase in aircraft operations of approximately 6 percent (Czech and Kessler 2010). Based on the continued operation of the NASNI airport at the levels identified in *AICUZ Update Noise Study for Naval Air Station North Island and Outlying Landing Field Imperial Beach, California* and *Environmental Assessment on Helicopter Wings Re-Alignment and MH-60 R/S Helicopter Transition*, we anticipate that the baseline level of incidental take of least terns and snowy plovers documented above is likely to continue into the future.

Aircraft collisions with adult least terns and snowy plovers will reduce the number of individuals present at NASNI. Loss of an adult during the breeding season may also affect eggs or juveniles due to absence of the parent bird. Under baseline conditions, least terns use NASNI during the breeding season, and snowy plovers use the installation year round. The occasional loss of an individual adult or juvenile least tern or snowy plover is not expected to substantially reduce the overall number of these birds that use NASNI for nesting, foraging, or roosting and will not jeopardize the continued existence of either species. We have reached this conclusion due to the low level and infrequent occurrence of such impacts. In addition, we recognize that the Navy is implementing measures that reduce the potential for collisions between aircraft and snowy plovers, as identified in the 2005 Biological Opinion (USFWS 2005). This includes removing snowy plover nests/eggs from the airfield and rearing and releasing birds hatched from the eggs. The Navy is also implementing significant conservation measures at the Navy "MAT" site to assure the persistence of the least tern at NASNI.

Based on the number of least terns and snowy plovers documented killed by aircraft during the 9-year monitoring period between 2001 and 2010, the following is hereby added to the Incidental Take Statement of the 2005 Biological Opinion:

1. We anticipate that up to six (6) least tern adults or juveniles will be struck and injured or killed by an aircraft during any 10-year monitoring period. The take threshold will be met if more than 6 least terns are injured or killed during any consecutive 10-year monitoring period.

2. We anticipate that up to three (3) snowy plover adults or juveniles will be struck and injured or killed by an aircraft during any 10-year monitoring period. The take threshold will be met if more than 3 snowy plovers are injured or killed during any consecutive 10-year monitoring period.

The following is hereby added to the Reasonable and Prudent Measures of the 2005 Biological Opinion.

> The Navy will continue to monitor the NASNI airfield for signs of collisions between least terns/ snowy plovers and aircraft, and report the results of monitoring on an annual basis.

The following is hereby added as an additional Term and Condition to the 2005 Biological Opinion, to implement the Reasonable and Prudent Measure identified above.

> The Navy will submit annual reports to the Service with the following information:
>
> a. A table depicting the number of least tern and/or snowy plover carcasses retrieved from the airfield during monitoring year;
>
> b. The type of aircraft, if known, involved in each collision;

c. The natal origin, if available via band recovery, of each least tern and/or snowy plover killed on the airfield; and

d. A map depicting the location(s) of all retrieved least tern and/or snowy plover carcasses.

We look forward to continue to work with you to conserve the natural resources at NASNI. If you have questions regarding this amendment, please contact Sandy Vissman of my staff at (760) 431-9440.

Sincerely,

Karen Goebel
Assistant Field Supervisor

LITERATURE CITED

Czech, J.J. and P.H. Kessler. 2010. AICUZ Update Noise Study for Naval Air Station North Island and Outlying Landing Field Imperial Beach, California. Contract No. N62472-07-D-1886. 50 pp.

U.S. Fish and Wildlife Service, 2005. Biological Opinion on Ongoing Operations and Management Strategies at Naval Air Station, North Island. Biological Opinion 3908.3. 31 pp.

U.S. Navy. 2010. Draft Environmental Assessment on Helicopter Wings Re-Alignment and MH-60 R/S Helicopter Transition. Naval Base Coronado. 196 pp.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

In Reply Refer To:
FWS-SDG-08B0503-09F0517

JUL 07 2010

Captain Yancy Lindsey
Commanding Officer
Naval Base Coronado
P.O. Box 7033
San Diego, California 92132

Subject: Biological Opinion on the U.S. Navy's Silver Strand Training Complex Operations, Naval Base, Coronado, San Diego, California

Dear Captain Lindsey:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion regarding effects to federally listed species from the proposed U.S. Department of Navy (Navy, DoN) military training program and associated resource management program on the Silver Strand in San Diego, California, in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*). This biological opinion is the result of a programmatic level consultation on Navy training activities and associated resource management proposed for the Silver Strand Training Complex (SSTC), which includes Naval Amphibious Base Coronado (NAB) and Naval Radio Receiving Facility (NRRF). Although technically not part of the SSTC, the beaches of Naval Air Station North Island (NASNI) are also included in this consultation as part of the SSTC action area. The Navy intends to use the programmatic nature of this document to establish a long-term management program for federally listed species on the SSTC.

Programmatic consultations evaluate planning documents or broad programs and may include actions where the best available scientific data may not support the determination of any anticipated incidental take (U.S. Fish and Wildlife Service and National Marine Fisheries Service Endangered Species Consultation Handbook, p.4-48). In such instances, actions are reexamined under the umbrella of the larger planning document during subsequent consultations on site-specific actions.

During consultation, we determined that adequate details were available to estimate levels of incidental take likely to occur as a result of the proposed actions included in the Navy's military training and resource management programs. For these actions an incidental take statement is included in this biological opinion. Nonetheless, project-level consultation may be necessary in the future for some actions (e.g., introduction of new equipment, changes in proposed training

locations, expansion of tern or plover nesting deterrence through habitat modification, construction of a dog kennel, dune restoration and habitat enhancement). Additional analysis and amendment of this biological opinion may also be necessary as new information becomes available regarding the effects of military working dogs on terns and plovers. We will continue to coordinate with the Navy to determine if future activities require consultation, and to reassess the effects of the action described herein in the context of changing abundance and distribution of listed species, as necessary. This programmatic consultation facilitates a streamlined process for any future site-specific military training or resource management activities within the action area. Any future incidental take statement to address the impacts of changes in training or management may be appended to this biological opinion.

The effects to three federally listed species that occur on the SSTC are evaluated within this biological opinion including one federally threatened species, the western snowy plover (*Charadrius alexandrinus nivosus*, "snowy plover"or "plover"), and two federally endangered species, the California least tern (*Sternula antillarum browni*, "least tern") and the San Diego fairy shrimp (*Branchinecta sandiegonensis*, "fairy shrimp"). The effects to the California brown pelican (*Pelecanus occidentalis californicus*, "pelican") were evaluated within our September 21, 2009, draft biological opinion. The California brown pelican was removed from the Endangered Species List, effective December 17, 2009, and has therefore been removed from consideration in this biological opinion.

Other listed species within the vicinity of the action area include the California clapper rail (*Rallus longirostris levipes*, "clapper rail"), Salt marsh bird's beak (*Cordylanthus maritimus* ssp. *maritimus*), and the East Pacific green sea turtle (*Chelonia mydas*, "green sea turtle"). However, the Navy has concluded that the proposed training and resource management activities would have no effect on the clapper rail and the Salt marsh bird's beak, and they are not addressed in this biological opinion. Any potential in-water effects to green sea turtle within San Diego Bay and the nearshore ocean waters is not addressed in this biological opinion, but would be addressed in separate consultation with National Marine Fisheries Service (NMFS), as required.

While written confirmation was not provided to your agency, formal consultation was initiated on September 22, 2008, the date we received your request for consultation. We initiated review of the Programmatic Biological Assessment for the Silver Strand Training Complex (BA; DoN 2008) in November 2009. This biological opinion is based on: information provided in the BA; modifications and clarifications to the project description outlined in the BA made during the consultation process; previous biological opinions developed addressing operations and activities on the SSTC and NASNI Beach (listed in Appendix B); Memorandums of Understanding (MOUs) developed to address management of federally listed species within the boundaries of the SSTC (listed in Appendix B); the *NBC Integrated Natural Resource Management Plan* (INRMP); the *Recovery Plan for the Pacific Coast Population of the Western Snowy Plover* (Service 2007a); the *Recovery Plan for the California Least Tern* (Service1985); the *Vernal Pool Recovery Plan for Southern California* (Service 1998); the *California Least Tern 5-Year Review* (Service 2006a); the *San Diego Fairy Shrimp 5-Year Review* (Service 2008a); annual least tern and western snowy plover monitoring reports submitted to the Service; literature

relevant to species and effects of the activities addressed; supplementary materials provided during the consultation process; site visits conducted before and during the consultation process; and on other available information.

This consultation supersedes biological opinion FWS-SDG-3452.3 (2005), which is the current comprehensive biological opinion regarding Navy training and management activities within the action area.

Consultation History

We received your request for consultation on training activities at the SSTC on September 22, 2008. When we received your request, our staff was working to complete a biological opinion for training activities and associated fire management at San Clemente Island (FWS- LA-09B0027-09F0040). Upon completion of the San Clemente Island biological opinion, on November 18, 2008, we initiated review of your consultation request and the BA.

Between November 18, 2008, and April 27, 2009, the Navy and Service met regularly to discuss the proposed action, effects to species and associated incidental take, and conservation measures to avoid, minimize, and monitor impacts.

The Service provided a draft biological opinion to the Navy for review and comment on August 28, 2009. The Navy provided preliminary comments on the draft biological opinion on September 28, 2009. The Navy and the Service discussed the Navy's comments at meetings held on September 21 and September 29, 2009. The Service addressed these comments and provided a revised draft biological opinion to the Navy on January 15, 2010. The Navy provided additional comments on the revised draft biological opinion to the Service, via electronic mail, on March 3, 2010. The Navy and the Service discussed the Navy's additional comments at meetings held on March 4 and May 26, 2010. The Service has addressed the Navy's comments in this final biological opinion as discussed in these meetings.

The complete project file for this consultation is maintained at the Carlsbad Fish and Wildlife Service Office (CFWO).

BIOLOGICAL OPINION

PROJECT DESCRIPTION

The Navy has a history of consultation and coordination with the Service regarding the effects of various activities located at NBC, including the SSTC, on federally listed species. The Navy has also coordinated with the Service in the development of their resource conservation and monitoring programs on the SSTC under the NBC INRMP. The proposed action represents a comprehensive description of future training activities and includes proposed continuation of a variety of natural resource management programs that monitor species status and may reduce adverse effects of proposed training.

The mission of the SSTC is to support Navy and U.S. Marine Corps (Marine Corps) individual and Fleet training by providing local land, sea, and airspace, support services, material, and training facilities that will help these forces achieve and maintain the highest level of operational readiness. The importance of the SSTC in supporting the Navy and Marine Corps' need for training and operational readiness is underscored by the wide range of commands and units and their proximity to SSTC facilities. The ability of local commands to engage in amphibious, inshore, clandestine, unconventional, and special warfare operations by providing local land, water, and airspace, support services, materials, and facilities for training on the SSTC is critical towards achieving and maintaining operational readiness.

The action area includes the area that will be directly or indirectly affected by the Navy's proposed military training and associated resource management program for the SSTC (Figure 1). The action area, located in and around the Silver Strand peninsula, has had a long history of training use and resource management. The Silver Strand peninsula is an 11.3 km (7 mi) coastal strand that extends from NASNI to the City of Imperial Beach in southern San Diego County. It is characterized by broad dune-backed beaches in the areas that have not been developed, and hosts many summer recreational visitors. Official military training areas, administered by NBC, are separated by the City of Coronado and Silver Strand State Beaches that are open to public use. These public beaches are included within the action area because some military training activities (primarily involving foot-traffic transit) occur on these beaches (Figure 1).

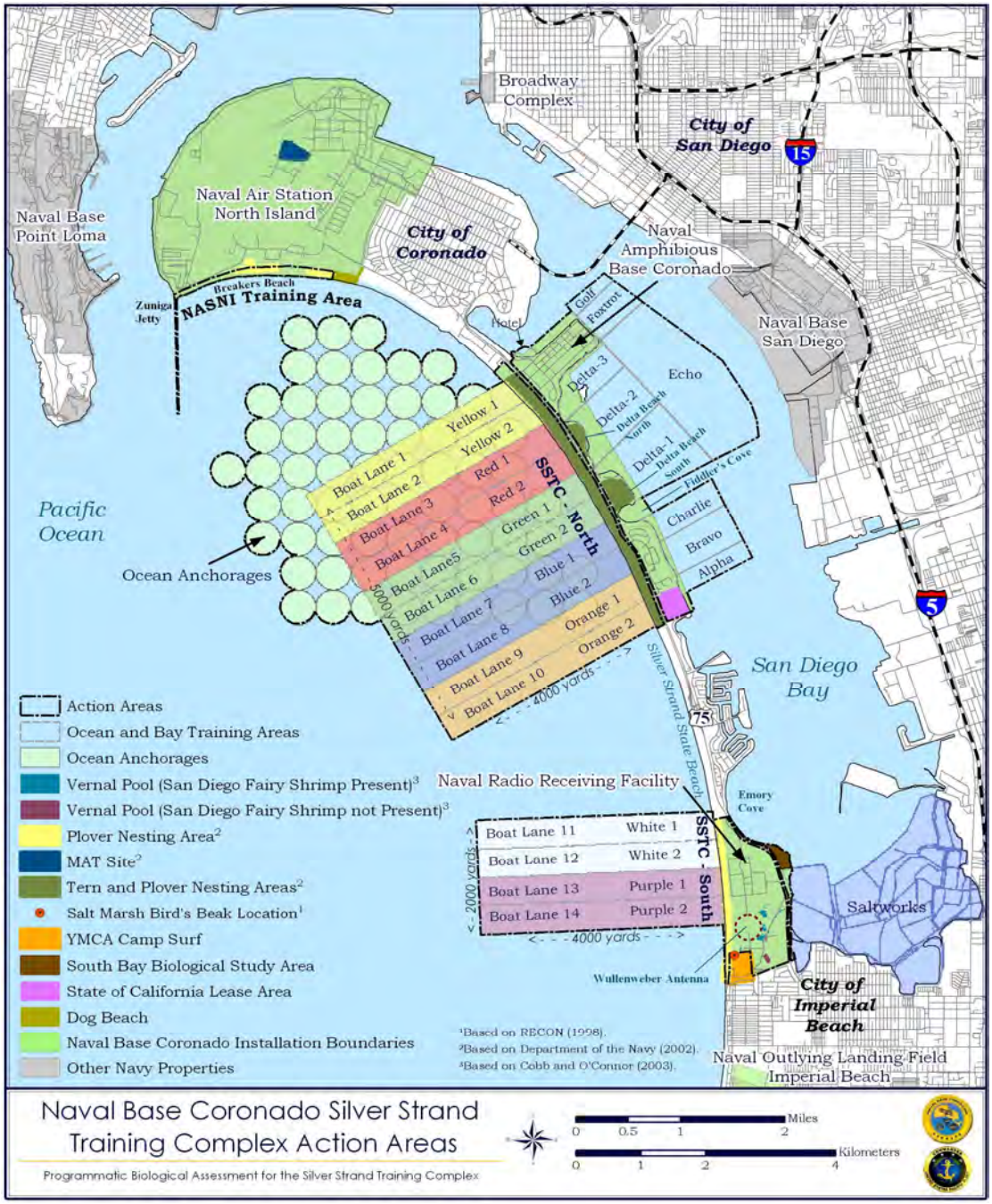
Military units conducting training within the SSTC action area report to one of four major commands: Commander Navy Surface Pacific (COMNAVSURFPAC); Commander Naval Special Warfare (COMNAVSPECWAR); Commander, Navy Expeditionary Combat Command (NECC), and the First Marine Expeditionary Force (I MEF). The COMNAVSURFPAC and COMNAVSPECWAR are headquartered on NBC. NECC is headquartered at NAB Little Creek, Virginia, with subordinate units stationed in the San Diego area. I MEF is headquartered at Marine Corps Base Camp Pendleton.

The Navy proposes to conduct training activities within the SSTC action area (Figure 1). The area is currently used for numerous training activities, which will continue under the proposed action. Training activities will occur at SSTC-North (SSTC-N) and SSTC-South (SSTC-S) and the adjacent ocean and bay waters, as well as the NASNI Beach. In addition, some physical fitness training and vehicle transit will occur on the City of Coronado Beach and Silver Strand State Beach. For scheduling purposes, the Navy uses Boat Lanes and Beach Lanes to identify the scheduled location(s) of training activities. Training is also proposed on the non-beach portion of SSTC-S, referred to as the "SSTC-S Inland" on the NRRF. Proposed military training activities include those conducted on land, in the air, in San Diego Bay, and in the Pacific Ocean. The proposed action includes the following components, which are discussed in more detail below:

(1) Continue Current Training;
(2) Increase Training Tempo;
(3) Conduct New Training;

(4) Conduct Current Training at Additional Established Training Areas;
(5) Increase Training Access to SSTC Beach and Inland Training Areas;
(6) Implement Avoidance Measures for Specific Activities, and
(7) Implement a Modified Conservation Program for Listed Species.

Figure 1: Silver Strand Training Complex Action Area



A complete description of the Navy's proposed action is provided in the BA.

1. Continue Current Training

Training exercises that are currently conducted at the SSTC are proposed to continue at frequencies required to maintain military readiness. Many personnel who would normally be going through training rotations at the SSTC are currently deployed overseas, and training exercises have also temporarily shifted from the SSTC to desert training areas to prepare military personnel for conditions they will encounter overseas. Data regarding the location, timing, and number of training exercises that have recently taken place each year at the SSTC are not available. To establish the "baseline" level of training at SSTC, training personnel were interviewed to determine the training frequency from a "representative year" for each training activity over a 7-year period (i.e., 2001 to 2008). The data collected does not represent the total or average number of training exercises conducted during a single year, rather a composite of the most representative year for each type of activity over a 7-year period. Therefore, training data termed the "baseline" level of training does not reflect the actual level of training conducted at SSTC in any given year from 2001 to 2008 or currently.

Under the "baseline" level of training established by the Navy, 3,926 training exercises per year would be conducted at the SSTC to maintain military readiness (DoN 2009). Data is not available to determine how this estimate of the "baseline" level of training compares to the actual level of training conducted at SSTC in any given year; however, due to the number of deployed troops and the shift to desert training areas, this baseline number is likely higher than the actual level of training conducted at SSTC from 2001 to present.

Current training exercises are listed in Table 1 and described in more detail in Appendix A. Table 1 provides the name of each training exercise (e.g., anchoring, towing, etc.) and the terrestrial activities associated with each type of training exercise [e.g., Beach Party Teams, Mine Counter Measures (MCM), Beaching, Beach Camps, etc.]. The estimated "baseline" and "proposed" annual frequency of each training exercise is also provided but does not necessarily reflect the actual level of current or future training, since less training has and will occur if troops are deployed overseas and/or are training in the desert. The terrestrial activities associated with each type of training exercise are provided to facilitate the assessment of impacts of various training exercises on the natural resources in the vicinity.

Training exercises include activities within and over the waters included in the action area. Boat travel occurs throughout San Diego Bay and the nearby ocean waters as vessels travel to and from training areas. Helicopter air traffic occurs from NASNI to over water areas, or designated landing areas at NAB and SSTC-S inland.

2. Increase Training Tempo

Training at SSTC is expected to return to levels identified as "baseline" in Tables 1, 16, and 17 after the end of current combat overseas and is also expected to increase to support future organizational realignments. Overall, the Navy proposes to increase the potential number of training exercises at the SSTC from the "baseline" level of 3,926 exercises per year to 5,343

exercises per year (i.e., a 36 percent increase). Training exercises that are conducted exclusively in the water will increase from a "baseline" level of 999 exercises per year to 1,584 exercises per year (i.e., a 59 percent increase). Exercises that include terrestrial training will increase from a "baseline" level of 2,927 exercises per year to 3,759 exercises per year (i.e., a 28 percent increase) (from information in Table 1 and Table 2). The anticipated increase in training tempo differs among the different installations included in the action area.

A list of existing training exercises that are proposed for continuation or increased frequency is provided in Table 1.

Helicopters will fly at an altitude below 152 m (500 ft) above ground level between NASNI/ NAB and SSTC-S along either of the following routes: 1) down San Diego Bay over the boat lanes in SSTC-N and the South San Diego Bay Unit of the Service's San Diego Bay National Wildlife Refuge (NWR), crossing the Silver Strand at Emory Cove (Figure 1.a) into SSTC-S; or 2) over the ocean crossing the SSTC-S Beach into the SSTC-S Inland area (not shown on Figure 1.a). Helicopters will not hover over the beach and will land only at the existing designated landing sites at NASNI/NAB and SSTC-S Inland. Helicopter travel down San Diego Bay from NASNI/NAB to SSTC-S will increase from a baseline of 100 to 150 sorties per year to 350 to 400 sorties per year (Latas 2010).

More than one training exercise can occur on the same date at a given location since many only take a few hours. Many training exercises are also strictly offshore and can be scheduled at the same time as those that only use the beach. In addition, some training exercises are done concurrently at the same location so groups can easily share resources.

Table 1: Current Training Exercises, Estimated Baseline* and Proposed Frequency, and Location(s)

	Training Exercise	**Frequency of Training**				**Location of Training**							**Terrestrial Activities**																
Reference number		Days per Event	Annual Events, Baseline*	Annual Events, Proposed	**Annual Increase**	SSTC-N Beach and/or boatlanes	SSTC-S Beach and/or boatlanes	Boat Lanes or Offshore Only (no beach)	SSTC-S Inland	Bayside Boat/Beach	NASNI Beach		Beach Party Teams	MCM Beaching	Beach Camps	Equipment Offload/Stage	Causeway/ ELCAS	LCAC Landing	Beach Crossing and OTB	Raids	Foot Patrol and Ambush	Vehicle Patrol	Observation Post	Reconnaisance	Logistic and Safety Vehi	Running	Manual Excavation	Visual Observations	SSTC-S Off Road Foot
1	Anchoring	1	72	72	0			x																					
2	Towing	1	30	30	0			x																					
3	Moor to Buoy	1	36	36	0			x																					
4	Parachuting	1	216	228	12			x	x																				

5	Mine Counter Measures	1	32	58	16	x	x							x														
6	Floating Mine	1	25	53	28	x	x																	x				
7	Dive Platoon	1	8	8	0			x																x				
8	Very Shallow Water Course	8	4	6	2			x																				
9	VSW Mine Countermeasures	1	120	156	36			x		x																		
10	Autonomous Underwater Vehicle	1	120	156	36			x		x																		
11	Marine Mammal/MMS	1	175	208	33			x																				
12	Mine Neutralization	1	4	4	0	x	x		x															x				
13	Visit Board, Search, Seize	1	30	42	12			x																				
14	Small Boat Handling	1	94	94	0					x														x				
15	Swimmer Conditioning-Bay, Ocean	1	189	189	0	x				x														x				
16	Basic Recon Course Final Mission	1	8	8	0		x		x														x	x				x
17	Obstacle Course	1	138	142	4	x																			x			
18	Hydrographic Reconnaissance	1	40	44	4	x	x			x	X													x			x	
19	Surf Observations	1	116	116	0	x	x																	x			x	
20	CRRC&IBS Surf Passage/Boat Team	1	72	72	0	x				x	X													x				
21	CRRC Towing, High Speed Maneuver	1	8	8	0						X																	
22	CRRC LCU Launch and Recover	1	24	24	0	x	x				X													x				
23	CRRC Navigation, Bay and Ocean	1	26	26	0	x	x				X													x				

24	Amphibious Raid Course Final Mission	1	24	24	0					x	X								x					x				
25	Amphibious Raid	3	2	18	16		x		x																			x
26	Direct Action	3	2	18	16		x		x																			x
27	LCAC Craft Landing Zone (CLZ)	1	4	4	0	x	x				x		x					x							x			
28	Swimmer/CRRC OTB Insertions/ Extractions with Pyrotechnics, Blanks	4	52	86	34	x	x		x		X								x		x			x	x		x	
29	Over the Beach Stalk	1	16	24	8		x		x																			
30	Immediate Action Drills	1	8	12	4		x		x																			
31	Breacher Training	1	9	20	9				x																			
32	Amphibious Warfare	1	50	84	34	x	x			x								x				x	x	x				
33	Mobility Primary Mission Area	1	2000	2000	0	x	x			x																		
34	Escape and Evasion	1	20	84	64	x				x										x								
35	Helicopter Rope Suspension Training Cast and Recovery	1	124	154	30	x	x		x	x																		
36	Rappel & Fast Rope Training	1	6	11	5	x																						
37	SDV/ASDS Certification to Deploy	14	14	40	26	x				x								x					x	x				
38	Offshore Petroleum Discharge System	25	6	6	0	x				x			x												x			
39	Amphibious Bulk Liquid Transfer System	15	4	5	1	x				x			x												x			
40	Barge/Ferry Causeway Coxswain Training	1-3	34	54	20	x				x			x												x			

41	Causeway Pier Insertion and Retraction	2-5	9	10	1	x				x			x				x							x				
42	Elevated Causeway System (ELCAS)	8-10	2	4	2	x				x			x				x							x				
43	Establish Beach Party Command Post	4	16	16	0	x							x										x	x		x		
44	Sterngate Marriage To Amphibious Ship	1	40	40	0	x																						
45	LCU/LCM Beaching	1	60	60	0	x	x			x			x											x				
46	LCU/LCM Towing, being towed	1	60	60	0	x				x			x											x				
47	Communication Training	2	1	2	1	x			x	x													x	x				x
48	Field Training with Beach Camp	14	1	2	0	x	x		x						x									x				x
49	Maritime Prepositioning Ships Offload	5	1	2	1	x	x		x				x			x	x							x				
50	Reverse Osmosis Water Purification Unit	4	4	4	0	x	x		x				x											x				
51	Roll On/Roll Off Discharge Facility	5	1	2	1	x			x	x			x			x								x				
52	MPF Utility Boat Operator Course	9	2	2	0	x				x			x											x				
53	LARC V Operator Training	6	1	1	1	x				x			x								x			x				
54	LAR V Closed Circuit breathing diving	1	126	126	0					x																		
55	Open Circuit Breathing Diving	1	12	12	0	x	x			x	X																	
56	OTB Field Training	5	36	36	0	x	x			x	X							x	x	x				x				
57	Rock Portage	4	18	20	2	x	x				X													x				
58	Land Patrolling	1	18	18	0	x	x		x	x										x				x				

59	Immediate Action Drills	1	5	6	1	x	x		x												x			x	x				x
60	OTB Insertion/Photo Reconnaissance	1	31	31	0		x		x																				x
61	Photo Image Capture	14	3	4	1				x																				x
62	Field Skills	1	22	24	2				x																				x
63	Stalking, Movement, Hide Sites	5	8	8	0	x	x		x												x				x				x
64	Close Quarter Combat (May include Use of Dogs)	1	109	198	89		x		x																x				
65	Communications	5	6	6	0				x																				
66	UAV Training	5	12	12	0				x																				
67	Around the World	1	6	6	0	x				x	X														x				
68	Physical Training Runs	1	464	464	0	x	x																		x	x			
69	Physical Conditioning Training	1	280	280	0	x			x	x								x							x	x			x
70	Swim Training	1	170	172	2	x				x															x				
71	Hell Week	5	6	6	0	x	x		x	x	X													x	x	x			x
72	Rucksack March	1	54	54	0	x	x		x																x	x			
73	Monster Mash	1	6	6	0	x	x		x																x	x			
74	Environmental Health Site Assessment	3	3	3	0		x		x																				
75	Conventional Ordnance IED Response	1	64	120	56	x	x		x																x				
76	Land Mine Detection and Neutralization	1	24	45	21	x	x		x																x				
77	Field Training Exercise	3-14	53	53	0				x	x															x				x
78	Small Boat Attack	1	30	36	6	x					X																		

*"Baseline" training levels identified in the table may exceed the actual baseline of training activity in any given year. The training identified as baseline represents, in most instances the maximum frequency for each activity that has occurred between 2001 and 2007.
**For analysis purposes, the Navy categorized activities into 4 groups and assigned each a number, as discussed in the "Effects of the Action" section.

Figure 1.a. Route of helicopter travel over San Diego Bay Compared to the Boundary of the South San Diego Bay Unit of San Diego Bay NWR.

*Figure based on Latas 2010, and Service 2006e

3. Conduct New Training

The Navy will conduct new training exercises at the SSTC, including eight new types of MCM exercises, one new type of amphibious exercise, and four new Naval Special Warfare exercises (Table 2). The new training exercises will be conducted primarily in training areas that already host similar operations. Based on future training requirements, the Navy has identified a need to replace Amphibious Assault Vehicles (AAVs) with Expeditionary Fighting Vehicles (EFVs), update the current Offshore Petroleum Discharge System (OPDS), and introduce the MH-60S helicopter. In addition, the Navy has identified a need to include military working dogs in breacher training exercises conducted at SSTC-S, and infrequently during Platoon Over the Beach(OTB) exercises. The Navy will use the EFV in lieu of the AAVs as part of the Mechanized Amphibious Raid in existing training locations. As part of this exercise, up to 14 of the EFVs will be beached, but the vehicles will not travel into the inland areas. The Navy will use a new type of OPDS equipment in the same areas currently used for OPDS. The training activity that uses this equipment will not change; however, the new equipment has a self-sinking mechanism that will reduce the need for external anchoring systems. The Navy will use the MH-60S helicopter in new exercises identified in Table 2.

The Navy will station up to 10 military working dogs at NBC; however, due to deployment, an average of 4 to 6 dogs will be present on the installation. The Navy will extensively train dogs at Lackland Airforce Base prior to their arrival at SSTC and will only station military working dogs at SSTC that are in the advanced stages of training, including training to avoid wild animals. Since there is currently no permanent kennel facility located on NBC, the Navy will temporarily house up to 10 (but on average 4-6) military working dogs at NAB Coronado. No location for a permanent kennel is yet proposed, and it will take an unknown amount of time to site, design, and construct a kennel. Future kennel construction may require additional consultation with the Service, depending on the location of the facility.

Military working dogs require daily exercise, and they will remain on a maximum 3 m (10 ft) leash under supervision of a handler when on the beach for exercise or training activities. The Navy will use SSTC-N Beach and SSTC-S Beach for exercising military working dogs. When on the beach, they will run primarily on the hard pack sand (i.e., below the mean high tide line). Occasional exercise may also be necessary on the soft sand on the sand road at SSTC-N, and/or above the mean high tide line at both locations, to avoid damage to dogs' paws and knees. Dogs and handlers will avoid any marked and buffered plover nests.

The Navy estimates that in total, there will be approximately 10 instances of dog exercise on the SSTC-N Beach each week. No dog exercise will occur in the southern 3 lanes at SSTC-N (i.e., Blue 2, Orange 1, and Orange 2) during the plover and tern breeding season until: 1) completion of a study to assess the effects of dogs on tern and plover behavior and productivity and 2) coordination with the Service regarding additional effects and necessary conservation measures identified as a result of the study. The study design will include the southern 3 beach lanes at SSTC-N as a "control" area. When using SSTC-N for dog exercise, handlers and dogs will enter/exit the beach at beach lane Yellow 1 to conduct runs. If it is necessary to cross the beach

from the intertidal area to the sand road, handlers and dogs will cross at the existing route that lies immediately to the north of the demo pit until completion of the study and coordination with the Service. According to Navy staff, the dogs cannot pass other dogs on their route, due to the potential for biting incidents or behavioral issues. Since multiple dogs will be exercised at one time, they will run with the handler to and from a destination point without running "laps" to avoid instances where dogs pass other dogs during training.

If training is conducted at SSTC-S, handlers and dogs will enter/exit the beach at Camp Surf or the middle gate at SSTC-S. Since dogs cannot pass other dogs on their route and no sand road is present at SSTC-S, only one military working dog will be exercised at a time primarily below the beach crest on the hard pack sand, but occasionally exercise will be necessary on soft sand. Dog handlers at SSTC-S will avoid any marked and buffered plover nests.

Military working dogs will be transported by vehicle to participate in breacher training activities at the SSTC-S Inland buildings. Infrequently, military working dogs may also participate in platoon OTB activities, which could occur across beach lanes at SSTC-N or SSTC-S. Platoon OTB training involves landing on the beach and crossing over the beach in a patrol (line) fashion. The crossing will occur with a platoon of personnel and one dog accompanying that platoon. A total of 10-15 beach crossings may occur during each event, which is conducted over a 1-2 day period. The exercise does not entail lateral movement up and down the beach. Platoon OTB activities involving dogs are proposed to occur 2-6 times per year. Platoon OTB training activities will not occur at SSTC-N Beach until completion of the study to evaluate the effects of dogs on terns and plovers and will never occur in the southern 3 beach lanes at SSTC-N during the nesting season.

A list of new proposed training exercises is provided in Table 2, and a description of what each exercise entails is included in Appendix A. Table 2 provides the name and proposed frequency of various training exercises (e.g., shock wave generator, surf zone test detachment equipment T/E, etc.) and the terrestrial activities associated with each exercise (e.g., Beach Party Teams, MCM Beaching, Beach Camps, etc.). Proposed new training exercises are primarily in the water or in the more developed portion of SSTC-S, so few terrestrial activities are denoted in the table.

If introduction of additional types of new equipment or changes in the use areas for equipment are proposed in the future, and if these changes would result in additional effects to listed species, the Navy will request a project-level consultation with the Service under the umbrella of this programmatic consultation.

Table 2: New Training Exercises

	Training Exercise	Frequency			Location(s) of Training Exercise						Terrestrial Activities Associated with Training Exercise																
		Days per Event	Annual Events, Baseline	Annual Events, Proposed	SSTC-N Beach	SSTC-S Beach	In-Water Only (no beach)	SSTC-S Inland	Bayside Boat/Beach	NASNI Beach	Beach Party Teams	MCM Beaching	Beach Camps	Equipment Offload/Stage	Causeway/ ELCAS	LCAC Landing	Beach Crossing and OTB	Raids	Foot Patrol and Ambush	Vehicle Patrol	Observation Post	Reconnaisance	Logistic and Safety Vehi	Running	Manual Excavation	Visual Observations	SSTC-S Offroad Foot
N2	Shock Wave Generator	1	0	90	x	x			x	x																	
N3	Surf Zone Test Detachment Equipment T/E	1	0	200	x	x			x														200				
N4	UUV Neutralization	1	0	4	x	x																	4				
N5	AN/AQS-20 Mine Hunting	1	0	200			x																				
N6	AN/AES-1 Airborne Laser Mine Detection System	1	0	48			x																				
N7	AN/ALQ-220 Organic Airborne Surface Influence Sweep	1	0	100			x																				
N8	Airborne Mine Neutralization system	1	0	48	x	x	x																				
N9	Tactical Recovery of Aircraft and Personnel	1	0	4		x		x																			
N13	Vehicle Patrolling and Testing	1	0	50	x			x												50							
N14	NSW Underwater Demolition Training	1	0	12	x	x																	12				
Total			0	756			396				0	0	0	0	0	0	0	0	0	50	0	0	216	0	0	0	0
	Military Working Dog Use*	1	0	198		x		x																			
	Military Working Dog Exercise*	1	0	520	x	x																					

The Navy estimates the need for 10 instances per week of dog exercise on the SSTC-N Beach (times 52 equals approximately 520 times per year , Military working dog training is incorporated into other exercises, not considered separate exercises. The number of days of military dog training is included within table to facilitate impact assessment, not included in totals to avoid double counts

4. Conduct Current Training at Additional Established Training Areas

The Navy proposes to conduct eleven current training activities at additional established training areas (Table 3).

Table 3: Current Training Exercises Proposed at Additional Established Training Areas

Training Exercise Number from Table 1	Training Exercise	Baseline Training Areas	Proposed Additional Training Areas
1	Anchoring	SSTC-N Anchorages	Offshore NASNI Beach
19	SUROBS	SSTC-N Beach Lanes Yellow 1-Orange 2	SSTC-S Beach Lanes White 1-Purple 2
31	Breacher Training	SSTC-S Inland (Bunker 98, Bunker 99, Interior)	(Northwest of Bunker 99, CQC/CQD Facility)
48	Field Training with a Beach Camp	SSTC-N Beach Yellow 1-Orange 2 ,	SSTC Beach Lanes 1-14 SSTC-S Inland
49	MPS Offload	SSTC-N Boat and Beach Lanes Yellow 1-Orange 2	SSTC-S Boat and Beach Lanes White 1-Purple 2 SSTC-S Inland
50	ROWPU	SSTC-N Beach Yellow 1-Orange 2	SSTC-S Beach Lanes White 1-Purple 2 SSTC-S Inland
55	Open Circuit Breathing Diving	All SSTC-N Boat and Beach Lanes Yellow 1-Orange Breakers Beach, Alpha-Hotel	SSTC-S Boat and Beach Lanes White 1-Purple 2
57	Rock Portage	SSTC-N Boat and Beach Breakers Beach, Yellow 1-Orange 2, Zuniga Jetty Coronado Rock Jetty	SSTC-S Boat and Beach Lanes White 1-Purple 2
64	Close Quarters Combat / Close Quarters Defen CQC/CQD	SSTC-S Inland Bunkers 98 & 99	CQC/CQD Facility
75	Conventional Ordnance/IED Response	SSTC-N Beach Lanes Yellow 1-Orange 2	SSTC-S Beach Lanes White 1-Purple 2
76	Land Mine Detection/ Neutralization	SSTC-N Beach Lanes Yellow 1-Orange 2	SSTC-S Beach Lanes White 1-Purple 2

5. Increase Training Access to Portions of SSTC Beach and Inland Training Area

The Navy proposes to allow training in areas that are seasonally restricted under baseline conditions, including portions of SSTC-N Beach and the SSTC Inland area. In addition, the Navy proposes to prevent future encumbrance on SSTC beaches by limiting the number of

plover nests that will be marked for avoidance on SSTC-N Beach and SSTC-S Beach and deterring least terns from nesting at SSTC-S Beach.

5.1 Increase Training Access to SSTC-N Beach by Modifying Management Strategies

Under the current resource management strategy, the Navy preferentially schedules training activities in beach lanes that support fewer tern and plover nests to the extent consistent with training need. Such scheduling will continue under the proposed action. If training activities are planned for the same time period, they will be compared and those that require use of larger beach areas will be preferentially scheduled on lanes that contain fewer nests, where it doesn't adversely impact training needs or realism. If training activities are scheduled during time periods when they are not competing with other activities, each activity will be scheduled in the suitable beach lane that supports the fewest least tern nests as long as long such scheduling doesn't adversely impact training needs.

Under the current resource management strategy, the Navy protects the southern 3 beach lanes (i.e., Blue 2, Orange 1, and Orange 2) (Figure 1) from human disturbance and does not conduct training activities within these lanes during the tern and plover breeding seasons (FWS-SDG-3452.5). The Navy proposes to continue to avoid the southern 3 beach lanes to the extent consistent with training need but anticipates that additional beach training area will be necessary to accommodate future training. To accommodate future training and to increase flexibility, the Navy now proposes to schedule and conduct training exercises during the tern and plover breeding season in beach lanes Blue 2, Orange 1, or Orange 2 if other suitable lanes are already being used. In recognition of the increasing likelihood that training activities may be necessary in beach lanes Blue 2, Orange 1, and Orange 2, the Navy will use the following criteria to guide beach scheduling during the tern and plover breeding season:

> Beach lanes Blue 2, Orange 1, and/or Orange 2 will be used for training during the tern and plover breeding season only if beach lanes White 1 and White 2 and Purple 1 and Purple 2 are unavailable or less suitable for the training activity in question, and beach lanes Red 1 and Red 2, Green 1 and Green 2, and Blue 1 are unavailable when additional training lanes are needed. The southern 3 beach lanes will be opened one at a time, based on need, with Blue 2 being opened first, Orange 1 being opened second, and Orange 2 being opened last. If one of the southern 3 beach lanes is opened to accommodate a training event, it will be closed again after the training event. After each training event, any incidental take that may have occurred will be documented during routine monitoring. The lanes may be re-opened, as necessary, to accommodate other training events that meet the criteria above.
>
> Beach lanes Blue 2, Orange 1, and/or Orange 2 may also be used in lieu of other available lanes in instances where characteristics of these lanes, when compared to all other available lanes, make the lanes more appropriate for meeting training needs. Examples of lane characteristics that may result in training need include: presence of sand bars or holes, slope or depth of beach, and proximity to other training activity.

The Navy will continue to implement all other baseline conservation measures at SSTC-N Beach, including those identified below under "Proposed Conservation Measures."

5.2 Prevent Expansion of Plover and Tern Nesting on SSTC Beaches

Under the current resource management strategy, the Navy buffers, marks, and avoids all plover nests that are established on the beach lanes of SSTC-N and SSTC-S, with the exception of those within the most heavily utilized training lanes (Green 2 and Blue 1) (FWS-SDG-3452.3). In addition, the Navy installs a mini-exclosure (i.e., small cage) over plover nests to protect them from mammalian and avian predators in instances where this technique appears beneficial. Within beach lanes Green 2 and Blue 1, the Navy installs a mini-exclosure over any nests established but does not buffer the site and mark with blue flexi stakes. Navy personnel routinely avoid area beyond the marked buffer to facilitate training and avoid impacting plovers. The avoidance of beach area in excess of the marked buffer reduces the width of the beach lane that is then used for the training activity (Delphine Lee, pers. comm. 2009d). The Navy now proposes to limit the number of active plover nests that will be marked for avoidance at any given time on the SSTC-N and SSTC-S Beaches to 22. This proposed change is intended to limit the future impacts of the markers on training exercises by limiting the number of nests that are marked and buffered. Each nest will be surrounded by a square buffer that is approximately 30-meter (m) [98.4-foot (ft)] on each side, and is marked by blue flexi stakes. The number of nests that will be marked and protected on the SSTC-N and SSTC-S Beaches will not exceed 22 at any given point in time. The total number of nests that will be marked and protected over the course of the 6 month breeding season is likely to be more than 22. Once chicks hatch, markers will be removed when biologically appropriate to minimize impacts to plovers, as determined by biological monitors in conjunction with Navy Natural Resources personnel.

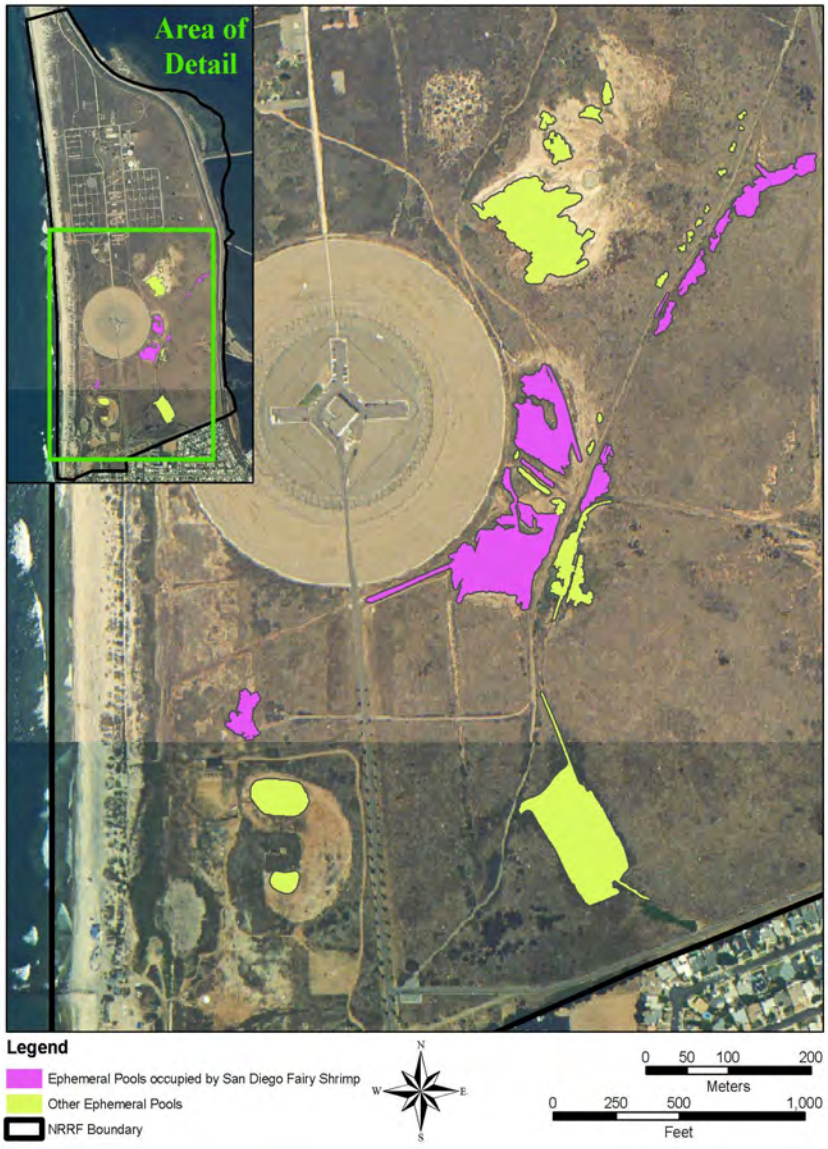
The Navy recognizes the potential for terns to expand their distribution to include nesting on the SSTC-S Beach and is concerned that this could encumber training. The Navy proposes to deter least tern nesting at SSTC-S Beach by actively removing any nests/eggs that become established on SSTC-S Beach. Tern scrapes will be smoothed over to deter nesting. Tern eggs will be collected if laid. If any tern eggs are collected, they will be taken to Project Wildlife, or other qualified and permitted wildlife rehab facility, if feasible.

5.3 Increase Training Access to SSTC-S Inland Area

Under current conditions, the Navy avoids training activities in the vicinity of vernal pools at SSTC-S Inland year-round. The Navy now proposes to allow off-road foot traffic training activities in the portion of SSTC-S inland that supports vernal pools that are occupied by San Diego fairy shrimp when the vernal pools are dry (Figure 2). Whether or not pools are dry will be determined by personnel under the guidance of the Navy's botanist or wildlife biologist. To assure that activities do not extend into occupied vernal pools when they are wet, the Navy will map vernal pools at SSTC-S Inland and subdivide the area into training areas that support groups of vernal pools. Training area boundaries will be based on the characteristics of vernal pools within the area and discernable geographic features, such as roads. If one pool in a particular

training area is wet, training activities will remain outside that training area until all pools in the training area are dry.

Figure 2. SSTC-S Inland and Vernal Pool Distribution



6. Implement Avoidance Measures for Specific Activities

The Navy proposes to implement specific measures to minimize the potential for incidental take associated with the following activities:

6.1 Underwater Detonation Measures

If a training exercise entails the use of multiple detonations, the second (or third, etc.) detonation will occur either immediately after the preceding detonation (i.e., within 10 seconds of the preceding detonation), or after 30 minutes have passed. This measure is intended to reduce the potential impacts to any piscivorous (fish-eating) birds, including least terns and pelicans, that forage in ocean waters and/or are attracted by stunned fish within the sphere of influence of the detonation.

A safety buffer zone [396.2 m (1,300 ft) radius for detonations occurring in 0 to 4 fathoms of water and 670.6 m (2,220 ft) radius for detonations in 4 to12 fathoms of water] will be established around each detonation point. Assigned personnel will be trained to survey the safety buffer zone for birds prior to the detonation event. One trained lookout on shore will use binoculars to survey the detonation area and safety buffer zone for seabirds prior to and after detonations in 0 to 4 fathoms of water. Trained lookout(s) in small boats (one for 0 to 4 fathoms and two for 4 to 12 fathoms) will also use binoculars to survey the detonation area and safety buffer zone to detect any seabirds prior to the detonation event and until at least 30 minutes after each detonation. The lookouts will be allowed adequate time to effectively survey the safety buffer zone. Safety buffer zones encompass a large area [49-hectare (ha) [122-acre (ac)] area for detonations occurring in 0 to 4 fathoms of water, 141-ha (349-ac) area for detonations in 4 to 12 fathoms of water], and the Navy will determine the length of time necessary to adequately survey this area for seabirds prior to detonation. If flocks of birds or individual foraging birds are sighted within the buffer zone or moving towards it, activities will be suspended until the birds voluntarily leave the area. Immediately following the detonation, visual monitoring for birds within the buffer zone will take place for 30 minutes. Observations will be made for animals that have been injured or killed. If animals are detected that have been injured or killed, report will be made to the Commander Navy Region Southwest Environmental Director and the Navy Pacific Fleet Environmental Office. The NASNI Wildlife Biologist will also be notified.

6.2 Vehicle Patrolling and Lighter Amphibious Re-supply Cargo 5-Ton (LARC V) Operator Training

Vehicle patrolling and LARC V Operator training will not occur in Red, Blue, or Orange beach lanes during the tern or plover nesting season to avoid incidental take from these intensive activities.

6.3 Working Dog Management

Disturbance to plovers and terns posed by military working dogs exercising or training on the beach will be reduced by controlling all dogs that exercise or train on the beach with a maximum 3-m (10-ft) leash. As stated above, the Navy will conduct a study to assess the effects of military working dogs on tern and plover behavior and productivity prior to conducting exercising of the dogs in the southern 3 beach lanes at SSTC-N, or using military working dogs in OTB training activities at SSTC-N Beach. Results from this study will be used to determine whether use of

dogs is likely to cause additional effects to terns and plovers and to develop additional conservation measures, if necessary.

6.4 NASNI Beach/Airfield Mowing Protocols

The Navy will mow vegetated areas surrounding the NASNI airfield when 25 percent of the vegetation reaches 20-centimeters (cm) [8-inch (in)] or higher, as measured from the soil, to deter avian species that pose a bird airstrike hazard from using the areas. The mowing schedule will be coordinated with the NBC Botanist and Wildlife Biologist to minimize the potential for harm to plovers associated with this activity. The area to be mowed will be surveyed prior to mowing if habitat conditions suitable for nesting plovers are present.

6.5 Beach Clean Up Activities

The Navy will conduct beach clean-up on beach segments that support terns and plovers only between August 30 and March 1 to avoid disturbance to these species during the breeding season.

7. Implement a Modified Conservation Program for Listed Species

The Navy has implemented successful programs directed at the conservation and management of federally listed species within the area now identified as the SSTC for over 20 years and proposes to continue to implement modified conservation measures, as part of the proposed action. Natural resources management within the SSTC has been adaptive in nature, adjusting to changes in natural resource conditions and training needs and adding to and modifying avoidance and minimization measures based on experience and past effectiveness of the measures. Several changes to the baseline conservation program are proposed to increase training flexibility as described under Section 5: *"Increase Training Access to Portions of SSTC Beach and Inland Training Area."* In addition to these changes, the Navy will implement the following modified conservation actions:

7.1 Seasonal Marking/Avoidance Measures

Mini-exclosures will be used to protect plover nests from mammalian and avian predators in instances where this technique appears beneficial. Once chicks hatch, the exclosures will be removed within seven days, or when biologically practical, to minimize impacts to plovers as determined by biological monitors in conjunction with Navy Natural Resources personnel.

The Navy will continue to maintain conditions at NASNI that are believed to support 12 to13 pairs of plovers by marking and protecting from human disturbances, a minimum of 6 ha (14.9 ac) of NASNI Beach as a Western Snowy Plover Management Area, as committed to during a previous consultation (i.e., FWS-SDG-3908.5).

SSTC-S Inland

The Navy will continue to prohibit: 1) training activities in and around all of the vernal pools when they are wet; and 2) driving of vehicles off of established roads at SSTC-S Inland, year round. Only emergency or security vehicles will infrequently be driven on unpaved roads. The NBC Botanist or Wildlife Biologist, or a qualified person overseen by the NBC Botanist or Wildlife Biologist will determine when the pools have dried enough to allow training.

7.2 Communication of Training Area Protocols

The Navy will continue to ensure effective communication and coordination among the biological monitors, the Natural Resources Office, and the scheduling commands for NASNI, SSTC-N and SSTC-S.

The Navy Natural Resources Office will continue to host an annual kickoff meeting(s) each year to outline natural resource needs and training/scheduling protocols designed to minimize the impacts of training to terns and plovers. Each command/tenant will participate in this kickoff meeting(s). During the breeding season kickoff meeting, the Navy Natural Resources Office will present information regarding the tern, plover, and management strategy to conserve these resources for that season.

The Navy Natural Resources Office will continue to submit to the SSTC scheduling office, on a weekly basis during the breeding season, an updated map that depicts the location of all active tern and plover nests. Likewise, the Navy Natural Resources Office will submit to the SSTC-S scheduling office each year, a map that depicts the most recent information regarding the location of vernal pools at SSTC-S.

7.3 Nest Relocation

The Navy will instruct Service-approved nest monitors to move least tern or snowy plover nests small distances, as necessary and appropriate, to reduce the potential for nest failure. For example, plover and tern nests located in existing Beach Crossing Lanes will typically be relocated to safer areas at the periphery of the Beach Crossing Lanes. The Navy will contact the Service to report the circumstance that necessitated movement of any tern or plover nest. This will be done via submittal of the Navy's weekly report to the Service. If relocation is necessary to reduce potential impacts, nests will be moved the shortest distance possible into suitable habitat to increase the chances for nest success.

The Navy will also instruct Service-approved monitors to salvage plover eggs from nests that have been abandoned, to allow incubation, rearing, and release onto beaches within the action area. Eggs may likewise be collected and removed to captivity in instances where high tide events will submerge eggs, and no safe adjacent beach is present in which to relocate eggs out of the intertidal zone.

7.4 Predator Management and Control

The Navy will continue to conduct predator management of mammalian and avian predators of the tern and plover at all nesting sites. This is currently accomplished via cooperative agreement with the U.S. Department of Agriculture. Predator management will include non-native species, as well as native predators. In instances involving native predators, every effort will be made to use non-lethal means of predator management. The Navy will continue to use pole traps as part of the predator management program, subject to the limitations placed upon the use of this tool as part of the USDA's depredation permit from the Service's Migratory Birds Office. The Navy will also continue to work cooperatively with the Service regarding the relocation of American peregrine falcons (*Falco peregrinus anatum*) if they are detected.

The Navy will continue to submit Migratory Bird Depredation Permit requests to address management of the gull-billed tern (*Gelochelidon nilotica vanrossemi*), a significant predator on least tern and snowy plover chicks within the action area. To date, the Navy has not received authorization to capture, relocate, or take this species although documented predation on least tern chicks has been significant, and permit applications have been submitted since 2005. The Navy will continue the use of wire wickets or domes, as appropriate, to attempt to reduce the level of nest predation by gull-billed terns. Wickets are made of two pieces of small gauge wire and formed into a 30-cm (1-ft) dome, which is placed over some active tern nests. The Navy is currently studying the wickets to determine their effectiveness.

The Navy will continue to manage southern fire ants (*Solenopsis xyloni*), field ants (*Lasius spp.*), Argentine ants (*Linepithema humile*), and pyramid ants (*Dorymyrmex spp.*) on the Delta Beaches and at NASNI prior to and during the plover and tern nesting seasons.

The Navy will also continue to periodically use cameras to document predator activity and collect status information.

7.5 Nesting Deterrence through Habitat Modification

The Navy will continue to modify beach topography within SSTC-N Beach Lanes Green 1 and Green 2 prior to the breeding season to discourage establishment of tern and plover nests in these intensively used areas. The Navy may also expand use of this management technique into other beach lanes, which will require future project-level consultation.

7.6 Annual Nesting Site Preparation

The Navy will continue to inspect and remove plant growth from North and South Delta Beach prior to the breeding season. In addition, the Navy will continue to replace or reinstall site grid poles and chick barriers around the site perimeter, use tern decoys, apply clean sand to, and place chick shelters throughout the nesting colony as necessary to prepare the site(s). The Navy will enhance substrate at the Delta Beaches and the NASNI Least Tern nesting site (MAT site) as opportunities arise with available sand or dredge spoil. If a sand source is identified for

application to the Delta Beaches or the MAT site, the Navy will first test the material to assure that it is: 1) appropriate size and quality for tern and plover nesting and 2) free from contaminants that may pose a risk to terns, plovers or other avian species that use the site. All work conducted to enhance the substrate by adding sand or dredge materials will occur between September 15 and February 15 each year.

The Navy will continue efforts to control invasive exotic plants on all SSTC ocean and bay-side beaches to improve habitat quality for terns and plovers. Due to the function that iceplant can provide for dune stabilization and the financial expense of removal, some non-native iceplant will be left in place until funds become available for native plant restoration activities. Invasive plant control may include weeding, using heavy equipment, or moving sand. During invasive plant control, the Navy will mark and avoid the locations of select native plants, including coastal woolly-heads (*Nemacaulis denudata*), Brand's phacelia (*Phacelia stellaris*), and Nuttall's lotus *(Lotus nuttallianus),* to protect these rare plants and provide a mosaic of vegetation for chick shelter and escape cover.

To maintain plover foraging habitat within the SSTC action area, the Navy will not rake or otherwise remove kelp or natural marine vegetation from beaches within the action area, with the exception of:

(A) The beach at YMCA Camp Surf will be periodically cleared of kelp to increase the safety of children participating in surf camps at this facility. Kelp removal will be limited to the area most intensively used during summer camping programs. Kelp will not be buried and will remain within the boundaries of SSTC to provide forage material for plovers.

(B) The beach immediately in front of the Navy Lodge will be periodically raked in accordance with a previous consultation (FWS-SDG-3908.5). During the plover breeding season, the beach raker will continue to coordinate with plover monitors to assure that raking does not result in nest/active scrape loss. The Navy will minimize beach raking at NASNI to the extent consistent with ongoing recreational use.

7.7 Long Term Habitat Enhancement Plan for Action Area Beaches

The Navy currently conducts site enhancement activities at the Delta Beaches as outlined under "Annual Nesting Site Preparation" above and has also implemented weed control activities on the eastern edge of training lanes to improve conditions for nesting terns and plovers. Site enhancement is currently conducted on an opportunistic basis, using resources for site enhancement (sand) if it becomes available during other projects. The Navy proposes to develop and implement a comprehensive site enhancement plan for SSTC, including the Delta Beaches, portions of SSTC-N Beach, and portions of SSTC-S Beach. One goal of the Long Term Habitat Enhancement Plan will be to improve conditions for terns and plovers at the Delta Beaches and portions of the training lanes, in hopes that the nesting distribution will shift into these areas and reduce potential conflicts with training activities. The site enhancement plan will include dune

restoration and establishment on the windward (western) edges of the Delta Beaches and some areas of SSTC-N Beach. The plan will include measures to ensure that terns or plovers that nest in restoration areas are not disturbed or harmed during restoration or site maintenance activities. These measures may include: coordination with tern/plover monitors; passive irrigation systems, and timing the planting and maintenance activities to reduce the level of human presence necessary during the breeding season. Dune establishment will enhance this area for plovers, create a source of sand for the least tern nesting area, and establish a better visual barrier between Highway 75 and the nesting colony.

7.8 Recreational Use Restriction

The Navy will continue efforts to eliminate recreational or casual use of the SSTC Beaches by the general public and by military personnel and their dependents from the Naval housing that is across the highway from beach lanes Blue 2, Orange 1, and Orange 2.

The Navy will send a letter to military housing residents each year prior to the plover and tern breeding seasons to increase awareness about recreational use restrictions. The Navy will use security patrols and guards to reduce recreational and casual use of the SSTC-N and SSTC-S Beaches. The Navy will also install a guard shack with a camera and improved signage/markers at the southern end of SSTC-N Beach to discourage unauthorized access by people from Silver Strand State Beach. Improved signage and markers will include: “K-rail” or other suitable barrier that will be installed from the existing fence, which lies above the high tide line, to the mean high tide line, and large visible signs that clearly delineate “No Trespassing”. The Navy will also continue to support the “Plover Patrol,” a volunteer effort coordinated by the Silver Strand State Beach personnel.

7.9 Rearing of Collected Eggs, Injured and Sick Individuals

All injured or sick least terns or snowy plovers will be taken to a wildlife rehabilitation center, preferably Project Wildlife, for rehabilitation.

Plover eggs that have been collected due to abandonment will be taken to Project Wildlife, Sea World, or other permitted and qualified rehabber, as appropriate, for hatching and rearing. The Navy will continue to supply Project Wildlife, Seaworld, or other permitted rehabber, with fiscal resources to support this activity to the extent consistent with Navy funding abilities. All chicks will be released in areas approved by the Navy with guaranteed predator management. The success of any released plovers or terns will be tracked and evaluated to develop more effective rearing methods.

7.10 Plover Health Study

The Navy will continue to support studies and efforts by the Service to determine the cause(s) of plover mortality if dead/sick plovers are observed within the action area.

7.11 Monitoring Species Status and Incidental Take

The Navy will continue the current intensive monitoring protocols for terns and plovers at all San Diego Bay NBC training locations. The Navy will continue to submit to the CFWO: 1) weekly reports during the least tern and snowy plover breeding seasons on the status of these species in the training areas; and 2) yearly reports that document, at a minimum, the location of all nests observed, nest outcomes, the location and cause (if known) of all nests or individuals injured or killed, the locations of nests/eggs collected, number of nests/eggs collected, the hatch date of each egg collected, the unique band combination given each captive-reared chick, the approximate fledgling date and the release date/location of each captive-reared fledgling, and suggestions to improve the efficacy of this process if used in future years. This information is necessary to assess the amount of incidental take, and the effectiveness of using this approach to minimize impacts.

Biological monitoring of the tern and plover during the breeding season will be conducted by Service-approved monitors at all nesting sites. The general schedule for monitoring is provided below but may be modified based on findings in the field and/or operational requirements. The Navy will ensure that, as part of routine monitoring, biological monitors look for and document the location of least tern or snowy plover nests, eggs and chicks prior to and after all military training exercises, to allow assessment of take associated with training activities. The frequency of monitoring described below will be used to accomplish this objective:

- NBC Ocean Beach: Monitoring for least terns and snowy plovers will be conducted 3 to 4 days each week from March 1 to April 15, 5 to 6 days per week from April 15 to August 1, and 3 to 4 days per week from August 1-August 31.

- Delta Beaches: Monitoring for terns and plovers will be conducted 3 days a week from April 15 to April 30, 4 to 5 days a week from April 30 to July 31, and 3 days a week from July 31 to August 31.

- Monitoring at SSTC-S Beach for plovers will be conducted 1 to 3 days a week from March 1 to mid-September.

- Monitoring for plovers will be conducted at all sites 1 day per week from September through February.

The Navy will band tern and plover adults and chicks in conjunction with monitoring of nests at the NASNI, SSTC-N and SSTC-S. Due to the large number of nests that must be monitored and the number of quality bands received from the Service, not all adults or chicks are banded, and color band combinations do not mark birds to the level of the individual.

STATUS OF THE SPECIES

California least tern (*Sterna antillarum browni*)

Listing Status

The California least tern was listed as endangered under the Act on June 2, 1970 (35 FR 8491), due to loss of nesting habitat in conjunction with increased loss of foraging areas, human disturbance, and predation at remaining breeding colonies. No critical habitat has been designated for the least tern. A recovery plan was adopted in 1980, and revised on September 27, 1985 (Service 1985).

The Service completed a 5-Year Review of the California least tern in September 2006 (Service 2006a) and published a notice announcing the completion of the review in the *Federal Register* on February 14, 2007 (72 FR 7064). The 5-Year Review recommended downlisting the species to threatened status in recognition of the reduction of threats by ongoing management efforts.

Species Description

The least tern is the smallest of the North American terns, measuring about 22 cm (9 in) long with a wingspan of about 51 cm (20 in). Males and females look alike with a black cap, gray wings with black tips, orange legs, and black-tipped yellow bill. Immature birds have darker plumage and a dark bill with distinctive white heads and dark eye stripe.

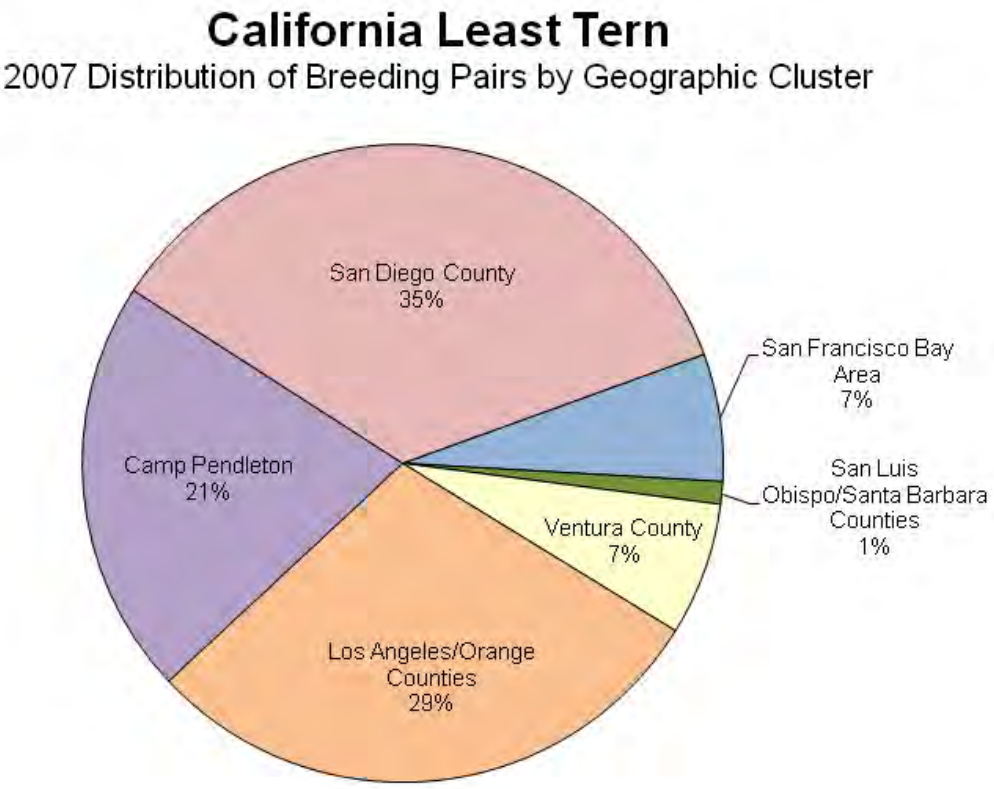
Distribution and Abundance, and Habitat Affinity

The breeding range of this subspecies has historically been described as extending along the Pacific Coast from Moss Landing, Monterey County, California, to San Jose del Cabo, southern Baja California, Mexico (American Ornithologists' Union 1957, Grinnell and Miller 1944). However, since 1970, nesting sites have been recorded from San Francisco Bay to Bahia de San Quintin, Baja California (Service 1985). The nesting range in California is thought to have been widely discontinuous, with the majority of birds nesting in southern California from Santa Barbara County south through San Diego County (Service 1985). Least terns typically arrive in California from Central and South America beginning in mid-April and complete their breeding cycle by the end of August. Their migration route in California is along the coast in both spring and fall. South of the Mexican border, the migratory route is not known, but it is assumed to be coastal (Service 1985).

The majority of the least tern population is concentrated in southern California within Los Angeles, Orange, and San Diego counties. Over half (56 percent in 2007) of the U.S. least tern population is found in San Diego County, including Camp Pendleton (Marschalek 2008; Figure 3). In 2007, approximately 35 percent of the population was distributed in San Diego County outside of Camp Pendleton. In northern San Diego County, least terns currently breed at the mouth of the Santa Margarita River on U.S. Marine Corps Base Camp Pendleton (USMCBCP),

and at Batiquitos Lagoon (Fancher 1992, Powell and Collier 2000, Marschalek 2005). In southern San Diego County, nesting sites are known from Mission Bay (including FAA Island, north Fiesta Island, Mariner's Point, Stony Point, and San Diego River Mouth), San Diego Bay [including South San Diego Bay NWR, Sweetwater Marsh NWR, Lindbergh Field, NASNI, NBC (Delta Beaches and SSTC-N Beach), and the Chula Vista Wildlife Reserve], and the beach areas north and south of the Tijuana River mouth. All of these sites are in proximity or adjacent to estuaries, lagoons, and/or river mouths.

Figure 3. California Least Tern 2007 Distribution*



* Data obtained from Marschalek 2008

Statewide efforts to implement protection and management for least tern nesting and foraging areas have contributed to a breeding population increase from 1,706 pairs in 1990 to an estimated 7,023 pairs in 2008, and 7,124 pairs in 2009 (Table 4). The annual population growth rates were variable between 1992 and 2003, and have stabilized since then. However, the fledgling per pair ratios were generally greater (i.e., approximately 2 times greater) from 1990 to 2000 (except 1995) than from 2001 to 2009 (Table 4).

Unfrequented sandy beaches close to estuaries and coastal embayments have traditionally served as nesting sites for the California least tern (Grinnell and Miller 1944, Garrett and Dunn 1981). Conflicting uses of southern California beaches during the least tern nesting season have

precluded the use of most natural nesting sites, although least terns nest adjacent to intensively used beaches if protected from the adjacent disturbance (e.g., Huntington Beach, Venice Beach). In recent years, some non-beach sandy surfaces in coastal areas (e.g., salt pond dikes, sand flats, sandfills, airports, and landfills around bays and estuaries) have been successfully used by least terns for nesting because potential nesting habitat has been greatly reduced by human disturbance associated with recreation and development (Massey and Atwood 1979 – 1985, Thompson et al. 1997).

Table 4. California Least Tern U.S. Rangewide Abundance *

Year	CLT pairs (minimum)	CLT fledglings (minimum)	Fledgling/Pair Ratio (minimum)	CLT Nests (minimum)	Change in Estimated Number of Pairs	Percentage Change in Estimated Population Size
1990	1706	759	.61	--		
1991	1827	1745	.96	--	+121	+7
1992	2100	1376	.66	--	+273	+15
1993	2324	2043	.88	--	+224	+11
1994	2792	1784	.64	--	+468	+20
1995	2599	1021	.39	--	-193	-7
1996	3362	1916	.57	--	+763	+29
1997	4017	3231	.80	--	+655	+19
1998	4141	2686	.65	--	+124	+3
1999	3493	671	.19	--	-648	-16
2000	4521	3710	.82	5301	+1099	+31
2001	4712	1773	.38	5319	191	+4
2002	3569	692	.19	4093	-1143	-24
2003	6780	2627	.39	7677	+3211	+90
2004	6351	1547	.23	7937	_-429	-6
2005	6865	1721	.23	8124	+514	+8
2006	7006	2571	.35	8173	+141	+2
2007	6709	2188	.32	7627	-297	-4
2008	7023	2254	.30	8223	+314	+5
2009	7124	1694	.24	8026	+101	+1

*Data obtained from California Department of Fish and Game annual status reports.

In addition to nesting areas, secure roosting and foraging areas are essential to the recovery of the species. Roosting areas are of two kinds: pre-breeding season nocturnal roosts and post-breeding season dispersal sites where adults and fledglings congregate. The best documented night roost is in Belmont Shore, Long Beach (Atwood 1986). However no recent surveys have been conducted to verify continued use of this night roost site. A night roost has also been identified at SSTC-N in beach lane Blue 2 and Orange 1 and 2, and in an area near the mudflats at Delta Beach North and South (DoN 2009a).

Least terns typically forage close to their nesting colony during the breeding season (Atwood and Minsky 1983, Minsky 1984, Copper 1986, Massey 1987, Ehrler et al. 2006). One study observed that although more abundant prey is available at a more distant location, least terns most intensely forage (i.e., number of least terns per hour per hectare) within approximately 1 km (0.6 mi) of their nesting colony (Ehrler et al. 2006). In San Diego Bay, a 2-year foraging study found that least terns nesting at Delta Beach North foraged the most intensely and frequently in sampling stations immediately adjacent to Delta Beach North, which extended up to 0.5 to 0.8 km (0.3 to 0.5 mi) away from the nesting colony, and that least terns forage more in the bay than in the ocean (Copper 1986). Another study observed that the majority of least terns forage less than 1.6 to 3.2 km (1 to 2 mi) from their nesting colony while a small proportion of least terns will sometimes forage up to 8 km (5 mi) from a colony site (Atwood and Minsky 1983). Adult terns exhibit two patterns of foraging activity, one of which is observed before the hatching of eggs and another observed subsequent to hatching. Adults feeding only themselves tend to go farther and feed on larger fish than when they are feeding chicks. After the eggs hatch, adults make shorter and more frequent trips to find the smaller fish needed by the chicks (Massey 1987).

Life History

The least tern is migratory, typically arriving in California from Central and South America in mid-April and departing by the end of August (Massey 1974). However, terns have been recorded in the breeding range as early as March 13 and as late as November 24 (San Diego Natural History Museum specimen records).

Least terns are gregarious year-round, feeding and migrating in flocks of 5 to 20 or more. Least terns flock together before the nesting season, at night roosts during the nesting season, and at shallow-water, freshwater, and estuarine marshes after the nesting season (Atwood and Minsky 1983, Service 1985). Nesting colonies of least terns range widely in size from less than 10 to over 100 pairs of terns (Marschalek 2007), and occur in 5 clusters along the western coast of the United States (Massey and Fancher 1989). Least terns are more loosely colonial than other tern species; nests are sometimes so widely spaced as to be out of sight of conspecific species (Thompson et al. 1997). In Connecticut, Brunton (1999) found that an intermediate colony size (approximately 150 nests) was optimal for least tern nesting success. She found that predation by small mammals, gulls, and crows was dependent on colony size and that these predators were deterred from colonies with more than 100 nests, but black-crowned night herons were attracted to large colonies

Least tern nesting has been characterized by two waves of nesting from approximately May through August (Massey and Atwood 1981). In years where two waves of nesting do occur, most of the initial nesting attempts are made by experienced breeders and are completed by mid-June. A second wave of nesting, from mid-June to early August, is comprised of re-nests after initial failures and second year birds nesting for the first time (Massey and Atwood 1981). A second wave of nesting, however, is not observed in all years.

The nest of the least tern is a simple scrape or depression in the sand that the birds sometime adorn with small fragments of shell or pebbles. One to three eggs are laid, usually two. Both parents share duties throughout nesting and chick-rearing, but the female incubates and broods chicks more than the male (Keane 1987). Nests are incubated for 20-25 days with a mean time of about 21 days. After their eggs hatch, breeding adults catch and deliver small fish [i.e., approximately 2.5 cm (1 in) long (Atwood and Kelley 1994, Ehrler et al. 2006)] to the flightless young. Newly hatched downy chicks are capable of walking in the vicinity of the nest (e.g., to seek shade) (Cornwell 1986). Young are capable of flight at approximately 20 days but continue to be fed and are taught how to feed by their parents for some time after fledging (Thompson et al. 1997). Recently fledged chicks intermingle with adults and chicks from other colonies, feed inexpertly for several weeks, and ultimately depart colony areas in preparation for migration within 4-8 weeks of fledging. Minimum breeding age is 2 years (Massey and Atwood 1981), and the average breeding life-span of least terns is 9.6 years (Massey et al. 1992).

Least terns exhibit a high degree of nest site fidelity from year to year (Atwood and Massey 1988), but inter-colony movement can occur in response to failure at a particular site. Factors which can affect colony site fidelity include reproductive failure and the physical attributes of the nest site such as the amount of vegetative encroachment. Declines at one nesting site sometimes are balanced by increases at another nearby site, assuming access and availability of a nearby appropriate food source. These shifts appear to be related to heavy predation or human disturbance event(s) which often times result in poor reproductive success. For example, least terns relocated from the colony sites in western Mission Bay (i.e., San Diego River Mouth and Mariner's Point) to colony sites in eastern Mission Bay (i.e., Stony Point and North Fiesta Island) during the 2006 breeding season and re-nested after predation decimated the offspring at the western sites (Marshcalek 2006). Least terns have also shifted in distribution at SSTC-N beach in response to disturbance and modified topography (DoN 2009a).

Least terns feed exclusively on small fishes captured in estuaries, embayments, and shallow near-shore waters, particularly at or near estuaries and river mouths (Massey 1974, Collins et al. 1979, Atwood and Minsky 1983, Atwood and Kelly 1984, Minsky 1984, Bailey 1984). They characteristically forage by hovering 1 to 10 m [1.1 to 11 yards (yd)] above the water, then plunging headfirst into the water to seize small fish. Least terns primarily forage on juvenile or larval anchovies [Engraulidae: deep-bodied anchovies (*Anchoa compressa*), slough anchovies (*A. delicatissima*), northern anchovies (*Engraulis mordax*)] and silverside smelt [Atherinidae: topsmelt (*Atherinops affins*) and jacksmelt (*Atherinopsis californiensis*)] that are less than 5 cm (2 in) long and occur in the upper 0.5 m (0.5 yd) of the water column, which is probably the deepest least terns can plunge-dive (Atwood and Kelly 1984, Baird 1997). Chicks receive smaller food items than adults or juveniles and newly hatched chicks consume fish that are approximately 2.5 cm (1 in) long (Atwood and Kelly 1984, Ehrler et al. 2006). Adults do not dismember prey fish before delivering to chicks, so chicks must be given fish that are small enough for them to swallow whole.

Threats

Threats to the nesting habitat of California least terns have been ameliorated but not eliminated. Habitat for the species is degraded throughout its range and competing human activities continue to threaten this species. The remaining nesting colonies are located within small sites requiring intensive management. Within these managed sites, the species remains vulnerable to predation, invasive non-native plants, and human-related disturbance (Service 2006). Without continued management of these sites, we anticipate that the threats of habitat loss and predation would reverse the population increase that has occurred since the species was listed (Service 2006). The site-specific threats to least terns habitat associated with climate change and rising sea level have not been evaluated, but the coastal location of least tern habitat places it at risk should sea levels rise over the next several decades.

The sensitive status of some predatory species requires special consideration and has reduced the predator management options available to protect least tern colonies in some instances. For example, the gull-billed tern, a species protected by the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 *et seq.*), has recently posed a localized problem for least terns nesting on beaches around San Diego Bay (Service 2009a), which supports over 20 percent of the rangewide population of the least tern (Appendix D). Gull-billed terns are terrestrial foragers and pluck prey while on the wing (Service 2009a). Their diet includes fish, marine invertebrates, and small terrestrial vertebrates such as least tern chicks. Historically, this species was not recorded as a breeding resident along the west coast of the U.S. There are no records of western gull-billed terns in San Diego County until 1985 (Unitt 2004), and currently the only area in which gull-billed terns have been found nesting in San Diego County is on the salt pond levees within the San Diego Bay NWR, southeast of the action area. The first gull-billed tern nest at the salt pond levees was observed in 1987 (Terp and Pavelka 1999), and between 1993 and 1998, eight to ten nesting pairs were recorded. Since then, the gull-billed tern colony at the salt pond levees has increased so that in 2009, over 78 nests and a minimum of 58 pairs were recorded (Service 2009b). Gull-billed terns have also been observed foraging further north, within and around least tern colonies at MCBCP and Bolsa Chica (Service 2009a), but gull-billed tern nesting on the west coast has not yet been documented north of San Diego Bay (Service 2009a).

During the 2002 nesting season, nest monitors documented a significant increase in least tern chick predation by gull-billed terns (Patton 2002). At least 37 incidents of least tern and snowy plover chick predation by gull-billed terns were documented in 2003 (Patton 2004b). In 2004, at least 44 least tern and snowy plover chicks were documented as lost to gull-billed tern depredation (Patton 2006), but the number of least tern vs. snowy plover chicks was not determined. In 2008, a total of 137 least tern chicks were documented as lost to gull-billed tern predation in the San Diego Bay area. Since biologists monitoring the nesting populations around the bay and at the Tijuana Estuary are only present intermittently on a weekly basis, it is likely that only a fraction of the actual predation occurring is observed. Despite the visible predation on least tern chicks within the action area and the low productivity observed here in recent years, the estimated number of least tern pairs in the action area has remained stable. A study is underway to assess the age class distribution of the least terns nesting within the action area,

since the age structure of the birds nesting in this area may have changed due to low productivity and recruitment. Tern monitors are also re-evaluating the methods used to estimate least tern pair numbers to determine if re-nesting efforts by least tern pairs that have failed due to predation, may be resulting in overestimates of the pairs currently using the site.

Although gull-billed terns have expanded their distribution to include San Diego Bay and have increased in number in San Diego, the recorded numbers of this species remain low rangewide. The gull-billed tern is included in the Service's Birds of Conservation Concern list (Service 2008b), and the Service recently received a petition to list the gull-billed tern as a threatened or endangered species (Center for Biological Diversity 2009). Concern over the status of the gull-billed tern has prompted the Service's Division of Migratory Bird Management to deny U.S. Navy requests for permits to lethally remove gull-billed terns observed foraging upon least tern chicks at SSTC.

The current situation, including unmanaged predation, the increasing size of the gull-billed tern colony in San Diego Bay, and likelihood of further northward expansion in gull-billed tern nesting distribution, has raised concerns that gull-billed tern predation may have rangewide recovery implications for the least tern. The ongoing impact of gull-billed tern predation on least tern colonies surrounding San Diego Bay, including NBC, is of particular concern because of the contribution of these colonies to the overall least tern status, the level of predation recorded at these colonies in recent years (Service 2009a), and the likelihood that ongoing lack of productivity could eventually depress the numbers of least terns in this area, if left unchecked. Various programs within the Service, including the Divisions of Migratory Bird Management, Wildlife Refuges**,** and Ecological Services, are currently working together to identify and implement actions that will provide a better understanding of the impacts of gull-billed tern predation on the least tern and snowy plover. Management options to address the conservation needs of the least tern, snowy plover, and gull-billed tern are under Service consideration (Structural Decision Making Workshop, September 2009) and a draft Environmental Assessment regarding gull-billed tern management options was released by the Service for public review in 2009 (Service 2009a).

Reduction in food supplies for least terns can decrease recruitment to the breeding population. Low reproductive success and high chick mortality in recent years has been attributed to shortages of fish prey (Marschalek 2005 and 2006). Reduced food availability negatively affects the reproductive success of the tern by reducing clutch sizes, significantly lowering weights of chicks, and increasing levels of egg abandonment and non-predator chick mortality (Atwood and Kelly 1984). More specifically, scarcity of small fish can result in chick mortality. The "El Niño" warm sea current phenomenon can have deleterious long-term effects on the entire least tern population. During the El Niño event of 1982-1983, diminished fish populations throughout the southern California bight caused a drastic reduction in least tern breeding success resulting in the lowest annual production of fledged young on record (Massey 1988, Massey et al. 1992). Subsequently, it took 5 years for the population to recover from this event. El Niño conditions were also evident during the 1992 breeding season, which also resulted in reduced statewide production of fledglings (Caffrey 1993).

Loss and/or degradation of foraging habitat through filling habitat, covering it with structures, or by reducing visibility in the upper water's surface can reduce the ability of least terns to capture their prey. To avoid temporary degradation of foraging habitat during the nesting season, Copper (1986) recommended that dredging and water-related construction in important foraging habitats, such as foraging habitat immediately adjacent to least tern colonies, occur outside the nesting season.

California least terns may also be somewhat susceptible to the expressed effects of pesticide contamination and bioaccumulation (Boardman 1988).

Rangewide Conservation Needs

The Least Tern 5-Year Review (Service 2006a) included the following recommendations for the future conservation needs of the California least tern:

1. Revisit and revise the current California least tern recovery plan;

2. Continue management of existing nest sites;

3. Develop binding, site-specific management plans in concert with State and Federal wildlife agencies to provide long-term protection of nest sites;

4. Continue monitoring nest sites; and

5. Create new nesting sites and expand existing nesting sites.

Western Snowy Plover (*Charadrius alexandrinus nivosis)*

Listing Status

The Pacific coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) was listed as threatened under the Act on March 5, 1993 (58 FR 12864). Threats to the species identified at the time of listing included loss and modification of nesting habitat resulting from encroachment of European beachgrass, extensive human recreational use of nesting areas, and human development of the coast, with predation also cited as a significant threat to a number of nesting colonies (58 FR 12872).

Critical habitat was first designated for this population of western snowy plover on December 7, 1999 (64 FR 68508). Following a lawsuit filed against the Service by the Coos County Board of County Commissioners and others, the 1999 critical habitat designation was remanded and partially vacated (Coos County Board of County Commissioners *et al*. v. Department of the Interior *et al*. CV 02-6128). A revised final critical habitat designation was published in the *Federal Register* on September 29, 2005 (70 FR 56969). The 2005 revised final critical habitat designation does not include lands owned or managed by the Department of Defense at NBC.

On July 29, 2002, we received a petition from the Surf-Ocean Beach Commission of Lompoc, California to delist the Pacific coast population of the western snowy plover. A similar petition dated May 30, 2003, was received by us from the City of Morro Bay, California. In accordance with our 1996 Petition Management Guidance (61 FR 36075), we treated the two petitions as a single petition because the second petition was neither greater in scope nor did it broaden the area of review of the first petition. We published a 90-Day Finding on the 2002 petition on March 22, 2004 (69 FR 13326), indicating the petition presented substantial information that the petitioned action may be warranted.

We completed our 12-Month Finding on the petition to delist the Pacific coast population of the western snowy plover on April 21, 2006 (71 FR 20607). In our 12-Month Finding, we determined the Pacific coast population of the western snowy plover met the criteria for discreteness and significance as outlined in the Service's and National Marine Fisheries Service's 1996 Joint Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act (61 FR 4722). At the time the 12-Month Finding was published in the *Federal Register*, the United States' portion of the Pacific Coast Distinct Population Segment (DPS) of the western snowy plover was estimated to be 2,334 adult birds (71 FR 20625). Furthermore, while we determined the DPS of the western snowy plover should remain classified as threatened under the Act, we also concluded that significant progress has been made toward recovery; therefore, concurrent with the publication of the 12-month finding, we also published a proposed Special Rule Pursuant to Section 4(d) of the Act for the Pacific Coast DPS of the western snowy plover (71 FR 20625). The proposed 4(d) rule would remove the section 9 prohibitions of the Act for activities that occur in counties where a particular county has met its Breeding Bird Management Goal, as specified in Table 1 of the April 2006 proposed rule (71 FR 20631). A Notice extending the comment period on the proposed 4(d) rule was published in the *Federal Register* on August 21, 2006 (71 FR 35406). A final rule is still in development.

The Service completed a 5-Year Review of the Pacific coast DPS of the western snowy plover in May 2006 (Service 2006b) and published a notice announcing the completion of the review in the *Federal Register* on February 14, 2007 (72 FR 7064). The 5-Year Review, which used the 2006 12-Month Finding as the basis for the review, recommended no change in the status of the Pacific coast DPS of the western snowy plover.

A Notice Announcing the Availability of a *Final Recovery Plan for the Pacific Coast Population of the Western Snowy Plover* (WSP recovery plan) was published in the *Federal Register* on September 24, 2007 (72 FR 54279).

Species Description

The western snowy plover is a small shorebird in the family Charadriidae. Adults weigh from 34 to 58 g (1.2 to 2 oz) and range in length from 15 to 17 cm (6 to 7 in) (Page et al. 1995). Western snowy plovers are pale gray-brown above and white below, with a white hind neck collar and dark lateral breast patches, forehead bar, and eye patches. The bill and legs are black.

Distribution, Abundance and Habitat Affinity

The breeding range of the Pacific coast western snowy plover population extends along coastal beaches from the southern portion of Washington State to southern Baja California, Mexico. The WSP recovery plan (Service 2007a) identified 159 current or historical western snowy plover breeding or wintering locations on the U.S. Pacific coast. These localities include 6 in Washington, 19 in Oregon, and 134 in California. In Baja California, breeding western snowy plovers concentrate at coastal wetland complexes as far south as Bahia Magdalena, Mexico (Palacios et al. 1994). The largest number of breeding birds occurs from south San Francisco Bay to southern Baja California suggesting that the center of the plovers' coastal distribution lies closer to the southern boundary of California (Page and Stenzel 1981, Palacios et al. 1994).

The 2009 western snowy plover population estimate for the U.S. is higher than the estimate at the time of listing of this species in 1993. Within the U.S., breeding season window surveys are used as an index to assess population trends and also as a basis for roughly estimating population size. At the time of listing, 1,386 birds were detected in California based on a 1989 survey, with 30 adults reported in Oregon in 1992, and fewer than 30 nesting birds in Washington (58 FR 12870). In 2005, the breeding season window surveys detected 1,817 plovers along the Pacific coast of the U.S. Numbers detected during the breeding season window survey increased in 2006 to 1,877 plovers, then decreased to 1,537 plovers in 2007, and increased slightly in 2008 and 2009 at 1,541 plovers, and 1,587 plovers, respectively. (Appendix C). Within the U.S., the Service has used a correction factor of 1.3 applied to the window survey results to develop a population estimate (Service 2007a). The correction factor was derived from studies using marked birds at one of the breeding locales, rather than rangewide, and evaluation of the accuracy of this correction factor in other areas is in progress (Watkins 2010). Using this correction factor, the estimated 2009 population on the U.S. Pacific coast was 2,063 plovers (Appendix C).

The most recent surveys conducted in Mexico detected fewer plovers on the coast of Baja California than detected in 1991-1992 (Eduardo Palacios 2009). Surveys in Baja California use methodology similar to the U.S breeding season window surveys. Surveys were conducted in 1991-1992 and again in 2007 and 2008. The 1991-1992 surveys detected 1,344 plovers in Baja California (Palacios et al 1994), and recent surveys used the same methodology and detected only 555 plovers in 2007 and 879 plovers in 2008 (Eduardo Palacios 2009). Using the 1.3 correction factor, the estimated 2008 population in Baja California was 1,143 plovers.

Sand spits, dune-backed beaches, sparsely to unvegetated beach strands, open areas around estuaries, and beaches at river mouths are the preferred coastal nesting areas of the snowy plover (Page and Stenzel 1981, Wilson 1980, Powell et al. 1997). Other areas used by nesting snowy plovers include dredge spoil fill, dry salt evaporation ponds, airfield ovals, and salt pond levees (Widrig 1980,; Wilson 1980, U.S. DoN 2004, Page and Stenzel 1981). Nest sites typically occur in flat, open areas with sandy or saline substrates with little or no vegetation (Widrig 198, Wilson 1980, Page and Stenzel 1981, Welchell and Keane 1998, Fancher 1998). Snowy plovers are sometimes found nesting in similar habitats as the least tern, such as occurs at Batiquitos Lagoon

(Welchell and Keane 1998), NBC (DoN 2004), and Camp Pendleton (Powell 1996) in San Diego County, California. Like the least tern, the western snowy plover requires suitable habitat that is subject to little disturbance from people, vehicles, and dogs.

Life History

The breeding season of the western snowy plover typically extends from March 1 through September 15. During the breeding season, plovers congregate in loose concentrations with the number of adults at coastal breeding areas ranging from 2 to 318 (Page and Stenzel 1981). Both unpaired males and pairs defend territories against other plover species by posturing, chasing, or fighting. Unpaired males defend territories for up to 45 days before procuring a mate (Page et al. 1995). Paired birds use the territories for courtship, nest sites, and sometimes feeding (Page et al. 1995).

Egg laying in southern California has been documented as early as February 13 (Copper 2008), but most often begins in mid-March and continues through late-July (Page et al. 1995).Generally, three (3) eggs are laid in a nest that consists of a shallow depression scraped in sandy or saline substrates. After the full clutch is laid, both males and females incubate the eggs for 27-33 days (Warriner et al. 1986). Chicks are mobile soon after hatching, and broods rarely remain within the nesting territory (Warriner et al. 1986). The male may lead the brood to a brood territory, which can range from 0.8 to 1.2 ha (2 to 3 ac) (Fancher 2003). Birds are able to fly within approximately 31 days of hatching (Stenzel et al. 1994).

Snowy plovers clutches are frequently destroyed by predators, people, tides, or weather, but they re-nest readily after these losses up to six times in some locations (Wilson 1980, Warriner et al. 1986, Page et al. 1995). Snowy plovers may also double or triple brood during favorable years. Re-nesting may occur in the same scrape (rarely), in proximity to the initial nest, or in a new location distant from the first attempt (Warriner et al. 1986, Powell and Collier 1994, Powell et al. 1997). Nests are rarely reused because weather typically destroys scrapes within days of hatching (Page et al. 1995).

Polygamy has been observed in snowy plovers along coastal California (Warriner et al. 1986). Snowy plover females may abandon chicks as young as 6 days old to find another mate leaving the male to care for the brood (Warriner et al. 1986). Males attend the young for 29-47 days (Warriner et al. 1986) and then may re-nest with a new partner if sufficient time remains in the season (Stenzel et al. 1994). This results in a serial polygamous breeding system in which males may double clutch and females may triple clutch.

Snowy plover adults and young forage on invertebrates along intertidal areas, along beaches in wet sand and surf cast kelp, in foredune areas of dry sand above the high tide, on salt pans, and along the edges of salt marshes and salt ponds. Page et al. (1981) observed snowy plovers moving between salt pans, tidal flats, and beaches indicating these areas function together in providing habitat for the species.

While some western snowy plovers remain in their coastal breeding areas year-round, others migrate south or north for winter (Warriner et al. 1986, Page et al.1995a, Powell et al. 1997). In Monterey Bay, California, 41 percent of nesting males and 24 percent of the females were consistent year-round residents (Warriner et al. 1986). At Marine Corps Base Camp Pendleton (MCBCP) in San Diego County, California, about 30 percent of nesting birds stayed during winter (Powell et al. 1995, 1996, 1997). The migrants vacate California coastal nesting areas primarily from late June to late October (Page et al. 1995a). There is evidence of a late-summer (August/September) influx of western snowy plovers into Washington; it is suspected that these wandering birds are migrants. Most western snowy plovers that nest inland migrate to the coast for the winter (Page et al. 1986, 1995). Thus, the flocks of non-breeding birds that begin forming along the U.S. Pacific coast in early July are a mixture of adult and hatching-year birds from both coastal and interior nesting areas. During migration and winter, these flocks range in size from a few individuals to up to 300 birds (Service 2007a).

Threats

Threats to the Pacific Coast population of the western snowy plover remain essentially the same as at the time of its listing in 1993. The magnitude of these threats in the U.S. has been reduced through active management afforded by protections under the Act and undertaken primarily by certain Federal, State, and County agencies (71 FR 20625). The most important threats are ongoing habitat loss and fragmentation; mortalities, injuries, and disturbance resulting from human activities; predation; and lack of comprehensive State and local regulatory mechanisms throughout the range of the Western snowy plover (71 FR 20607). Natural factors, such as inclement weather, have also affected the quality and quantity of western snowy plover habitat (Service 2007a). The threats associated with climate change and rising sea level have not been evaluated, but the coastal location of plover habitat places it at risk should sea levels rise over the next several decades.

The gull-billed tern represents a threat to the snowy plover as discussed above for the least tern. At least 37 incidents of least tern and snowy plover chick predation by gull-billed terns were documented in 2003 (Patton 2004b), although the number of terns vs. plovers was not identified. In 2004, at least 44 least tern and snowy plover chicks were documented as lost to gull-billed tern depredation (Patton 2006). In 2008, a total of six incidents of snowy plover predation were documented by gull-billed terns in the San Diego Bay area. Gull-billed tern predation on the snowy plover is being address as discussed above for the least tern.

Rangewide Conservation Needs

The goal to achieve the long-term survival and recovery of the Pacific coast snowy plover population, as identified in the WSP recovery plan includes three criteria:

(1) maintain for 10 years an average of 3,000 breeding adults distributed among six recovery units, including 500 breeding adults in Recovery Unit 6;

(2) maintain a 5-year productivity of at least one fledged chick per male in each recovery unit in the last 5 years prior to delisting; and
(3) establish participation plans among cooperating agencies, landowners, and conservation organizations to assure protection and management of breeding, wintering, and migration areas.

While some positive contributions have been made to achieving each of these criteria, recovery actions are still needed (71 FR 20625). Conservation needs identified in the WSP recovery plan include: monitoring; management of breeding and wintering habitat to reduce threats (e.g. disturbance, loss of natural coastal processes, predation, invasive vegetation); enhancement and creation of habitat; reduction of disturbances on nesting and wintering beaches; and public education.

San Diego Fairy Shrimp (*Branchinecta sandiegonensis*)

Listing Status

The San Diego fairy shrimp was federally listed as endangered on February 3, 1997, (62 FR 4925). In September 1998, the Service published the *Recovery Plan for Vernal Pools of Southern California* (VP recovery plan) (Service 1998). The San Diego fairy shrimp is included in this recovery plan. Critical habitat for the San Diego fairy shrimp was designated on October 23, 2000, (65 FR 63438). Critical habitat was remanded, but not vacated, by the Central District Court of California on June 12, 2002. Critical habitat was re-proposed on April 22, 2003, (68 FR 19887). Revised critical habitat for the San Diego fairy shrimp was designated on December 12, 2007 (72 FR 70648). The 2007 revised final critical habitat designation excluded lands owned or managed by the Department of Defense at NBC because of the conservation efforts for the San Diego fairy shrimp identified in the INRMP for this area. Lands at the area now referred to as SSTC-S were considered biologically essential to the San Diego fairy shrimp, but did not meet the second provision of the definition of critical habitat pursuant to section 3(5)(A)(i)(II) because of the special management and protection identified in the INRMP.

The Service completed a 5-Year Review of San Diego fairy shrimp in September 2008 (Service 2008a) and published a notice announcing the completion of the review in the *Federal Register* on March 25, 2009 (74 FR 12878). The 5-Year Review recommended no change in the status of the San Diego fairy shrimp.

Species Description

The San Diego fairy shrimp is a small freshwater crustacean in the family Branchinectidae of the Order Anostraca. The species was originally described by Fugate (1993) from samples collected on Del Mar Mesa, San Diego County. Male San Diego fairy shrimp are distinguished from males of other species of Branchinecta by differences found at the distal (located far from the point of attachment) tip of the second antennae. Females are distinguishable from females of other species of Branchinecta by the shape and length of the brood sac, the length of the ovary,

and by the presence of paired dorsolateral (located on the sides, toward the back) spines on five of the abdominal segments (Fugate 1993). Adult male San Diego fairy shrimp range in size from 9 to 16 mm (0.35 to 0.63 in) and adult females are 8 to 14 mm (0.31 to 0.55 in) long.

Distribution, Abundance and Habitat Affinity

The range of the San Diego fairy shrimp includes Orange and San Diego counties in southern California, and northwestern Baja California, Mexico (Service 1998, Brown et al. 1993). In Baja California, San Diego fairy shrimp have been recorded at two localities: Valle de Palmas, south of Tecate and Baja Mar, north of Ensenada. A single isolated female was previously reported from vernal pools in Isla Vista, Santa Barbara County, California; however, directed surveys have not located any additional individuals (62 FR 4925).

In Orange County, the San Diego fairy shrimp has been documented at Fairview Park (CNDDB occurrence #11, 1996), Newport Banning Ranch, Irvine Ranch Land Reserve, and within the San Juan Creek watershed at Chiquita Ridge and Radio Tower Road.

In San Diego County, the species occurs in vernal pools from MCBCP, inland to Ramona and south through Del Mar Mesa, Proctor Valley, and Otay Mesa. A minimum of 246 pools on MCBCP are known to be occupied by San Diego fairy shrimp. Based on surveys of the 2,856 vernal pool basins currently mapped on Marine Corps Air Station Miramar, 1,303 are occupied by San Diego fairy shrimp (Miramar 2006). Of the 62 vernal pool complexes[1] mapped by the City of San Diego[2], 29 were found to be occupied by San Diego fairy shrimp and occur at the following localities: Del Mar Mesa (1), Carmel Mountain (1), Mira Mesa (6), Nobel Drive (3), Kearny Mesa (3), Mission Trails Regional Park (1), and Otay Mesa (14) (City of San Diego 2004b).

Additional vernal pool complexes with occurrences of San Diego fairy shrimp located in San Diego County but not included in the City of San Diego's Inventory include: Carlsbad, San Marcos, Ramona, Poway, Santee, Rancho Santa Fe, Murphy Canyon, Otay Lakes, Imperial Beach, East Otay Mesa, Marron Valley, NRRF, and Proctor Valley (CNDDB Occurrence # 27, 2001).

The loss of vernal pools that have the potential to support San Diego fairy shrimp has resulted in a rangewide reduction in diversity and abundance of San Diego fairy shrimp. Urban and water development, flood control, and highway and utility projects, as well as conversion of wild lands to agricultural use, have eliminated or degraded vernal pools and/or their watersheds in southern California (Jones and Stokes Associates 1987). Historically, vernal pools covered approximately 518 sq km (200 sq mi) of San Diego County (Bauder and McMillan 1998). Approximately 95 to

[1] Vernal pool complexes are defined as a series of vernal pool groups that are hydrolocially connected with similar soil types and species compositions. They were first described and surveyed by Beauchamp and Cass 1979 and subsequently updated in 1986 (Bauder) and 1998 (recovery plan).

[2] The City of San Diego conducted non-protocol surveys for San Diego fairy shrimp. Therefore, this inventory may under-represent the true number of vernal pools with occurrences of San Diego fairy shrimp.

97 percent of vernal pools within San Diego County have been destroyed (Bauder 1986, Bauder and McMillan 1998, Oberbauer 1990). Most of the remaining vernal pools in San Diego County occur on Redding soils, primarily on MCAS-Miramar (Service 1998).

At the time of listing, San Diego fairy shrimp were known to inhabit a minimum of 25 vernal pool complexes in coastal areas of San Diego, Orange, and Santa Barbara counties, and northwestern Baja California, Mexico (62 FR 4925). However, the names and locations of all complexes were not specified in the listing rule, and therefore, it is difficult to ascertain the status of these complexes. Currently, 137 complexes occupied by San Diego fairy shrimp have been identified in the U.S.; an additional 3 complexes that were identified as occupied at listing have since been extirpated (Service 2008a). Most of these additional complexes fall within the extant range of the San Diego fairy shrimp known at the time of listing. We expect that these additional complexes and occurrences were occupied at the time of listing, but they had not been identified due to lack of survey effort and do not represent an actual expansion of San Diego fairy shrimp distribution and range into previously unoccupied areas. Rather, they provide a better understanding of the historical distribution and range of the San Diego fairy shrimp that was unknown at the time of listing. Therefore, we estimate that the overall San Diego fairy shrimp distribution has not decreased or increased appreciably since listing. A summary of occupied vernal pool complexes is provided in Appendix 1 of the *San Diego Fairy Shrimp (Branchinecta sandiegonensis) 5-Year Review: Summary and Evaluation* (Service 2008a).

Impacts to vernal pools from development have been offset through the restoration, enhancement, and management of habitat. In some cases, due to security of the site and the active management of the vernal pools, the species status has improved. In addition, grants have been awarded to restore habitat in several areas including Otay Mesa, the San Diego NWR, and Sweetwater Authority lands. Sites that have been restored benefit from fencing and management, which further removes threats from the site that were occurring prior to the restoration efforts.

San Diego fairy shrimp are restricted to vernal pools and vernal pool-like depressions (e.g., ruts in dirt roads). Vernal pools are ephemeral wetlands that occur from southern Oregon through California into northern Baja California, Mexico (Service 1998). They require a unique combination of climatic, topographic, geologic, and evolutionary factors for their formation and persistence. They form in regions with Mediterranean climates where shallow depressions fill with water during fall and winter rains and then dry up when the water evaporates in the spring (Collie and Lathrop 1976; Holland 1976; Holland and Jain 1977, 1988; Thorne 1984).

Downward percolation of water within the pools is prevented by an impervious subsurface layer consisting of claypan, hardpan, or volcanic stratum (Holland 1976, 1988). Seasonal inundation makes vernal pools too wet for adjacent upland plant species adapted to drier soil conditions, while rapid drying during late spring makes pool basins unsuitable for typical marsh or aquatic species that require a more persistent source of water. Local upland vegetation communities associated with vernal pools include needlegrass grassland, annual grassland, coastal sage scrub, maritime succulent scrub, and chaparral (Service 1998).

San Diego fairy shrimp tend to inhabit shallow, small vernal pools and vernal pool-like depressions that range in temperature from 10° to 26° celsius (C) [50° to 79°farenheit (F)] They are ecologically dependent on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year, duration of inundation, and other environmental factors that likely include specific salinity, conductivity, dissolved solids, and pH levels (Gonzalez et al. 1996, Hathaway and Simovich 1996, Holtz 2003)

Life History

San Diego fairy shrimp are non-selective particle feeding filter-feeders, or omnivores. Detritus, bacteria, algal cells, and other items between 0.3 to 100 microns (0.00001 to 0.004 in) may be filtered and ingested (Eriksen and Belk 1999). Adult fairy shrimp are usually observed from January to March; however, in years with early or late rainfall, the hatching period may be extended (65 FR 63438). Like most vernal pool fairy shrimp, San Diego fairy shrimp have a two-stage life cycle and spend the majority of their life cycle in the cyst stage (Templeton and Levin 1979, Schaal and Leverich 1981, Herzig 1985, Hairston and De Stasio 1988, Venable 1989). After hatching, San Diego fairy shrimp reach sexual maturity in about 7 to 17 days, depending on water temperature and persist for about 4 to 6 weeks (Hathaway and Simovich 1996). Fairy shrimp mate upon reaching maturity, and female San Diego fairy shrimp produce between 164 and 479 cysts (eggs) over their lifetime (Simovich and Hathaway 1997). The cysts are either dropped by the females to settle into the mud at the bottom of the pool, or they remain in the brood sac until the female dies and sinks to the bottom (Eriksen and Belk 1999). Fairy shrimp cysts may persist in the soil for several years until conditions are favorable for successful reproduction (Simovich and Hathaway 1997). The cysts will hatch in 3 to 5 days when water temperatures are between 10° and 20° C (50° and 68° F) (Hathaway and Simovich 1996). Not all cysts are likely to hatch in a season, thus providing a mechanism for survival if water quality and ponding conditions are not favorable in a given year (Simovich and Hathaway 1997, Ripley et al. 2004).

Threats

The San Diego fairy shrimp still faces the same threats that were identified in the final listing rule throughout its range. These threats can be divided into three major categories: 1) direct destruction of vernal pools and vernal pool habitat as a result of construction, vehicle traffic, domestic animal grazing, dumping, and deep plowing; 2) indirect threats which degrade or destroy vernal pools and vernal pool habitat over time including altered hydrology (e.g , damming or draining), invasion of non-native species, habitat fragmentation, and associated deleterious effects resulting from adjoining urban land uses; and 3) long-term threats including the effect of isolation on genetic diversity and locally adapted genotypes, air and water pollution, climatic variations, and changes in nutrient availability (Bauder 1986, Service 1998, Bohonak 2005).

Rangewide Conservation Needs

Based on current population trends, threats analysis, and new genetic information, the San Diego fairy shrimp has the following needs to survive and recover:

1. Vernal pool habitat should be restored and enhanced; this includes expansion of existing populations and re-establishment of populations where habitat and historical conditions are appropriate;

2. Vernal pool management plans should be developed and implemented to maintain hydrologic regimes; watershed and habitat functions; and species viability;

3. Land protection strategies should be developed to prevent further loss and fragmentation of existing habitat; and

4. Vernal pool complexes not identified in the VP recovery plan as necessary to stabilize or reclassify the population should be re-evaluated based on their genetic structure to ensure the genetic variation within the San Diego fairy shrimp population is maintained.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 *CFR* §402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of State and private actions which are contemporaneous with the consultation in progress.

Since 1943, the Navy has conducted a variety of training activities in several locations on the Silver Strand and more recently has implemented natural resources programs to support these resources in a manner consistent with training requirements. Baseline training activities include: physical conditioning, force protection, mine counter measure training, amphibious operations, over the shore logistics, mission area training, and Naval special warfare. The action area for military training at the SSTC includes the following areas:

(1) Ocean-front beaches and ocean waters adjacent to three Naval installations that are part of NBC:
   a) NASNI,
   b) NAB; SSTC-N, and
   c) NRRF; SSTC-S;

(2) Bay-front beaches identified as the California Least Tern Preserve (Delta North and Delta South, Delta Beaches);

(3) SSTC-S Inland;

(4) Bay-front beaches at SSTC-N, SSTC-S, and Emory Cove, bay waters from SSTC-N to SSTC-S, and the South San Diego Bay Unit of the San Diego Bay NWR;

(5) City of Coronado Beach; and

(6) Silver Strand State Beach.

During development of the Navy's biological assessment for training activities at SSTC, the Navy collected data on the baseline number of activities within the action area as a whole but did not provide a breakdown on the number of activities conducted in each training area (DoN 2008, Delphine Lee 2009a, Table 1). We used the information in the BA and provided during consultation to estimate the baseline number of training activities, and anticipated increases for each training area.

1.a. NASNI Ocean-front Beach and Ocean Waters

NASNI is located adjacent to the City of Coronado and was once an island north of Coronado ("North Island"). A strip of shallow water approximately 1.6 km (1 mi) long and 177 m (581 ft) wide ("Spanish Bight") once separated the two land masses, but it was filled in 1945. North Island was commissioned as Naval Air Station San Diego in 1917 and re-named Naval Air Station North Island in 1955.

NASNI Beach is approximately 27.07 h (66.9 ac) in size and lies south of the NASNI airfield. The beach extends approximately 4.43 km (2.75 mi) from Zuniga jetty to the base boundary (Figure 1). The Navy retains exclusive jurisdiction over this beach. The beach is used primarily as a recreational beach serving off-duty military personnel and their families, although it also supports a limited number of training activities included within the proposed action. Baseline training activities are identified in Table 1. The number of training activities conducted on the NASNI Beach under baseline conditions is not available.

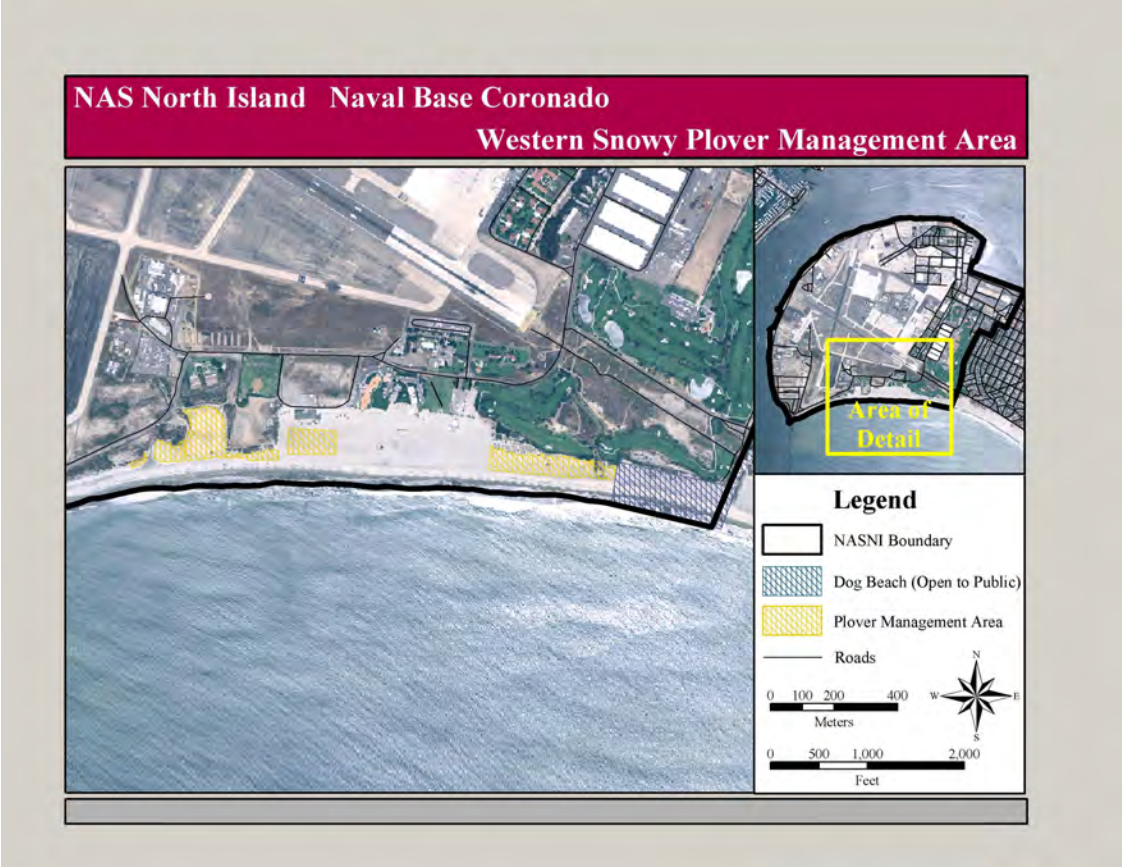
An approximately 366-m (1200-ft) long segment of beach front property of NBC is under license to the City of Coronado for public recreation. This area is approximately 4 ha (10 ac) in size and is separated from the remainder of NBC by a fence that extends from the back dunes to below the mean high tide line. Lights on the fence in between this strip of beach front and NBC illuminate this beach area at night. This beach front area supports beach habitat that would be suitable for western snowy plover or California least tern use in the absence of human and pet disturbances. The beach is currently under exclusive jurisdiction to the Navy and currently the City of Coronado cannot enforce City or State laws due to the jurisdictional status. However, the NBC and the City of Coronado are working collaboratively to give the City concurrent jurisdiction over this area. This will allow both agencies to patrol the area as security forces are available to enforce applicable federal, state and local laws or ordinances.

Under baseline conditions, the Navy discourages western snowy plover nesting and use of the NASNI airfield adjacent to the NASNI Beach due to their concern that nesting plovers could pose a Bird Airstrike Hazard (BASH) risk (FWS-SDG-3908.3). To deter nesting, the Navy destroys any nest scrapes that are initiated, actively harasses plovers from the area, and removes eggs that are laid within defined airfield boundaries. As part of this program, approximately 112 western snowy plover eggs (approximately 33 nests) have been removed from the NASNI airfield since 2004 (DoN 2009b). The harassment and deterrence of western snowy plovers from the airfield, and lack of other nearby suitable habitat, increases the importance of the NASNI Beach to plovers. Plovers that might otherwise nest within the NASNI airfield boundaries are more likely to nest on the NASNI Beach as a result of deterrence from the airfield. The Navy marks three areas of the NASNI Beach (described below) that total approximately 6 ha (14.9 ac) with blue flexi-stakes during the breeding season. The marked areas are mapped as the Western Snowy Plover Management Area (Figure 4). Each of the three small areas is in proximity to recreational activity, dogs, beach raking, and military training activities. The NASNI Beach, from Zuniga jetty to the boundary with Dog Beach, is regularly monitored to determine the status of the plovers. Plovers generally nest in the immediate vicinity of the nests from previous years, within the marked boundaries (Figure 4). In addition, foot and vehicle traffic are directed outside of the Western Snowy Plover Management Area during the plover breeding season to minimize impacts to breeding plovers from airfield activities and to improve habitat conditions.

The eastern end of the NASNI Beach (i.e., “East Breakers Beach”) is adjacent to the lighted fence at Coronado Dog Beach. Intact foredunes that support approximately 4.3 ha (10.5 ac) of sand verbena/beach bursage are present between the East Breakers Beach and the adjacent Navy golf course. An area above the mean high tide line at East Breakers Beach (2.2 ha; 5.5 ac) is included as part of the Western Snowy Plover Management Area. However, dog and human footprints are routinely observed within the boundaries of this segment of the Western Snowy Plover Management Area (DoN 2009c).

The broadest portion of the NASNI Beach is midway between the eastern and western ends. This middle beach segment supports several buildings, including a hotel for Navy personnel (i.e., the Navy Lodge). The area in front of the Navy Lodge and adjacent parking lot is the primary recreational use area at the NASNI Beach. Hundreds of people stay at the Navy Lodge each year and frequent the NASNI Beach. A 1.1-ha (2.8-ac) area near the Navy Lodge is included as part of the Western Snowy Plover Management Area and despite its proximity to heavily used recreational areas, it typically supports several pairs of plovers each year. The Navy consulted with the Service in 2004 to address proposed expansion of this hotel (FWS- SDG-3908.5). When the Navy Lodge expansion is completed, the capacity of the hotel will increase from 100 rooms to 360 rooms, so the number of people using the beach is likely to increase.

Figure 4: NASNI Beach and the Western Snowy Plover Management Area



The western end of the NASNI Beach (i.e. , near Zuniga Jetty, Figure 1) is characterized by a narrow beach strip that is backed by a steep slope [approximately 2-m (6-ft) high] and is fully inundated at the highest tides and during storm events. Upland fill/ruderal habitat lies adjacent to the sandy beach atop the 2-m (6-ft) slope. The western end of the NASNI Beach is signed as off-limits to foot traffic due to the potential dangers associated with its proximity to a Small Arms Range (SAR). The western end of the beach has limited habitat suitability to nesting plovers because of the narrowness of the beach and because nests can be inundated during the highest tides, especially early in the spring. Plovers do, however, attempt to nest in this area despite the narrow width of the beach. Since nests could be inundated, this area was not included as part of the Western Snowy Plover Management Area. Although this beach segment has limited value as a nesting beach in its current condition, it provides valuable foraging and roosting habitat for plovers because the area is not raked and is less frequently used for training and recreation than the adjacent beach segments. Birds that use this beach segment for foraging or roosting are subjected to less disturbance than on adjoining stretches of the NASNI Beach. People do, however, routinely disregard signs and walk on this narrow beach strip (DoN 2009a)

Under baseline conditions, NASNI Beach is subject to raking throughout the year except in the Western Snowy Plover Management Area and the western end. During the breeding season, the beach rake operators coordinate with western snowy plover monitors who check the raked area each morning prior to raking to determine if western snowy plover scrapes/nests are present in the area scheduled for raking. If plover nests are located, they are marked and avoided.

Dogs had been allowed on a segment of the NASNI Beach since 2003, and dog tracks have been routinely observed within the Western Snowy Plover Management Area boundaries (DoN 2009c). However, in recognition of its commitment to manage portions of the NASNI Beach as the Snowy Plover Management Area, the Navy has recently prohibited dogs from NASNI Beach (Tiffany Shepherd 2010).

Baseline conservation activities at NASNI Beach include ongoing intensive plover monitoring during the breeding season, extensive coordination between the plover monitors and other beach personnel (lifeguards and beach rakers), a twice monthly educational "beach bird walk" conducted by Navy Natural Resources personnel or plover monitors, predator management, and dune restoration [0.5 ha (1.2 ac)] at the eastern end/central portion of the beach). Maintenance of suitable nesting conditions for plover use of the NASNI Beach requires constant active management, since recreational use, dogs, and training activities routinely enter the areas that are designated as the Western Snowy Plover Management Area and limited habitat is available.

1.b. SSTC-N Ocean-front Beach and Ocean Waters

SSTC-N encompasses the Navy installation also known as NAB, where military training has been conducted since 1943. San Diego Bay lies on one side of the narrow beach strand, and the Pacific Ocean is on the other side. SSTC-N Beach is not fenced at the City of Coronado or the Silver Strand State Beach boundary.

The portion of the beach strand that supports SSTC-N is narrow [approximately 0.4 to 0.8-km (0.25 to 0.5-mi) wide]; however the beaches are relatively wide, extending approximately 150 to 200 m (492 to 656 feet) above the mean high tide line (Figure 1). The SSTC-N Beach is approximately 112.5 ha (277.8 ac) and extends approximately 4.5 km (2.8 mi) from Coronado Beach to Silver Strand State Beach (Figure 1). The Navy leases this beach from the State of California for training use and retains jurisdiction to the mean high tide line as surveyed in 1948 (now inundated). The beach is used as a military training beach. Baseline training activities include: physical conditioning, force protection, mine counter measure training, amphibious operations, over the shore logistics, mission area training, and Naval special warfare. Estimates of baseline activities at STTC-N Ocean-front Beach and Ocean Waters are shown in Table 5. Activities listed in Table 5 are the components of the various numbered training exercises included in Table 1.

Table 5: Estimated Baseline Annual Activities at the SSTC-N Oceanside Beach and Boatlanes

Activity	Baseline Total Annual Events including SSTC-N Beach and Ocean and SSTC-S	Baseline SSTC-N Beach and Ocean Annual Events*	Baseline SSTC-N Beach and Ocean Events Between from April through July
Beach Party Teams	**204**	**204**	**68**
MCM Beaching	**32**	**3**	**1**
Beach Camps	**1**	**1**	**0-1**
Equipment Offload/Stage	**2**	**2**	**0-1**
Causeway/ ELCAS	**12**	**10**	**3**
LCAC Landing	**4**	**4**	**1**
Beach Crossing and OTB	**432**	**216**	**72**
Raids	**60**	**30**	**10**
Foot Patrol and Ambush	**60**	**70**	**23**
Vehicle Patrol	**139**	**1**	**0-1**
Observation Post	**50**	**50**	**17**
Reconnaisance	**152**	**152**	**51**
Logistic and Safety Vehicles	**2275**	**1706**	**568**
Running	**948**	**853**	**284**
Manual Excavation	**68**	**61**	**20**
Visual Observations	**156**	**78**	**26**
SSTC-S Off road Foot	**422**	**0**	**0**
Total	**5017**	**3441**	**1147**

*** Based on percent of activities in SSTC-N included in Navy model**

*** The percentage of activities anticipated at SSTC-N represents a "worst-case scenario" percentage breakdown with training activities biased towards SSTC-N Beach lanes.*

SSTC-N supports approximately 112.5 ha (277.8 ac) of southern foredune/beach, including 94 ha (232.5 ac) of beach, and 18.3 ha (45.3 ac) of coastal dunes. Foredunes arise along the coast where sandy beaches occur and where coastal headlands are absent. Dune size and shape typically vary and are mostly dependent on wind speed and direction. Plants found here are generally prostrate and have long taproots, with many succulents. A band of mostly non-native vegetation, predominantly iceplant (*Carpobrotus sp.*) is found on the eastern edge of the foredunes at SSTC-N. A 5-7 m (15-21ft)-wide unvegetated "sand road" lies beyond this band of non-native vegetation. This sand road facilitates linear off-highway movement of traffic and personnel. State Highway 75, which is the main road that runs along the Silver Strand, defines the northeastern boundary of the action area at SSTC-N (Figure 1).

The SSTC-N action area is divided into 10 ocean training boat lanes, which are each 457-m (500-yd) wide and 3,657-m (4,000-yd) long, overlapping some of the NOAA-established anchorages (numbered 101-178) (Figure 1). These boat lanes are numbered (1-10). As the boat lanes meet the shore, they are referred to as beach lanes and are identified by color, with each colored beach lane measuring 914-m (1,000-yd) wide and divided into two 457-m (500-yd) subsections (Yellow 1, Yellow 2, Red 1, Red 2, etc.). Together, the 10 SSTC-N boat lanes and beach lanes extend 4,570 m (5,000 yd) along the beachfront and extend offshore 3,657 m (4,000 yd). The name and approximate area of each of the SSTC N Beach Lanes is provided in Table 6.

Table 6: Area of SSTC N Beach Lanes Above the Beach Crest

Lane	Yellow1	Yellow2	Red 1	Red 2	Green 1	Green 2	Blue 1	Blue 2	Orange 1	Orange 2	Total
Area ha (ac)	1.1 (2.74)	4.79 (11.83)	6.55 (16.19)	5.90 (14.59)	5.88 (14.52)	6.27 (15.50)	4.97 (12.29)	5.96 (14.73)	5.66 (13.99)	4.82 (11.91)	51.92 (128.29)

*data obtained from DoN 2005.

The State of California (State) owns the land that supports SSTC-N and leases it to the Navy for military training under lease number PRC 6110. The current lease expires on August 31, 2021. Based on the language of the lease, Navy jurisdiction extends from Highway 75 to the 1948 mean high tide line, which is now completely submerged. Thus, Navy jurisdiction now includes the entire beach, including submerged lands. The ocean waters that support the boat lanes of SSTC-N are under State jurisdiction but, with the exception of any submerged land above the 1948 mean high tide line, are not subject to a lease.

The frequency of military use of the SSTC- N has varied considerably through time. Upon request, military training units are assigned to one or more boat lanes and/or beach lanes to conduct various training activities. Many of the training activities take place primarily on the hard packed sand portion of the beach lanes below the mean high tide line, or even mostly within the water. However, some activities involve foot traffic, vehicle traffic, or operation of heavy equipment above the mean high tide line in the beach lanes, and some activities require foot traffic or vehicle movement from the wave washed section of the beach to the sand road adjacent to Highway 75. A beach lane that is suitable for a particular training activity may not be suitable for a different activity, depending on the water depth and bathymetry of the adjacent boat lane, distance from berthing and other facilities, and accessibility for equipment. A permanent demolition pit primarily used by Naval Special Warfare is located in the northern end of Blue 1 Beach Lane. Since 1994, a pattern of lane use has evolved, due to the preference of training units for particular areas, the distribution of California least terns and western snowy plovers, and Navy efforts to minimize impacts to these species.

The beach lanes Green 1, Green 2, and Blue 1 sustain the highest level of training use under baseline conditions. These lanes are closest to an access point off of Highway 75, support a demolition pit, and sustain in-water conditions conducive to large-scale amphibious operations (i.e., those that involve offloading, heavy vessels coming ashore, etc.). The Navy has modified topography within beach lanes Green 1 and Green 2 (Figure 5) in an effort to discourage nesting

in these lanes (FWS-SDG-3452.3). The strategy appears to discourage tern and plover use of these areas.

Figure 5: Modified Topography in SSTC-N Beach Lanes Green 1 and Green 2

Due to changes in training needs and changing numbers and distribution of the least tern and snowy plover on the SSTC-N beaches, the Navy has re-initiated consultation on proposed training and associated conservation strategies every 1 to 3 years at SSTC North since 1994. (Appendix B). Strategies that have been used at SSTC-N to reduce the effects of military training activities on the least tern and snowy plover have included:

(1) Marking and avoidance of California least tern nests and snowy plover nests.
– Between 1994 and 2000, the Navy coned off the area where least terns had begun nesting (primarily in Beach Lane Green 2). They also marked all least tern nests detected on the beach at SSTC-N with stakes and avoided the nests during training activities or moved nests out of harm's way. This measure provided maximum protection for the least tern, but it became an encumbrance to training activities as the number of tern nests on the beach increased. The Navy marks plover nests with a 9.1-m (30-ft) buffer and avoids these areas.

(2) Marking of "beach crossing lanes" to facilitate movement of people and equipment from hard packed sand areas to the sand road.
– Between 2001 and 2003, the Navy avoided least tern nests by avoiding large areas of beach where the birds were nesting and conducted training activities on the hard packed sand or below the beach crest. To allow movement of people and equipment over the beach without crushing nests or eggs, the Navy marked "beach crossing lanes" with white stakes and green flagging for the length of the lane and allowed travel from below the beach crest to the sand road on the beach crossing lanes only. If tern or plover nests were detected within the beach crossing lanes, they were moved from the lane to adjacent habitat to reduce the potential for people and equipment to crush the nests. The use of beach crossing lanes has continued into the present to allow for troop movement across the portion of the beach where tern nests are marked and avoided.

(3) Deterring adult terns and taking eggs into captivity.
– In 2002, the Navy conducted daily beach raking on beach lanes Green 2 and Blue 1 to discourage birds from nesting in these beach lanes. Despite regular raking, birds continued to construct nest scrapes and lay eggs in these beach lanes. The Service authorized the Navy to remove tern and plover eggs that were laid in beach lanes Green 2 and Blue 1 in conjunction with the Navy proposal to protect tern and plover nests in other beach lanes. Approximately 100 California least tern eggs were removed from these beach lanes over the course of 2 years and taken to a local wildlife rehab center for captive rearing, banding, and release. No birds that were released into the wild as part of this management strategy have been subsequently observed. Based on Navy staff observations, terns continued to attempt to nest within the beach lanes, despite repeated raking (Conkle 2007).

(4) Removal of predators from all nest sites within the action area.
– In 1988, the Navy initiated predator management activities to protect the Delta Beaches. This management activity was extended to the SSTC-N oceanfront beaches in 1996.

(5) Education of the general public and providing security measures to reduce unauthorized uses of the action area.

(6) Protection of beach lanes on the SSTC-N beach for nesting birds and training without avoidance measures elsewhere on the SSTC-N beach.
– From 2003-2005, the Navy marked and avoided four beach lanes at SSTC-N (i.e., Green 1, Blue 2, Orange 1, and Orange 2) to provide a protected area for California least terns and western snowy plovers. Protected lanes were intended to minimize the impact of the potential incidental take associated with training activities elsewhere on the SSTC beaches. Green 1 was protected because it supported a large number of tern nests, and Blue 2 and Orange 2 were protected because these lanes were farther from facilities and received less use requests. The Navy tried discontinuation of predator management as a means of deterrence for terns and plovers nesting on the beach in 2004, but lack of predator management increased nest loss without changing relative distributions, and management was therefore re-initiated in 2005.

The most recent comprehensive biological opinion (FWS-SDG-3452.3) on training and natural resource management strategies that defines the environmental baseline at SSTC-N was finalized in 2005. In accordance with this opinion, the Navy reduced the size of the area protected for least terns and snowy plovers to accommodate the projected training need, and currently conducts training activities during the breeding season within seven of the ten beach lanes at SSTC-N and protects three of the beach lanes (i.e., Blue 2, Orange 1, and Orange 2) for terns and plovers. These three beach lanes are marked with blue stakes and are not scheduled for training activities during the breeding season. These lanes are less desirable for most types of training due to the distance from infrastructure and facilities, as well as the marine conditions directly off

shore from the lanes. The Navy identifies beach crossing lanes to facilitate movement of equipment and personnel across protected beach lanes. In addition, the Navy conducts conservation measures within the boundaries of SSTC- N, including: (1) predator management at all nest sites; (2) annual nest site preparation; (3) modification of the beach to create hummocks (Figure 5) to deter terns and plovers from nesting in intensively used lanes Green 1 and Green 2; (4) scheduling efforts to avoid beach lanes with higher nest numbers; (5) marking and avoidance of established western snowy plover nests; (6) public outreach to military residents of adjacent housing; and (7) limited enforcement of range boundaries.

Protection of a beach segment that supports a significant percentage of the least tern population on the SSTC-N beaches has justified the absence of avoidance measures for the least tern elsewhere on the training beach and provided increased realism in training to the troops. The Service recommended that the Navy continue this management strategy to support future training needs and provide conservation for the least tern and snowy plover at SSTC (FWS-SDG-3452.3).

Like the other beaches included within the action area, SSTC-N experiences unauthorized recreational use under baseline conditions. SSTC-N is across Highway 75 from military housing and is also close to Coronado Cays residential development. People cross Highway 75 to use the beach area at SSTC-N, or walk along the beach from Silver Strand State Beach (to the south) or Coronado and NAB (to the north), and have entered into least tern nesting areas. During July 4th weekends, people routinely ignore signage and walk onto the beach to watch the City of Coronado fireworks display. Although some marking is present at both ends of the beach and a guard is periodically stationed at the north end to keep non-military civilians out, under baseline conditions, enforcement of base boundaries is irregular and is not effectively controlling public uses. Under baseline conditions, the Navy does not have jurisdiction to enforce leash laws or regulations pertaining to trespass, which reduces the effectiveness of security personnel. In addition, too few security staff are on duty to allow them to respond to calls pertaining to dog issues or trespass (Shepherd 2010). Maintenance of suitable nesting conditions for least terns and snowy plovers may require improvements in enforcement to minimize disturbances at SSTC-N in areas where nesting, roosting, and foraging occur.

1.c. SSTC-S Ocean-front Beach and Ocean Waters

SSTC- S is located at the southern end of the Silver Strand and includes the beach as well as an inland area. SSTC-S lies to the south east of Silver Strand State Beach and northwest from the City of Imperial Beach (Figure 1). SSTC-S Beach is not fenced at the Imperial Beach or the Silver Strand State Beach boundary.

SSTC-S Beach is approximately 31.5 ha (77.9 ac) in size and extends approximately 2.7 km (1.7 mi) from Silver Strand State Beach to Imperial Beach. The Navy retains exclusive jurisdiction over this beach down to the mean high tide line. The beach below mean high tide line is administered by the State Lands Commission, as are most beaches in California. No signage or markers delineate the boundary between the beach administered by the State Lands Commission

and the beach administered by the Navy. SSTC-S Beach is used primarily as a military training beach, while the area below mean high tide line receives frequent use by recreational hikers and dog walkers. Baseline training activities include physical conditioning, force protection, mine counter measure training, amphibious operations, mission area training, and Naval special warfare. Estimates of baseline activities at STTC-S Beach are shown in Table 7. Activities listed in Table 7 are the terrestrial components of the numbered training exercises included in Table 1.

Habitat at SSTC-S Beach includes approximately 17.6 ha (43.5 ac) of beach and 13.9 ha (34.4 ac) of sand verbena-beach bursage series plant community. Since Highway 75 is not visible from most of the SSTC-S Beach, this beach is relatively secluded from the surrounding urban environment. The beach is, however, subject to frequent unauthorized recreational use. People enter the beach from Imperial Beach, to the southeast, and from Silver Strand State Beach, to the northwest. Based on accounts presented at breeding season meetings and weekly reports prepared for the Navy, recreational trespass onto the Navy lands and use of the adjacent intertidal beach (State Lands) creates a significant disturbance that may affect the potential for plover nesting or nest success. Under baseline conditions, enforcement of base boundaries is irregular and is not effectively controlling public uses. Under baseline conditions limitations in the number of on duty security personnel reduces their ability to respond to calls pertaining to dog issues or trespass (Shepherd 2010). Maintenance of suitable nesting conditions for terns and plovers may require improvements in enforcement to minimize disturbances at SSTC-N in areas where nesting, roosting, and foraging occur.

SSTC-S Beach includes 18.2 ha (45 ac) leased by the Navy to the Young Men's Christian Association (YMCA) for use as a recreational camping facility for youth. The leased area includes the southern portion of the SSTC-S Beach, as well as a fenced inland area. The facility, known as Camp Surf, serves many day and overnight campers each year. Recreational use of the Camp Surf Beach occurs under baseline conditions and is expected to continue at levels that are likely to preclude least tern or western snowy plover nesting.

The SSTC-S Beach north of Camp Surf (Figure 1) is divided into four ocean training boat lanes, which are each 457-m (500-yd) wide and 3,657-m (4,000-yd) long. These boat lanes are numbered (11-14). As the boat lanes meet the shore, they are referred to as beach lanes and are identified by color, with each colored beach lane measuring 914-m (1000-yd) wide and divided into two 457-m (500-yd) subsections (White 1, White 2, Purple 1, Purple 2). Together, the four SSTC-S boat lanes and beach lanes extend 1,828 m (2,000 yd) along the beachfront and extend offshore 3,657 m (4,000 yd). The approximate area of each of the SSTC-S beach lanes is provided in Table 8. The beach at SSTC-S has been described as a narrower beach with a shallow entry from the water, when compared to the SSTC-N beaches, with numerous sand bars located offshore (DoN 2008, Delphine Lee, 2009b).

Table 7: Estimated Baseline Annual Activities at SSTC-S Beach**

Activity	Baseline Total Annual Activities, including SSTC-N,SSTC-S, NASNI, and Bayside*	Baseline SSTC-S **Annual Activities	Baseline SSTC-S Activities from April through July***
Beach Party Teams	204	0	0
MCM Beaching	32	29	10
Beach Camps	1	0	0
Equipment Offload/Stage	2	0	0
Causeway/ ELCAS	12	0	0
LCAC Landing	4	0	0
Beach Crossing and OTB	432	216	72
Raids	60	30	10
Foot Patrol and Ambush	60	69	23
Vehicle Patrol	139	0	0
Observation Post	50	0	0
Reconnaisance	152	0	0
Logistic and Safety Vehicles	2275	569	187
Running	948	95	32
Manual Excavation	68	7	2
Visual Observations	156	78	26
SSTC-S Off-road Foot	422	422	141
Total	5017	1002	334

* Information from Table 1

** Explicit data regarding the baseline or proposed number of activities for SSTC-S was not provided to the Service for analysis, thus, the data in this table is based on an assumption that SSTC-S would host all activities that did not occur at SSTC-N. Data was provided regarding the percentage of each type of terrestrial activity that was conducted at SSTC-N vs. all other areas. The numbers presented in this table are base on the assumption that the training activities that did not occur at SSTC-N would occur at SSTC-S. Accordingly, the table provides only rough estimates of baseline and proposed levels of activity. *The percentage of activities anticipated at SSTC-N represents a "worst-case scenario" percentage breakdown with training activities biased towards SSTC-N Beach lanes.*

*** This number is based on the assumption that training events will be conducted at a constant rate throughout the year.

The Navy implements conservation measures on the SSTC- S Beach, including: (1) marking and avoiding western snowy plover nests at SSTC-S; and (2) predator management.

Table 8: Area of SSTC-S Beach Lanes Above the Beach Crest.*

Lane	White 1	White 2	Purple 1	Purple 2	Total
Hectares (ac)	5.8 (14.53)	5.3 (13.18)	4.8 (11.88)	4.1 (10.08)	20.0 (49.67)

*data obtained from DoN 2005.

2. Delta Beaches

Delta Beach lies across Highway 75 from the SSTC-N beaches, on the shore of San Diego Bay (Figure 1), and is flanked by Fiddler's Cove Marina to the south and NAB to the north. The area was created from dredge fill and extends approximately 1,829 m (2,000 yd) along the bayside of the Silver Strand. Delta Beach is divided into North Delta Beach (Delta Beach-N) and South Delta Beach (Delta Beach-S), which are separated by an expansive intertidal mudflat with saltmarsh vegetation. A chain-link fence separates Delta Beach from Highway 75.

The 30.4-ha (75-ac) Delta Beaches were officially designated as the California Least Tern Preserve upon completion of a Memorandum Of Understanding (MOU) in 1984 (March 12, 1984, *Memorandum of Understanding between the U.S. Fish and Wildlife Service and the U.S. Navy relating to the Description and Management of a Preserve for the California Least Tern on Naval Amphibious Base Coronado*), to partially offset the loss of 25.7 ha (63.5 ac) of nesting area associated with the construction of the LAMPS MK III project at NASNI (Biological Opinion 1-1-82-F-123). Delta Beaches received additional management commitment from the Navy in 1987 when the Service and the Navy signed another MOU to establish standards and conditions for Navy in-water construction activities conducted in San Diego Bay. Under specifications of the MOU, the Navy intensified management of least tern colonies on Naval facilities to offset the impacts to the tern from Navy in-water construction projects. Active management of the Delta Beaches for least tern nesting has included extensive biological monitoring, beach sand deposition, grading and invasive plant species control, protection of sensitive plant species, installation of chick shelters and gull-billed tern deterrent wickets, and predator control. The MOU is currently under revision, and the Navy and Service are operating under the tenets of the existing MOU until the revision is complete.

The habitat included within the California Least Tern Preserve includes areas that have been enhanced for tern and plover use, primarily via active sand deposition and vegetation/weed removal. The 1984 MOU indicated that the Navy was going to develop a management plan for this site, but a specific written plan has not been developed. The Navy has, however, continued to implement management actions at the site, including site preparation, predator management, and monitoring, and has included these measures within the NBC INRMP. While least tern use of the site has increased as the species' status has improved, snowy plovers have rarely used the site.

Delta Beach-N was created in the late 1970s/early 1980s from dredge spoils from an unidentified location, and Delta Beach-S was created from dredge spoils removed from beneath Navy ships at

Naval Base San Diego in 1966 (DoN 2009d). Delta Beach-S is included on the Navy's list of Munitions Response Program (MRP) sites as NAB Coronado MRP Site 5. The area has potential contamination associated with the dredge spoils used to create the site, as well as known presence of munitions and possibly unexploded ordnance. The status of this site as an MRP site had not been mentioned in previous biological opinions or in the MOU that established the California Least Tern Preserve. Under the MRP, the Navy recently conducted a Site Inspection that found exposed munitions on the site, including a 20-mm cartridge case found in the corridor used by Navy SEALS (DoN 2009). Evaluation of the site and the need for remedial measures is underway as part of the MRP. The site had originally been capped with approximately 1.5 m (1.8 yd) of sand from an unknown source (DoN 2009d). Sand loss has apparently occurred along the shoreline, resulting in some of the exposed ordnance detected in the 2009 surveys. Potential impacts of contaminants to birds nesting on this site are unknown. However, no organic explosive contaminants were detected in the site soils and an ecological risk assessment is currently being conducted. Although the Navy would conduct any remediation activities outside the breeding season, some uncertainty is introduced regarding the suitability of the site as a preserve for the least tern because of the future remediation activities that may be necessary.

3. SSTC-S Inland

SSTC-S Inland is immediately adjacent to the SSTC-S Beach, where the coastal strand joins the mainland (Figure 1). This facility includes the large "Wullenweber" circular antenna, which was used until 1999 to provide primary communication links for the Navy's submarine community. The northern part of the 182 ha (450-ac) facility provides a city-like layout of the base that provides a realistic site for urban warfare training. SSTC-S Inland is completely fenced, and a manned guard gate provides security for this installation.

The non-native iceplant is the predominant vegetation in the northern part of the installation. The southern part of the site is less developed and supports California annual grassland plant communities, maritime succulent scrub, vernal pools, and marsh communities. Baseline training activities at SSTC-S inland include: helicopter rope suspension, parachuting, mine neutralization, amphibious raids, pyrotechnics use, and breacher training (Table 1).

A current conservation objective for the SSTC-S Inland area, as stated in the NBC INRMP, is to "conserve the San Diego fairy shrimp through proper management of vernal pool habitat" (U.S. Navy 2002). The INRMP indicates that the Navy posts the vernal pool area with signs on the high ground around the perimeter to inform personnel of the presence of the vernal pool complex in the low area inside the perimeter and seeks opportunities to restore verrnal pool habitats that have been disturbed (U.S. Navy 2002, p.4 - 48). The Navy has not implemented the signage described in the INRMP (Vissman, pers. Obs 2010), however current conservation activities at SSTC-S Inland include avoidance of all offroad travel (foot traffic or vehicle) within the southern portion of the fenced facility to avoid impacts to vernal pools, monitoring and control of invasive plant species, and periodic surveys to detect San Diego fairy shrimp. Portions of the installation are also identified in an MOU with the Service as a prospective mitigation bank for Navy projects elsewhere; however, the Navy intends to terminate this MOU (Tiffany Shepherd,

2009a). Under current conditions, emergency and security vehicles infrequently use the unpaved roads at SSTC-S Inland.

4.a. SSTC-N Bay-front Beach and Bay Waters

SSTC-N includes five bayside beach training lanes and eight boat lanes within San Diego Bay (Figure 1).The types of training conducted in San Diego Bay under baseline conditions include: small boat handling, navigation, swimmer conditioning, amphibious warfare activities, hydrographic reconnaissance, parachuting, helicopter flights, and transit of larger craft to the ocean training lanes. Estimates of baseline activities at STTC-N Bay-front Beach and Bay Waters are shown in Table 1. Under baseline conditions, approximately 100 to 150 helicopter sorties per year are flown over the SSTC-N bay side boat lanes as helicopters transit from NASNI/NAB to SSTC-S (Latta 2010). In addition, an unidentified number of helicopter sorties are flown from NASNI to NOLF IB, which lies south of the action area.

The bayside shoreline in this area is not currently managed for botanical or other biological resources, although recent discovery of a federal candidate plant species, Brand's phacelia (*Phacelia stellularis*), in this area has resulted in initiation of evaluation of the resources within this area. Plant communities present include upland fill ruderal habitat and upland transition habitat. The Navy Natural Resources Office plans to include management of this area in subsequent revisions of the NBC INRMP.

Conservation actions within San Diego Bay include Navy support of a foraging study to identify important California least tern foraging locations.

4.b. SSTC-S Bay-front Beach and Bay Waters

The action area includes the bay-front beach and bay waters that extend from SSTC-N, over the South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge (NWR), to SSTC at Emory Cove (Figure 1, 1.a). Emory Cove is adjacent to the South Bay Biological Study Area and the South San Diego Bay Unit of the San Diego Bay NWR. A small segment of SSTC-S extends into Pond 11 of the NWR.

The routes of helicopter travel from NASNI/NAB to SSTC-S Inland lie within the boundary of the South San Diego Bay Unit of the San Diego Bay NWR and the Chula Vista Nature Preserve. The NWR was established to protect, manage, and restore habitats for federally listed endangered and threatened species and migratory birds and to maintain and enhance the biological diversity of native plants and animals. The South San Diego Bay Unit includes approximately 405 ha (1,000 ac) of open bay that are within the action area along the west side of the Bay from Sweetwater Marsh south to Emory Cove and along the northern edge of the existing salt pond complex (Service 2006e). The NWR also includes dikes and solar salt evaporation ponds at the south end of the bay, some of which lie outside the action area, and the western end of the Otay River floodplain.

The American Bird Conservancy has designated the South San Diego Bay Unit as a Globally Important Bird Area due to the presence of globally significant numbers of nesting gull-billed terns and continentally significant numbers of surf scoters, Caspian terns, and western snowy plovers. The entire southern end of San Diego Bay, including the Sweetwater Marsh and South San Diego Bay Units, has also been recognized as a Western Hemisphere Shorebird Reserve Network Site. Through a partnership of Federal, State, and local agencies and several non-governmental organizations, approximately 121 ha (300 ac) of coastal habitat will be restored and/or enhanced in south San Diego Bay in 2010/2011. One component of the coastal restoration project is planned for 2010/2011 adjacent to the action area, where 94 ha (233 ac) of existing salt ponds, located along the eastern edge of SR-75, will be restore to tidally influenced coastal wetlands. Habitat proposals in the restored ponds include cordgrass-dominated salt marsh habitat to support the federally listed endangered light-footed clapper rail and subtidal habitat to expand foraging opportunities for the least tern (Service 2006e).

The portion of the NWR that lies within the action area provides foraging and roosting habitat for a variety of migratory birds. Least tern foraging within this portion of the action area is likely. Nesting habitat for a variety of ground nesting birds, including the least tern, snowy plover, and six other tern species, some of which only nest in a few locations in the United States, lies within the boundaries of the NWR, but outside the action area.

The waters in the southern portion of San Diego Bay are very shallow and a channel within Emory Cove extends to the bayside shoreline, adjacent to SSTC-S. The southern shore of Emory Cove supports pickleweed (*Salicornia sp.)* marsh within the boundaries of SSTC-S. Training activities within and adjacent to Emory Cove include helicopter travel over the cove (Figure 1a), small boat travel up the channel to the beach, and maneuvers from the beach across Highway 75. Estimates of baseline activities at STTC-S Bay-front Beach and Bay Waters are shown in Table 1.

5. City of Coronado Beach

The City of Coronado Beach, like the other beaches along the Silver Strand, has physical characteristics suitable for western snowy plover use (Figure 1). The beach supports a back dune system that has been groomed in some areas and cultivated with non-native plant species (i.e., ice plant). Like Coronado Dog Beach, this beach is regularly groomed, and no management to benefit snowy plovers has been implemented. The beach is approximately 1.6-km (1-mi) long, 120 ha (296 ac) in area, and supports millions of beach visitors each summer. A single roosting plover has been reported during winter window surveys (Service 2007b); however, there are no recent records of nesting plovers on the City of Coronado Beach. It is likely that the level of disturbance and reduction in prey availability from beach grooming have affected the potential for this beach to support plover nesting or substantial roosting without active management directed at disturbance minimization and retention of beach wrack in some areas. A nest scrape was detected on the City of Coronado Beach in April 2009 (Elizabeth Copper 2009a).

The Coronado Municipal Beach is affected by Navy training to the extent that some training activities (i.e., running along the beach, swimming) occur in a linear fashion along the beach, primarily for training activities to go from NASNI Beach to SSTC-N. The number of training activities conducted on the NASNI Beach under baseline conditions is not available. However, Navy activity on this beach is expected to be a minor component of the already intensive use by recreational visitors.

6. Silver Strand State Beach

Silver Strand State Beach, located between SSTC-N and SSTC-S, extends 4 km (2.5 mi) along the shore and encompasses 34.4 ha (85 ac) of beach and dune habitat (Figure 1). Silver Strand State Beach is administered by California State Parks and broadly divided into: the northern portion, which supports RV camping and parking lots for day visitors and holds several facilities; the southern portion, which is designated as the Silver Strand Natural Preserve; and the eastern portion on the San Diego Bay, separated from the ocean by Highway 75 but connected through a series of tunnels. California State Parks also manages an Underwater Park, constituting approximately 29,137 ha (7,200 ac) of off-shore aquatic area directly contiguous with the beach and dune area.

In the northern end of the State Beach, there are four large paved parking lots that provide access to RV campers and day campers. The parking lots are close to the high tide line. Approximately 130 RV camping spots are located at the northernmost parking lot, adjacent to the southern end of SSTC-N. Approximately 15,000 vehicles per month entered Silver Strand State Beach during summer 2008 (Chris Peregrine, 2009). Other facilities in this portion include a four-storied lifeguard headquarters building, a small concessions stand, and several restrooms.

The eastern portion of Silver Strand State Beach on San Diego Bay is largely undeveloped but also holds an aquatic complex facility managed by Southwestern Community College and California State Park maintenance facilities. The aquatic complex is set on Crown Cove and runs a series of classes and recreational activities associated with non-motorized boating. The State Park maintenance facility lies to the south and serves as the primary maintenance headquarters for the State Beach. Portions of the undeveloped region are used for over-night camping with special-use permits. This eastern portion supports a unique bay-side vegetation association including rare plants such as: Nuttal's lotus, Brand's phacelia, coastal wooly-heads, Lewis's evening primrose (*Camissonia lewisi)*, and off-shore eel-grass beds. The area supports a diverse bird assemblage including nesting killdeer (*Chardrius vociferous*) and horned larks *(Eremophila alpestris).* State Parks manages approximately 29.5 ha (73 ac) in this region.

The southern portion of the State Park-managed area is designated as a State Natural Preserve and supports southern foredune vegetation and lies adjacent to SSTC-S. Since this area is farther from the large parking areas and RV park, it receives significantly less recreational use. This southern portion, or Natural Preserve, holds approximately 16.6 ha (41 ac) of the beach above the mean high tide and foredune. This area is marked with symbolic fencing and signage year-

round to discourage foot traffic in the sand dunes. Predator management activities are also supported by State Parks to protect the western snowy plover at this location.

Silver Strand State Beach lies outside of Navy jurisdiction; however, it is used for military training activities that require linear travel along the beach from SSTC-N to SSTC-S as well as activities that occur on the bay and traverse through the tunnels to the ocean. The specific number of training activities conducted on the Silver Strand State Beach under baseline conditions is not available; however, they are typically periodic in nature and mostly associated with Navy BUDS training events. Navy activity on this beach is expected to be a minor component of the already intensive use by recreational visitors.

Several small signs mark the boundary between Silver Strand State Beach and the southern end of SSTC-N. The signs are located well above high tide, and most of the foot traffic occurs closer to the water where the signs are not evident. Consequently, a significant amount of unauthorized foot traffic enters SSTC-N from Silver Strand State Beach. The Silver Strand State Beach web site (www.parks.ca.gov) has listed the SSTC-N Beach as a hiking trail, which likely contributed to the number of civilian beachgoers who strayed onto SSTC-N and inadvertently disturbed nesting terns and plovers. During consultation, the SSTC-N Beach was removed from the State Park web site, but reference to this area as a hiking trail remains available to the public on a variety of internet web sites. Additionally, a significant portion of the dogs that are noted on Silver Strand State Beach during avian monitoring arrive from SSTC-S as a result of beach users and their dogs walking north from the City of Imperial Beach (DoN 2009a). Dogs are not allowed on Silver Strand State Beach and the Natural Preserve.

The California State Parks and California State Parks Foundation have entered into a partnership with the Loews Coronado Bay Resort, which is located across Highway 75 from the State Beach. As part of the partnership, State Parks rakes a segment of the Silver Strand State Beach to make the beach more appealing to the clients of the Loews Coronado Bay Resort. Loews also contributes funds collected by assignment of a 1-percent room fee to the Silver Strand State Parks Foundation for conservation of beach resources.

Terrestrial Plant Communities and Cover Types

The action area lies within the south coast subdivision of the California Floristic Province. The terrestrial plant communities within the action area are provided in Table 9 (DoN 2008).

Table 9: Terrestrial Plant Communities and Cover Types in the Action Area.*

Plant Community	*NASNI*		*SSTC North (NAB Coronado)*		**SSTC South (NRRF)**		***TOTALS***	
	Acres	*Ha*	*Acres*	*Ha*	*Acres*	*Ha*	*Acres*	*Ha*
Diegan coastal sage scrub[H]					*15.1*	*6.1*	*15.1*	*6.1*
California buckwheat series[S]					2.7	1.1	2.7	1.1
California sagebrush series[S]					7.7	3.1	7.7	3.1
Coyote brush series[S]					4.7	1.9	4.7	1.9
Maritime succulent scrub[H]					*7.3*	*3.0*	*7.3*	*3.0*
California Annual Grasslands [S]					*125.5*	*50.8*	*125.5*	*50.8*
Upland transition			*90.0*	*36.4*			*90.0*	*36.4*
Southern foredune/beach[O]	*95.3*	*38.6*	*277.8*	*112.5*	*77.8*	*31.5*	*450.7*	*182.4*
Beach[O]	83.6	33.8	232.5	94.1	43.5	17.6	359.6	145.6
Sand verbena-Beach bursage series[S]	10.5	4.3			34.4	13.9	44.9	18.2
Disturbed coastal dune[O]			45.0	18.2			45.0	18.2
Dune restoration[O]	1.2	0.5					1.2	0.5
Vernal pools[O]					*3..2*	*1.3*	*3.2*	*1.3*
San Diego Mesa vernal pools[H]					3..2	1.3	3.2	1.3
Water[O]	*1.1*	*0.4*	*20.8*	*8.4*	*9.0*	*3.6*	*30.8*	*12.4*
Unvegetated channel[O]	1.1	0.4					1.1	0.4
Freshwater pond[O]					0.8	0.3	0.8	0.3
Open water			20.8	8.4	8.2	3.3	29.0	11.7
Freshwater marsh[H]	*0.1*	*0.1*			*3.3*	*1.3*	*3.4*	*1.4*
Cattail series[S]	0.1	0.1					0.1	0.1
Bulrush-Cattail series[S]					0.9	0.3	0.9	0.3
Spikerush series[S]					2.4	1.0	2.4	1.0
Coastal salt marsh[H]	*0.2*	*0.1*	*13.8*	*5.6*	*56.7*	*22.9*	*70.7*	*28.6*
Pickleweed series[S]					55.4	22.4	55.4	22.4
Salt grass series[S]	0.2	0.1					0.2	0.1
Pickleweed-saltgrass series[S]					1.3	0.5	1.3	0.5
Landscaped[O]	*140.7*	*57.0*					*140.7*	*57.0*
Eucalyptus woodland[S]	16.6	6.7					16.6	6.7
Ornamental vegetation[O]	28.7	11.6					28.7	11.6
Golf course[O]	95.5	38.7					95.5	38.7
Developed, Ruderal, or Other[O]	*2273.9*	*920.6*	*404.8*	*163.9*	*283.3*	*114.7*	*2962.0*	*1199.2*
Ruderal habitat[O]	365.4	147.9	34.8	14.1	42.7	17.3	442.9	179.3
Iceplant[S]					165.1	66.8	165.1	66.8
Urban/developed lands[O]	1881.4	761.7	370.0	149.8	75.5	30.6	2326.9	942.1
Riprap[O]	6.8	2.7					6.8	2.7
Least tern nesting (MAT) site[O]	20.3	8.2					20.3	8.2
Totals	*2532.1*	*1025.1*	*786.1*	*318.3*	*572.9*	*231.9*	*3891.1*	*1575.3*

* Sources For This Data Include RECON 2004 and 2005 and DoN 1982 and 1998. (Two Different vegetation classification systems have been used in the action area, Holland [1986] and Sawyer and Keeler-Wolf [1995])

Vegetation Classification Systems: [H] Holland, [S] Sawyer & Keeler-Wolf, [O] Other types not classified by either system.

Integrated Natural Resources Management Plans

The Sikes Act (16 U.S.C. 670) authorizes the Secretary of Defense to develop cooperative plans for conservation and rehabilitation programs on military reservations and to establish outdoor recreation facilities. While the Sikes Act of 1960 was in effect at the time that the tern was listed, it was not until the amendment of 1997 (Sikes Improvement Act) that Department of Defense Installations were required to prepare Integrated Natural Resources Management Plans (INRMPs). Consistent with the use of military installations to ensure the readiness of the Armed Forces, INRMPs provide for the conservation and rehabilitation of natural resources on military lands. They incorporate, to the maximum extent practicable, ecosystem management principles and provide the landscape necessary to sustain military uses.

The Navy completed an INRMP for NBC in 2002. The Service was a member of the NBC INRMP Working Group that identified issues and strategies for managing the natural resources found on NBC, including measures to avoid and minimize the take of federally listed species, such the least tern and snowy plover, in their management of Navy installations. The NBC INRMP addresses resource management at NASNI, NRRF, NAB, La Posta Mountain Warfare Training Facility, Camp Morena, and Remote Training Site Warner Springs. Like other INRMPs, it is largely ecosystem-based except where biological opinions direct species-specific actions. The NBC INRMP includes a conservation strategy for the least tern and snowy plover.

The Navy and the San Diego Unified Port District (Port) completed an INRMP for San Diego Bay in September 2000. The Service was also a member of the San Diego Bay INRMP Working Group that identified issues and strategies for managing the natural resources found in San Diego Bay, including measures to avoid and minimize the take of federally listed species, such the least tern and snowy plover. The San Diego Bay INRMP provides information on the biological resources of San Diego Bay and future management strategies that could be implemented by the Navy and the Port, the two major managers and users of the bay. The San Diego Bay INRMP includes a conservation strategy for least tern foraging habitat.

Previous Consultations-Biological Opinions and Memoranda of Understanding Pertaining to Training and Resource Management

The Navy has coordinated extensively and previously consulted on activities within the action area, including maintenance and construction of facilities at NASNI, military training on bayside and oceanside beaches, and in-water construction activities.

1. NASNI helicopter maintenance and training facilities.

The construction of a helicopter MAT facility, including a LAMPS MK III, resulted in the loss of an occupied least tern nesting area (Service BO 1-1-80-F-18 5 March 1980). A total of 25.7 ha (63.45 ac) were affected by the project. As a result of section 7 consultation, a 10.6-ha (21.6-ac) area of the existing nesting area called the MAT site was preserved, indefinitely, for terns nesting at NASNI. An additional 11.8 ha (29.2 ac) of NASNI were prepared on an annual basis

as alternate nest sites, including predator and vegetation control, in the event the MAT site was not successful.

Consultation on development of the NASNI airfield culminated with a 1983 biological opinion (Service BO 1-1-82-F-123, March 2, 1983) under which the Navy excluded 30.4 ha (75 ac) of land at Delta Beach from public access by fencing for least terns under the terms of a MOU between the Service and NAB Coronado. The biological opinion required that the 30.4 ha (75 ac) of land at Delta Beach be "fenced and officially established as a nesting site." The designation of the Delta beaches as a "least tern preserve" was formalized in a 1984 MOU between the Navy and Service (DoN and Service 1984) that was developed to provide long-term management of the 30.4 ha (75-ac) Delta Beach site. The MOU did not inhibit the use of Delta beaches for military maneuvers, but directed maneuvers to the northern and eastern perimeters of the site. Prior to designation as the California Least Tern Preserve, Delta Beach North had been used both for Navy training and as a public boat launching facility. Public access was closed as a result of the fencing and a requirement of the California Coastal Commission Consistency Determination (CD-4-84 22, February 1984) to address this loss. California least terns returned to nest regularly at Delta Beach North starting in 1985.

2. Military training activities

The Navy has coordinated and consulted with the Service on training activities since 1994 to facilitate continued training while minimizing incidental take to least terns and western snowy plovers. The strategy used to minimize incidental take and facilitate training have varied as the tern (and plover) populations have grown and training needs have increased. The Service has issued 11 biological opinions or extensions of opinions regarding training activities and associated management activities (Appendix B). Each of the opinions/extensions addressed activities over a period of 1-2 years to allow for changes in management strategies and address changes in the status/distribution of least terns and snowy plovers in training areas.

The most recent comprehensive biological opinion (FWS-SDG-3452.3) addressing training and natural resource management strategy that defines the environmental baseline at SSTC-N was finalized in 2005. In accordance with this opinion, the Navy currently conducts training activities during the breeding season within seven of the ten beach lanes at SSTC-N and minimizes the impacts of training by providing a disturbance-free nesting area for western snowy plovers and California least terns in three of the beach lanes. Beach lanes Blue 2, Orange 1, and Orange 2 are marked with blue stakes and are not scheduled for training activities during the breeding season. These lanes are less desirable for training due to the distance from infrastructure and facilities, as well as the marine conditions directly off shore from the lanes. The Navy identifies beach crossing lanes to facilitate movement of equipment and personnel across the beach in beach lanes that are protected. In addition, the Navy conducts conservation measures within the boundaries of SSTC- N, including: (1) predator management at all nest sites; (2) annual nest site preparation; (3) modification of the beach to create hummocks to deter terns and plovers from nesting in intensively used beach lanes Green 1 and Green 2; (4) scheduling efforts to avoid beach lanes with higher nest numbers; (5) marking and avoidance of

established western snowy plover nests; (6) public outreach to military residents of adjacent housing; and (7) limited enforcement of range boundaries.

3. In-water construction noise and turbidity

The 1987 MOU between the Service and the Navy established standards and conditions for in-water construction activities in San Diego Bay to prevent adverse effects to the endangered California least tern (DoN and Service 1987, 1993, 1999, 2000, 2004). Originally a 5-year MOU, it has been formally renewed several times, most recently in 2004 for 2 years. A letter from the Service allows for recognition of the MOU until a new one is signed (FWS-SDG-08B0211-08I0203, December 18, 2007). In the 2004 MOU, the Navy committed to enhance 4 ha (10 ac) at South Delta Beach for tern nesting, as well as an additional 1.2 to 2 ha (3 to 5 ac) of California least tern foraging habitat. In addition, the Navy committed to the removal of overhead power lines at Delta Beach, predator control efforts for tern colonies, studies to determine effects of various in-water construction activities, end-of-year reports on tern population monitoring, and a list of proposed Navy projects to be conducted in San Diego Bay.

With implementation of these conservation measures, ongoing maintenance and new construction activities could be conducted by the Navy in San Diego Bay without the need for formal consultation with the Service on each action as long as California least tern foraging areas were not affected. The U.S. Navy agreed to provide an annual funding source of $250,000 for management and monitoring of the least tern in the San Diego Bay region, as well as a one-time funding source of $500,000 to be used to create additional tern foraging or nesting habitat. In addition, the Navy agreed to staff a permanent position to oversee the implementation of the MOU. The 1987 MOU was updated in 1993 and provided for annual funding of $250,000 by the Navy to continue California least tern management and predator control efforts. The MOU between the Navy and Service has provided funding consistency up front, rather than depending on project-by-project funding. It has also provided personnel consistency by establishing a permanent, full-time Navy natural resource position since 1988 to manage the tern conservation program and coordinate with the Service on Navy projects that may affect the tern.

4. The NASNI Operations (airfield and recreational as well as military training use of the beaches)

The NASNI operations include 112,570 annual airfield operations (based on take-offs and landings in 2004) and training and recreational activities on the beach. They include a Bird/Animal Aircraft Strike Hazard (BASH) program designed to reduce wildlife hazards in the airfield area. As part of the BASH program, the Navy harasses avian species to keep them away from the runway. Plovers have historically nested within the airfield boundaries. The flat topography of the airfield, lack of foot traffic, consolidated substrate with loose windblown sand, and proximity to the ocean and the bay have proven attractive to plovers, especially since undisturbed habitat closer to the shoreline is limited. The Navy consulted with the Service on the proposal to include snowy plovers among the birds harassed during BASH activities and to

remove any plover nests from the airfield (FWS-SDG-3908.3 2005). The resulting consultation secured commitment to protect an area big enough to support 12 to13 pairs of plovers.

5. Navy Lodge Expansion

The Navy proposed to increase the size of the Navy Lodge and consulted with the Service to address the effect of this proposal on western snowy plovers that nest on adjacent beaches (FWS-SDG-3908.5). To minimize the effects of Navy Lodge expansion, the Navy conducts the following management at NASNI: (1) continued plover nest marking for 30-m (98.4-ft) diameter buffers and monitoring; (2) avoidance of plover management areas when beach raking; (3) setting aside of 6 ha (14.9 ac) of suitable (and historically used) plover habitat as off-limits to foot traffic, vehicle traffic, beach raking, and pets during the snowy plover breeding season; (4) implementation of predator controls including anti-perch materials on buildings; (5) placement of signage and distribution of educational materials to patrons, employees, life guards; (6) training for construction workers; and (7) shielding of lighting away from the beach during nesting season.

California Least Tern

The California least tern is a breeding resident that is present from approximately April 1 to September 15 within the action area. The action area has historically been used for nesting by California least terns. Records of least tern use of Coronado and Silver Strand beaches include specimens currently housed at San Diego Natural History Museum and the Los Angeles County Museum. Least tern specimens include five specimens taken from the Silver Strand during the breeding season between 1921 and 1926, and one specimen taken from the "Coronado Strand" in 1918. While the collection location of these specimens is not precise, it is likely, given these records and the habitat affinities of least terns that this species historically nested throughout the action area.

Within the action area, least terns currently nest exclusively on the oceanfront SSTC-N beaches and across Highway 75 in the bayside Delta Beaches (Figures 6a, 6b). Least terns also nest outside, but close to, the action area on lands administered by NBC, within the "MAT Site" and occasionally on an additional site at NASNI (i.e., the Runway 11 site). Least terns are known to roost on the jetty and beach at Zuniga Point NASNI (DoN 2009a.) and a least tern night roost has also been identified in the southern 3 beach lanes at SSTC-N Beach (i.e., Blue 2 and Orange 1 and 2) and in an area near the mudflats at Delta Beach North and South (DoN 2009a). Least terns nest on dikes located within the South San Diego Bay Unit of the San Diego Bay NWR; however, these dikes lie beyond the influence of helicopter disturbance and thus are outside the action area. Least terns forage in the bay and ocean waters throughout the action area.

The least tern colony at SSTC-N has successfully established and coexisted with baseline levels of training disturbance. Least terns currently nest within and adjacent to SSTC-N beach lanes used during the breeding season for training exercises and forage in waters that support baseline training exercises. The need for consistency in training, combined with the Navy's successful

avoidance and minimization measures, has resulted in reduced human and vehicle traffic in some areas of the training beach lanes. The status of the SSTC-N Beach as a military training area has also resulted in reduced recreational use of the area, improving conditions for least tern nesting compared to recreational beach areas.

Figure 6a. California Least Tern and Western Snowy Plover 2008 Nest Distribution at SSTC-N Beach Lanes Red 1 to Green 2.

Figure 6b. California Least Tern and Western Snowy Plover 2008 Nest Distribution at SSTC-N Beach Lanes Blue 1 to Orange 2.

The occupied beaches included in the action area provide important breeding habitat for the California least tern. Proximity to both the ocean and San Diego Bay make the action area

beaches particularly attractive to the California least tern, which forage in the ocean and San Diego Bay (Baird 1997). From 2005 to 2009, the Navy directed training during the least tern nesting season to the northern 7 beach lanes and avoided the southern 3 beach lanes at SSTC-North Beach. During this time, an average of 17.8 percent of the U.S. rangewide least tern population nested in the action area, making it second only to Camp Pendleton in terms of numerical importance to the species (Appendix D). Under actual levels of training from 2005 to 2009, an average of 11.3 percent (range from 7 to 13.6 percent) of the U.S. rangewide least tern nests were initiated annually on the SSTC-N Beach, with an average of 4.9 percent initiated in the northern 7 beach lanes, and an average of 6.3 percent initiated in the southern 3 beach lanes (Appendix E, Table E.2). During this time period, an average of 6.0 percent (range from 4.6 to 8.1 percent) of the U.S. rangewide least tern nests were initiated on the Delta Beaches (Appendix E, Table E.2).

The number of least nests observed within the action area has increased significantly in recent years. The number of least tern nests recorded within the action area has increased from 229 nests in 1994 to 1,741 nests in 2009 (Table 10). Most of the increase has occurred in tern nesting areas protected from training during the breeding season (i.e., from 228 nests in 1999 to 1,272 nests in 2009). The relative number of least terns nesting on SSTC-N beach lanes has increased when compared to the number nesting on the Delta Beaches and consequently, SSTC-N Beach now supports a higher percentage of the least tern nests within the action area than the Delta Beaches (Table 11). Training use affects the distribution of least terns on the SSTC-N Beach. Least tern nest density is highest in training lanes that are protected from disturbance under baseline conditions (i.e., Blue 2, Orange 1, and Orange 2) (Figure 7).

Table 10. Number and Distribution of California Least Tern Nests in Action Area

	1994	95	96	97	98	99	2000	01	02	03	04	05	06	07	08	09
Delta Beaches (Bayside)																
Delta N	*210*	*177*	*224*	*349*	*337*	*344*	*229*	*271*	*257*	*285*	*263*	*351*	*223*	*224*	*295*	*413*
Delta S	*18*	*1*	*21*	*25*	*80*	*81*	*70*	*81*	*84*	*216*	*195*	*215*	*155*	*156*	*174*	*235*
Delta Beach Totals	**228**	**178**	**245**	**374**	**417**	**425**	**299**	**352**	**341**	**501**	**458**	**566**	**378**	**380**	**469**	**648**
SSTC-N Beach (Oceanfront)																
Yellow 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow 2	0	0	0	0	0	0	0	0	0	0	0	0	44	47	52	69
Red 1	0	0	0	0	1	0	0	0	0	9	*24*	70	206	142	231	248
Red 2	0	0	8	6	18	28	19	33	30	61	*50*	47	89	59	77	84
Green 1	0	13	21	27	68	101	81	*101*	*116*	*155*	*141*	108	56	32	37	29
Green 2	*1*	18	54	*46*	*48*	*58*	*54*	75	46*	71	*35*	42	19	19	22	23
Blue 1	0	0	1	0	0	6	6	7	8*	14	*13*	27	41	31	24	16
Blue 2	0	0	0	11	41	57	101	*126*	*108*	*138*	*130*	*97*	*232*	*132*	*209*	*221*
Orange 1	0	0	0	1	6	15	36	*69*	*57*	*69*	*69*	*77*	*145*	*146*	*173*	*152*
Orange 2	0	0	0	0	2	13	33	*52*	*36*	*106*	*115*	*102*	*215*	*174*	*230*	*251*
SSTC-N Beach Totals	**1**	**31**	**84**	**91**	**184**	**278**	**330**	**463**	**401**	**623**	**577**	**570**	**1047**	**782**	**1055**	**1093**
Total in Active Training Lanes	**0**	**31**	**84**	**45**	**136**	**220**	**276**	**115**	**84**	**155**	**0**	**294**	**455**	**330**	**443**	**469**
Totals in Protected Areas, Including Delta Beaches	*229*	*178*	*245*	*420*	*465*	*483*	*353*	*700*	*658*	*1124*	*913*	*842*	*970*	*832*	*1081*	*1272*
Action Area Totals	**229**	**209**	**329**	**465**	**601**	**703**	**629**	**815**	**742**	**1124**	**1035**	**1136**	**1425**	**1162**	**1524**	**1741**

- The number of nests, as recorded in this table, is greater than the number of tern pairs, because terns may re-nest after failure. For comparison, pair estimates for 2008 were 267 for Delta N, 162 for Delta S, and 906 for SSTC-N beach.
- The area that has protected from human disturbance has changed throughout the years. For each year, the italicized text and numbers highlight the areas that were marked and avoided (i.e., protected from human disturbances). Delta Beaches were protected in all years.

Table 11. Comparison of Least Tern Numbers at Delta Beaches and SSTC-N Beach

Year	Delta Beaches N and S Nests- "bayside" (percent of overall nests in action area)	SSTC-N Beach Nests- "oceanfront" (percent of overall nests in action area)	Total Nests Within Action Area
1999	425 (60)	278 (40)	703
2000	299 (48)	330 (52)	630
2001	352 (43)	462 (57)	815
2002	341 (46)	401 (54)	742
2003	501 (45)	623 (55)	1124
2004	455 (45)	549 (55)	1007
2005	566 (50)	570 (50)	1136
2006	378 (27)	1047 (73)	1425
2007	380 (33)	782 (67)	1162
2008	469 (31)	1055 (69)	1524
2009	648 (37)	1093 (63)	1741

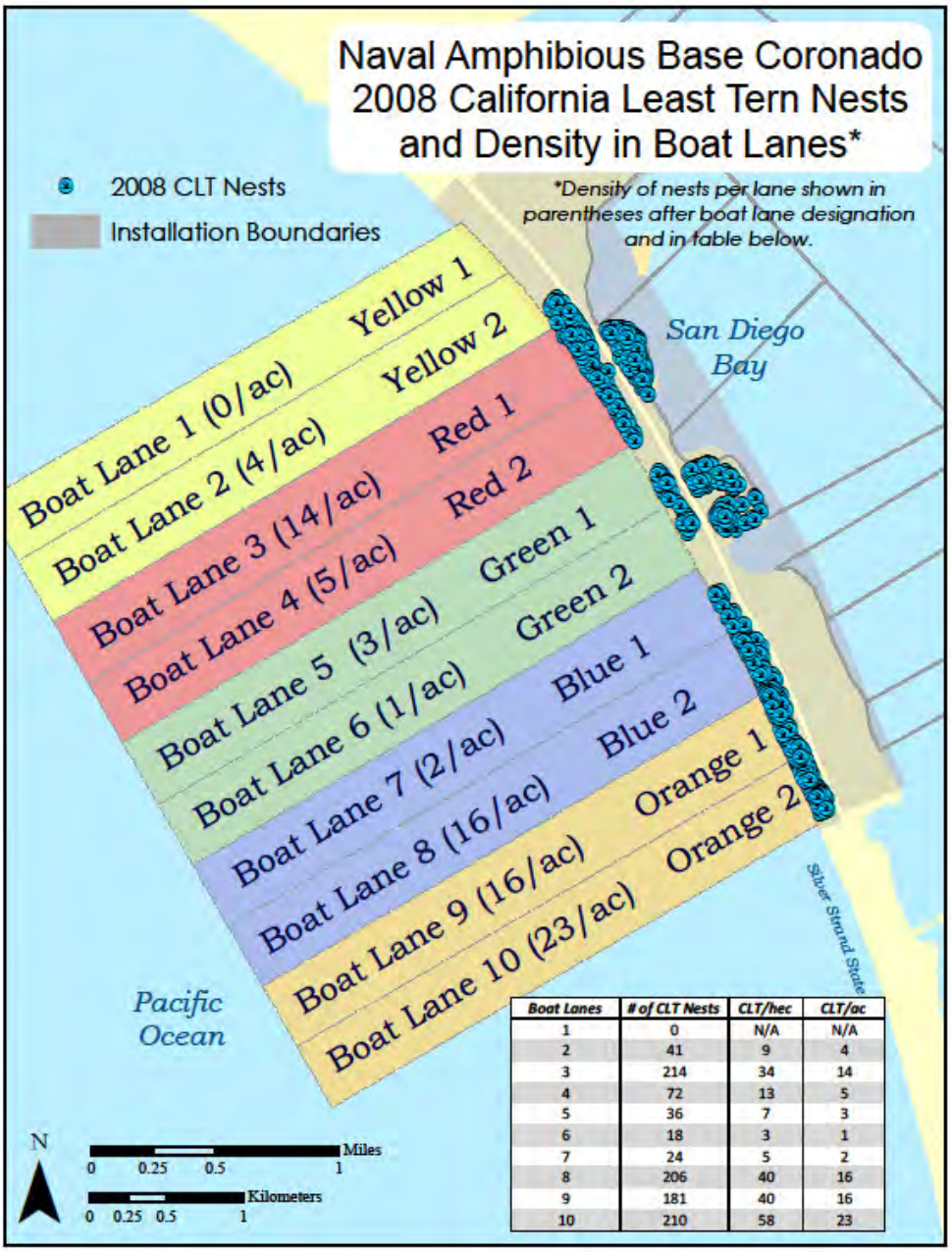
The increase in the number of least tern nests observed within the action area is likely a result of the general resurgence in the least tern population, the proximity of the action area to ocean and bay foraging resources, the suitability of the beach habitat for least tern nesting, predator management, and successful nest avoidance efforts of the Navy. The number of least tern nests observed may be greater than the number of pairs using action area beaches because some pairs initiate a second nest after a nest failure.

Least terns within the action area are affected by baseline levels of military training; however, the benefit of the current Navy management to the least tern appears to have outweighed the impacts to individual nests or chicks that have occurred over the past 10 years. Least tern nests, eggs, and chicks have been lost as a result of training activities, as detected by monitoring activities, which are conducted several times per week throughout the breeding season. Given the intensity of training under baseline conditions in areas that are immediately adjacent to, or among least tern nests (Table 5), the recorded incidental take of least terns is exceedingly small. The low level of observed take during the past 4 years may, however, be due to the actual level of training, which may be lower than the Navy's estimated "baseline" level of training. No least tern eggs/chicks were injured or killed in 2004, when the Navy avoided all tern nests. The number of eggs/chicks injured or killed as a result of training has increased in the past 3 years, likely because tern nests are not marked for avoidance outside of the protected beach lanes. From 0 to 15 eggs have been moved and 0 to 45 least tern eggs/chicks have been injured or killed each year between 1999 and 2009 due to training activities, but no adults have been reported as injured or killed (Table 12). Nonetheless, the possibility of complete loss of nests, chicks, and eggs has been present, particularly in beach lanes that support more intensive training activities such as Beach Camps, Beach Parties, and LCAC Landings (Appendix C).

Least terns within the action area are affected by vandalism and foot and vehicle traffic of unknown origin. Although the Navy's goal is to prohibit recreational and other unauthorized activities on the SSTC-N Beach, impacts to least terns have occurred during periods where the

impact did not coincide with a scheduled training activity. Such impacts likely occurred due to recreational activities. From 0 to 7 least tern eggs/chicks have been injured or killed each year between 1999 and 2009 due to vandalism or foot and vehicle traffic of unknown origin (Table 12).

Figure 7. California Least Tern 2008 Nest Density at SSTC-N Beach Lanes*



Boat Lanes	# of CLT Nests	CLT/hec	CLT/ac
1	0	N/A	N/A
2	41	9	4
3	214	34	14
4	72	13	5
5	36	7	3
6	18	3	1
7	24	5	2
8	206	40	16
9	181	40	16
10	210	58	23

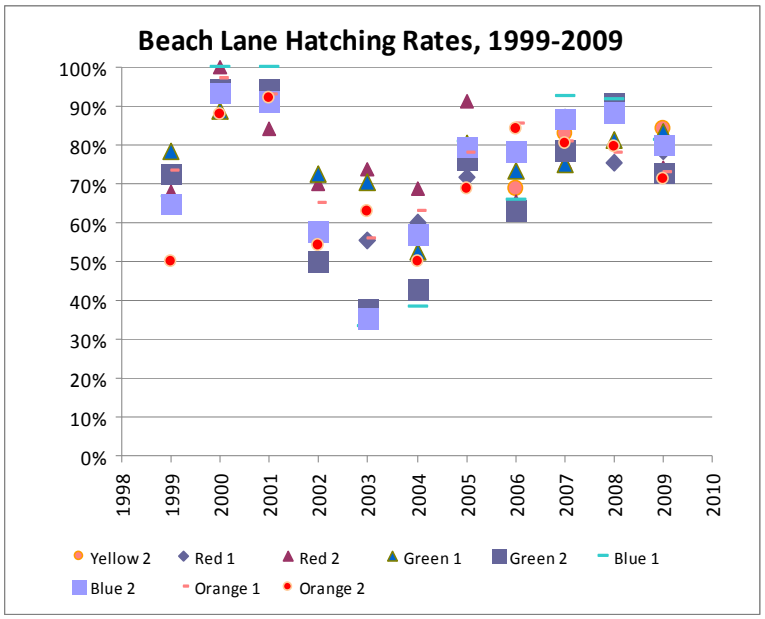
- *Tern nest numbers in each lane in Figure 7 vary from those presented in Table 10, because this figure was derived from GIS data*

Table 12: Recorded Human Impacts to California Least Tern Eggs/Chicks at SSTC-N Beach

	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
Estimated Eggs/Chicks in Active Training Lanes*	938	886	660	910	588	0	310	168	230	552	440
Eggs/Chicks Taken as a Result of Training (Percent of Total Eggs/Chicks in Active Training Lanes)	45 (4.8)	30 (3.4)	34 (5.2)	23 (2.5)	38 (6.5)	0 (0)	9 (2.9)	3 (1.8)	1 (.4)	2 (.4)	1 (.2)
Eggs/Chicks Taken as a Result of Vandalism, Unknown Foot Traffic, or Unknown Vehicles	1	0	6	3	0	0	6	0	7	3	5
Eggs moved out of training area to protected area	6	4	4	0	0	15	10	5	1	0	0
Eggs Collected From Training Lanes	0	0	0	0	0	0	51	50	0	0	0
Eggs damaged during monitoring	0	0	2	1	0	1	0	0	1	0	0

* Based on active nest numbers in lanes used for training given in Table 10 and average 2 egg clutch size.

Figure 7.a. Least Tern Hatching Rates by Beach Lane



Data provided by Shepherd, 2010.

The recorded hatching rate of least tern eggs at SSTC varies by beach lane and by year; however, hatch rates are relatively high in most years, even in the active training lanes. Predation, food availability, variation in yearly management techniques, and location and type of training activity

could influence hatching rates within different beach lanes; however, no clear pattern is evident from the available data.

Previous biological opinions have exempted incidental take far in excess of that observed to date to address the possibility of complete loss in active training lanes, given the nature and uncertainties of the training activities, and lack of marking/avoidance across sections of the beach. To offset the potential injury or death of tern eggs and chicks in beach training lanes, the Navy has continued to mark and avoid a beach segment that is less desirable for most training needs from 2005 to 2009 (Blue 2, Orange 1 and 2). The low level of observed training impacts to tern eggs and chicks is due to the avoidance of tern nests in the protected beach lanes, additional avoidance/ scheduling measures implemented by the Navy, and the concentration of least terns in areas that receive less training use.

Predation is a significant limiting factor for least tern productivity throughout their range and is addressed within the Navy-managed portions of the action area by an intensive predator management program. Most predators are removed from nest sites as a result of this program. Predation by gull-billed terns, however, remains a threat to least terns in the action area that is unmanaged at this time. The Navy has attempted, unsuccessfully, to deter gull-billed terns from least tern nesting sites (Bonesteel 2009). The Navy submitted depredation permit requests to the Service's Division of Migratory Bird Management from 2005 to 2009 in an effort to address this threat to the least terns within the action area. Depredation permit requests have been denied each year by the Service, due to concern regarding the status of the gull-billed tern. Biological monitors contracted by the Navy observed over 12 percent of the least tern chicks that had hatched within the action area taken by gull-billed terns between May and June 15, 2009 (DoN 2009a). Monitors, Navy staff, and Service NWR staff infer, given the limited time period over which observations were made, high visibility of many foraging gull-billed terns, and the rapid disappearance of most chicks, that most of the least tern chicks that hatched during this period were taken by gull-billed terns. The low least tern reproductive success recently observed within the action area is thus believed to be primarily due to predation by gull-billed terns (DoN 2009a). The low observed productivity of least terns in the San Diego Bay area may result in changes in the local abundance and distribution of least terns, including declines in abundance, in coming years, however no decline in local abundance has yet occurred, based on the available information. A study to determine the age structure of the least terns that nest within the action area and other nesting areas around San Diego Bay is underway to determine whether the local least tern population is over represented in older age classes as a result of low juvenile recruitment.

The South San Diego Bay NWR supports the nesting colony of gull-billed terns in San Diego Bay. The NWR recently drafted an Environmental Assessment (Service 2009) outlining the threat that gull-billed terns pose to the least tern and describing a proposed pilot program to study the effectiveness of reducing gull-billed tern reproductive success in reducing predation pressure within the action area and surrounding area. The pilot program was not implemented during the 2009 breeding season, but it may be implemented in future years after completion of the National Environmental Policy Act process.

We anticipate that predation by the gull-billed tern is likely to continue to exert a visible, and potentially significant, impact on least tern and snowy plover reproductive success within the action area. The Service has prioritized development of a management strategy to address the interaction between the gull-billed tern, least tern, and snowy plover in the vicinity of San Diego Bay.

Western Snowy Plover

The action area has historically been used for nesting by western snowy plovers. Records of western snowy plover use of Coronado and Silver Strand beaches include specimens currently housed at San Diego Natural History Museum and the Los Angeles County Museum. The San Diego Natural History Museum has one snowy plover specimen collected from "the Strand" in the spring of 1918, one specimen collected from Coronado in April 1926, as well as eggs collected from "the Strand" in 1921 and from Imperial Beach in 1928 (SDNHM museum records) . The Los Angeles County Museum collections include two western snowy plover skins (one male and one female taken on the same day) collected on May 27, 1899, on "Coronado Beach" (LACM museum records). Snowy plover pairs were also reported by L. E. Stenzel and S. C. Peaslee on the Silver Strand in May 1978 as part of an extensive study of the distribution and ecology of the species through California (Page and Stenzel 1981). While the collection location of these specimens is not precise, it is likely, given the habitat affinities of western snowy plovers that this species historically nested throughout the action area.

In areas where appropriate physical conditions exist, plovers in the action area successfully reproduce in proximity to occasional disturbances (primarily military training) when the area immediately surrounding the nest site has been protected. Disturbance during the breeding season, by human activities, pets, or predators, may preclude plover nesting or roosting on otherwise suitable beaches (Service 2007b).

Sandy beaches suitable for western snowy plover nesting and roosting are currently present across most of the ocean and bay-side beaches that lie within the action area. The Navy's management actions, including predator management, prohibitions on beach raking, and nest avoidance have contributed to the persistence of plovers on these beaches. Plovers nest on the SSTC-S Beach, SSTC-N Beach, NASNI Beach, and on Silver Strand State Beach. Plover nests are distributed primarily within areas that are marked and avoided at Silver Strand State Beach, SSTC-N, and the NASNI Beach (Table 13, Figures 6a and 6b and 8). The plover nest distribution on the beach is clustered. Nests occur in active military training lanes, but are located more frequently in areas that are protected from disturbance during the breeding season (Figure 9, Table 14 a). The higher frequency of nests located within protected areas is likely a function of the lower levels of human activity that occurs within these areas. However, for some unknown reason, plover nesting is rare on the protected Delta Beaches.

Table 13. Western Snowy Plover Total Nest Numbers in Action Area.

Year	NASNI Beach	NASNI Airfield	Delta Beach North	Delta Beach South	SSTC-N	SSTC-S	Total NBC	Silver Strand State Beach	Total Within the Action Area
2000	4	0	2	5	37	1	49	19	68
2001	13	0	0	0	34	2	49	14	63
2002	26	0	1	2	57	13	99	24-26	123-125
2003	31	0	0	2	59	9	101	22	123
2004	13	23	0	2	63	14	116	24	140
2005	10	20	0	0	42	8	80	21	101
2006	12	11	1	0	43	6	73	20	93
2007	9	1	0	0	26	6	42	12	56
2008	26	12	0	0	41	12	91	18	109
2009	40	12	0	0	68	14	134	25	159

Table 13 a. Western Snowy Plover Breeding Season Window Survey Results 2003-2009*.

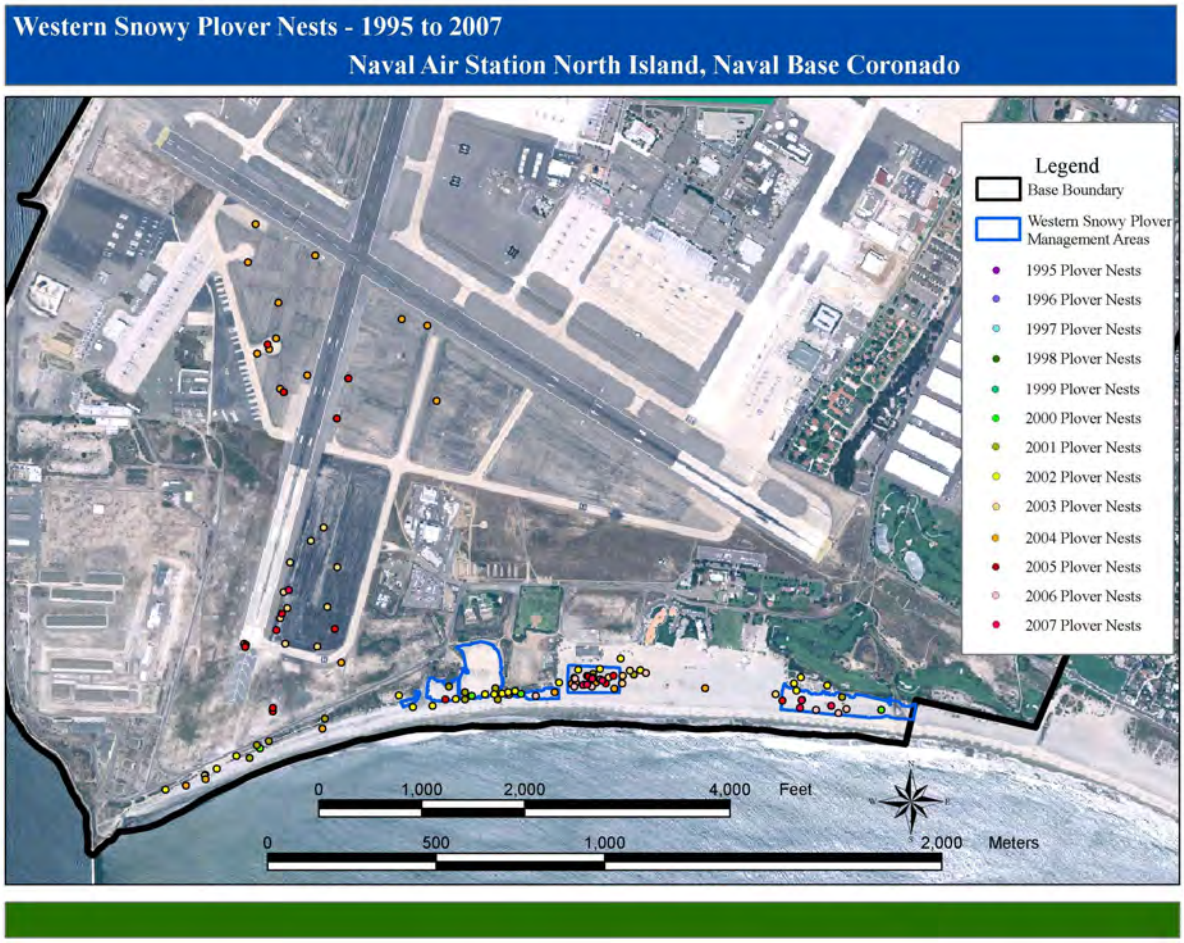
Year	NASNI BEACH**	Delta Beach North	Delta Beach South	SSTC-N	SSTC-S	NBC Total***	Silver Strand State Beach	Silver Strand (SSTC-N,SSTC-S, SSSB)	Action Area Total
2003	17	0	1	n/a**	n/a**	n/a**	n/a**	58	76
2004	18	0	1	n/a**	n/a**	n/a**	n/a**	56	75
2005	4	0	0	21	0	25	5	26	30
2006	22	0	2	36	8	68	8-9	52-53	76-77
2007	4	0	2	11-17	3	20-26	7	21-27	27-33
2008	15	0	0	33	8	56	15	56	71
2009	17	0	0	28	8	53	10	46	63

* unpublished data (Service 2004, 2009)

** in 2003 and 2004, data was not recorded on the individual beach units along the Silver Strand, but was recorded as a total for SSSB, SSTC-N, and SSTC-S.

Plovers can re-nest up to six times post failure and can also produce two or three clutches in a successful season (Wilson 1980, Warriner et al. 1986, Page et al. 1995), so the total number of nests present on a beach may provide a significant over estimate of the number of birds using a nesting beach. To provide an accurate estimate of the minimum number of birds present, the Navy supports an intensive monitoring program and uses the maximum concurrent active nest numbers observed (rather than total number of nests over the course of the season) as the basis for a minimum pair estimate (Table 14).

Figure 8. Western Snowy Plover Nest Distribution at NASNI Beach.



Western snowy plovers have coexisted within and adjacent to the active amphibious training areas at NASNI, SSTC-N, and SSTC-S subject to baseline levels of training disturbance. Snowy plovers currently nest and forage within and adjacent to SSTC beach lanes used during the breeding season for training exercises. The need for consistency in training, combined with the Navy's successful avoidance and minimization measures, has resulted in reduced human and vehicle traffic in some areas of the training active beach lanes and also protected each plover nest that is detected on the beach. The status of the SSTC-N and SSTC-S Beaches as military training areas has also resulted in reduced recreational use compared to municipal beaches, which improves conditions for snowy plover nesting. Within beach lanes currently subject to training during the breeding season, snowy plovers exhibit some tolerance of adjacent disturbances, and some have repeatedly nested adjacent to some of the more intensively used portions of the beach. The Navy's ongoing avoidance and buffering of plover nests has protected the nests, and avoidance of the southern 3 beach lanes has also provided an undisturbed area to which adult plovers and broods can retreat during periods of training use.

Table 14. Snowy Plover Maximum Concurrent Active Nest/Minimum Pair Estimates

Year	NASNI BEACH**	Delta Beach North	Delta Beach South	SSTC-N	SSTC-S	SSTC-N and SSTC-S Total***	NBC Total***	Silver Strand State Beach
2000	2	2	3	13	1	na	na	8
2001	5	0	0	13	2	na	na	8
2002	12	1	2	20	5	na	na	7
2003	13	0	1	20	5	22	33	9
2004	12	0	1	20	5	24	33	7
2005	7	0	0	15	3	18	21	8
2006	7	1	0	19	3	22	27	9
2007	3	0	0	9	3	11	13	5
2008	14	0	0	14	4	16	26	8
2009	13	0	0	19	4	22	33	9
Avg. 2005-2009	9	0	0	15	3	18	24	8

** NASNI Airfield not included because nests are actively removed*** Total Numbers are not additive since the maximum number of concurrent nests in subsets of the larger area may not occur on the same day. This results in a total for NBC that is not the sum of the individual areas within NBC

The current snowy plover nest distribution within the action area reflects the relative infrequency of recreational use on military training beaches and the footprint of baseline training activities. Relatively low plover densities are recorded on SSTC-S Beach, which is subject to extensive unauthorized recreational use, including dog walking. The lower density of plovers detected at SSTC-S beach is likely related to disturbance resulting from the unauthorized recreational use. At SSTC-N, lower plover numbers are observed in lanes that support training activities than in lanes that are avoided during the breeding season (Table 14a). The lowest densities of plovers observed on the SSTC-N Beach in 2008 occurred within the beach lanes that were not marked and avoided during the breeding season (Yellow 1 through Blue 1; average 0.11 nests per acre), and the highest densities occurred in the areas marked and avoided during the breeding season (Blue 2, Orange 1, and Orange 2; average 0.8 nests per acre) (Figure 9). Although the number of plover nests observed in active training lanes is lower than the number observed in less disturbed lanes, snowy plovers have demonstrated some habituation to training disturbances as evidenced by nesting within active training lanes in recent years (Table 14a).

Table 14 a. Maximum Active Plover Nests By SSTC-N Beach Lane (2005-2009)***

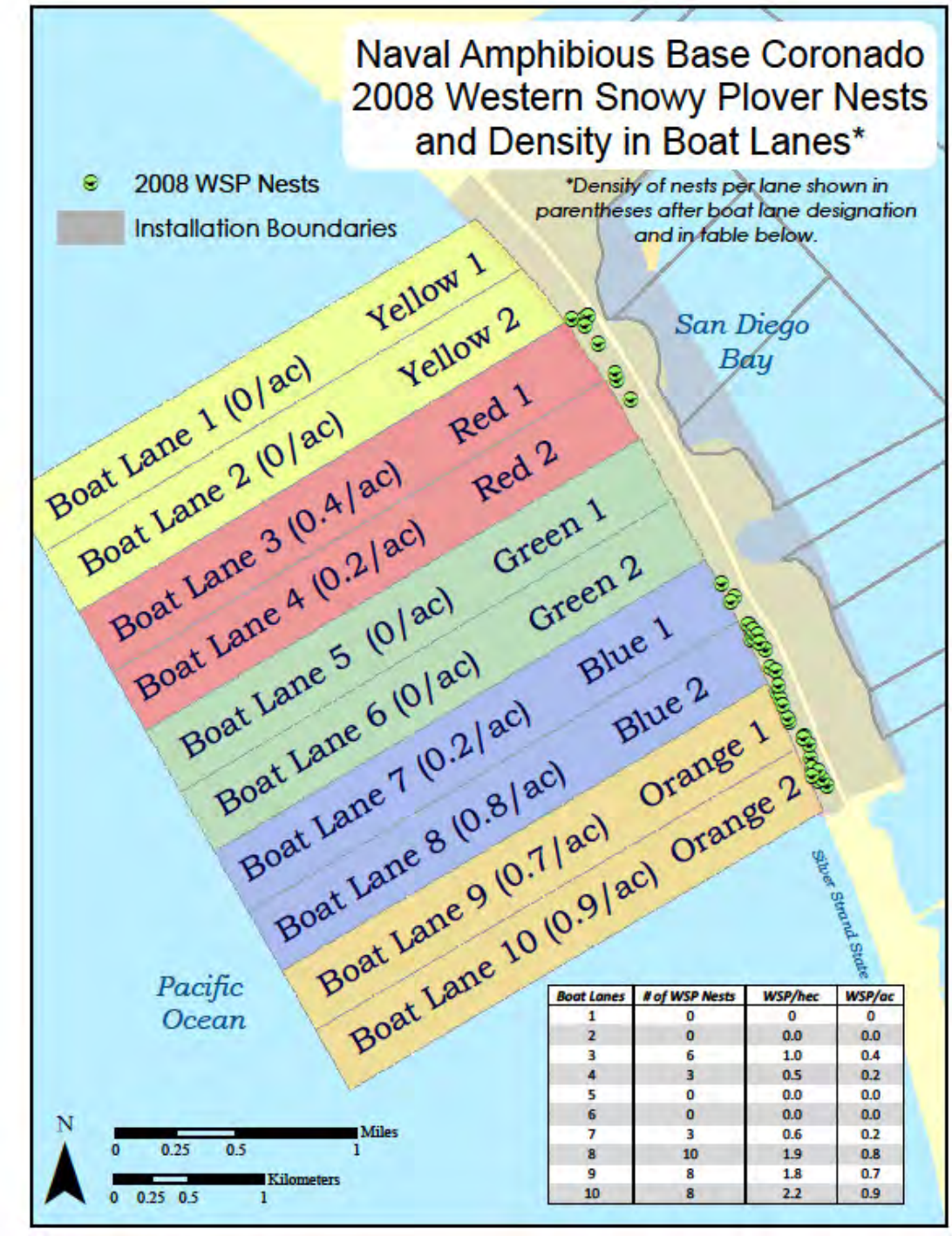
	2005	2006	2007	2008	2009
Yellow 1	0	0	0	0	0
Yellow 2	2	1	1	1	3
Red 1	2	4	3	3	3
Red 2	2	2	0	1	2
Green 1	0	0	0	0	1
Green 2	1	0	0	0	0
Blue 1	1	2	3	2	2
Blue 2	3	6	3	5	6
Orange 1	3	2	2	4	5
Orange 2	5	4	1	4	6
Y1-B1*	6	7	4	4	8
B2-O2**	9	11	8	10	13

* Maximum active in lanes Yellow 1 through Blue 1 combined.
** Maximum active in lanes Blue 2 through Orange 2 combined.
*** Unpublished Navy data. Total Numbers are not additive since the maximum number of concurrent nests in subsets of the larger area may not occur on the same day.

The WSP recovery plan identifies six recovery units across the range of the western snowy plover. The action area lies within Recovery Unit 6, which includes Los Angeles, Orange, and San Diego Counties. The beaches included in the action area provide important breeding and wintering habitat for the western snowy plover.

The Recovery Plan identifies criteria for each of the six recovery units that will be used by the Service to determine if recovery objectives have been met. One of the criteria for Unit 6 is 500 breeding adults (averaged over a 10 year period). Based on available data, Recovery Unit 6 supported an estimated average of only 316 breeding adults averaged over the 5-year period from 2005 to 2009 (Appendix C). Approximately 25 percent of the plovers counted within Unit 6 during the breeding season window surveys (2003 to 2009) were within the action area (Appendix C), demonstrating the importance of the action area to the recovery of the snowy plover.

Figure 9. Western Snowy Plover 2008 Nest Density at SSTC-N Beach Lanes



Boat Lanes	# of WSP Nests	WSP/hec	WSP/ac
1	0	0	0
2	0	0.0	0.0
3	6	1.0	0.4
4	3	0.5	0.2
5	0	0.0	0.0
6	0	0.0	0.0
7	3	0.6	0.2
8	10	1.9	0.8
9	8	1.8	0.7
10	8	2.2	0.9

- *Plover nest numbers in each lane in Figure 9 vary from those presented in Table 14, because this figure was derived from GIS data.*

Each recovery unit and beach segment within the recovery unit also has a "Management Potential Breeding Number" identified to indicate the number of plovers that may, with active management, support attainment of the recovery criteria. The Management Potential Breeding Number for Recovery Unit 6 and the beach segments within the action area is 615 and 95 breeding adults, respectively. The average number of breeding adults estimated within Recovery Unit 6 between 2005 and 2009 (i.e., 316) is approximately half of the Management Potential Breeding Number. The Management Potential Breeding Number for the action area beaches (i.e., 95) represents 15 percent of that for all of Recovery Unit 6a. Beach segments within the action area supported an estimated maximum of 79 plovers between 2005 and 2009 (Appendix C), so they have not attained the Management Potential Breeding Number (i.e., 95).

The Recovery Plan also identifies reproductive success, defined as at least one fledgling per adult male over a 5-year period, as one of the recovery criteria necessary for reclassification of the species. Fledgling estimates within the action area range from 22 to 61 between 2005 and 2009 (U.S. Navy, unpublished data, Appendix C). Since plovers are not individually marked, the number of males is not known; consequently the reproductive success, in terms of fledglings per adult male, cannot be determined from available data.

The NASNI airfield, adjacent to the action area, also provides conditions appropriate for plover nesting. Plover nesting within the boundaries of the airfield (including runway ovals and other adjacent areas) is considered a potential safety hazard by the Navy due to the Bird Aircraft Strike Hazard (BASH) risk, so plovers are actively discouraged from nesting here, and nests are removed if they are detected. The Navy consulted with the Service on these management activities (FWS-SDG-3908.3). As a result of airfield management, 112 plover eggs (33 nests) have been removed from the NASNI airfield since 2004. The eggs are taken to a Project Wildlife volunteer, who incubates, hatches, and rears the chicks. When chicks have reached independence, they are released on beaches within the action area. Approximately 112 eggs have resulted in the release of 51 western snowy plover chicks within the action area in this time period (DoN 2009b). Plovers continue to nest on the airfield despite the ongoing removal of eggs from this site. The number of plovers that have been recruited into the population from release efforts is unknown because released birds are currently not banded with individual color combinations, although released birds do receive a federal numbered band and a cohort (year) color band (DoN 2009b).

Plovers within the action area are affected by human disturbance from recreation and military training activities, predation, and illnesses/deaths from an undiagnosed health problem. Human disturbances within the action from recreation activities are frequent, primarily as a result of recreational use of the beaches within and adjacent to the SSTC beaches and a lack of available Navy security and patrol personnel (Tiffany Shepherd, 2009b). Recreational use includes primarily foot traffic and dog-walking, which sometimes extends above the beach crest and into nesting areas. Uncertainty pertaining to installation boundaries and jurisdiction has also contributed to a lack of enforcement and the high level of recreational use, particularly at the SSTC-S, which is unfenced and poorly marked, and adjacent to the Silver Strand State Beach and the City of Imperial Beach. Security personnel that might normally be stationed at NBC are

currently deployed, leaving gaps in the availability of Security staff available to assure that people (and dogs) do not trespass onto Navy training areas (Tiffany Shepherd 2009c). Military training activities can result in disturbance during breeding, foraging, and roosting activities, however plover nests are avoided during training activities and few instances of incidental take have been documented.

Predation is a major factor limiting snowy plover reproductive success at many Pacific coast sites (Service 2007b) and is addressed within the Navy-managed portions of the action area by an intensive predator management program. Predators within the action area include non-native species and feral animals such as Norway rats (*Rattus norweigicus*) and cats (*Felis domesticus*) but also include native species such as gull-billed terns, American kestrels (*Falco sparverius*), loggerhead shrikes (*Lanius ludovicainus*), burrowing owls (*Speotyto cunicularia*), peregrine falcons (*Falco peregrinus*), great blue herons (*Ardea herodias*), coyotes (*Canis latrans*), and others. As surrounding areas have become more urbanized and plover populations more concentrated and localized, native predators have arisen as a significant issue.

Most predators, including native and non-native species, are removed from plover nest sites as a part of the Navy's predator management program, which benefits the plover by reducing the potential for nest loss from predation. Predation by gull-billed terns, however, remains a threat to snowy plovers in the action area that is unmanaged at this time. Gull-billed terns forage frequently throughout the action area and have been observed capturing and consuming plover chicks (Copper 2009b). In addition, intensive monitoring efforts have failed to re-locate most chicks hatched within the action area, particularly during the portion of the plover breeding season that overlaps with gull-billed tern presence in the area. As stated above, the Navy submitted yearly depredation permit requests to the Service's Division of Migratory Bird Management from 2005 to 2008 to address this threat to the least terns and snowy plovers in the action area. Depredation permit requests have been denied each year due to concern regarding the status of the gull-billed tern.

An undiagnosed health issue has resulted in annual deaths of western snowy plovers primarily within the action area, although sick or dead plovers have been found elsewhere in southern California (Service 2007b). The suspected cause of the sick plovers is domoic acid poisoning or botulism; however, no conclusions have been drawn from the limited necropsy work that has been done to date. The Navy has supported local necropsy of plovers by the San Diego County veterinarian, and the Service has supported study of deceased or sick plovers at the National Wildlife Health Center in Madison, Wisconsin.

Although plover nests are distributed across active training lanes, the Navy has actively avoided direct impacts to most nests by monitoring for the presence of nests, and marking and avoiding nest that are detected. Plovers outside the protected area immediately surrounding each nest are at risk of being harmed by training activities if they are underway; however, there are few recorded instances of nest, chick, or adult loss associated with training (DoN 2008).

Western snowy plovers use the action area beaches for roosting and foraging during the winter months. Table 15 depicts the number of western snowy plovers observed in the action area during the non-breeding season window surveys, conducted in January of each year. During the winter months, no management or special protection directed at western snowy plovers is conducted. During 2008 Winter Window surveys, the action area supported approximately 229 plovers, which represents 33 percent of the plovers detected within Recovery Unit 6, and 7 percent of the plovers detected along the U.S. Pacific Coast.

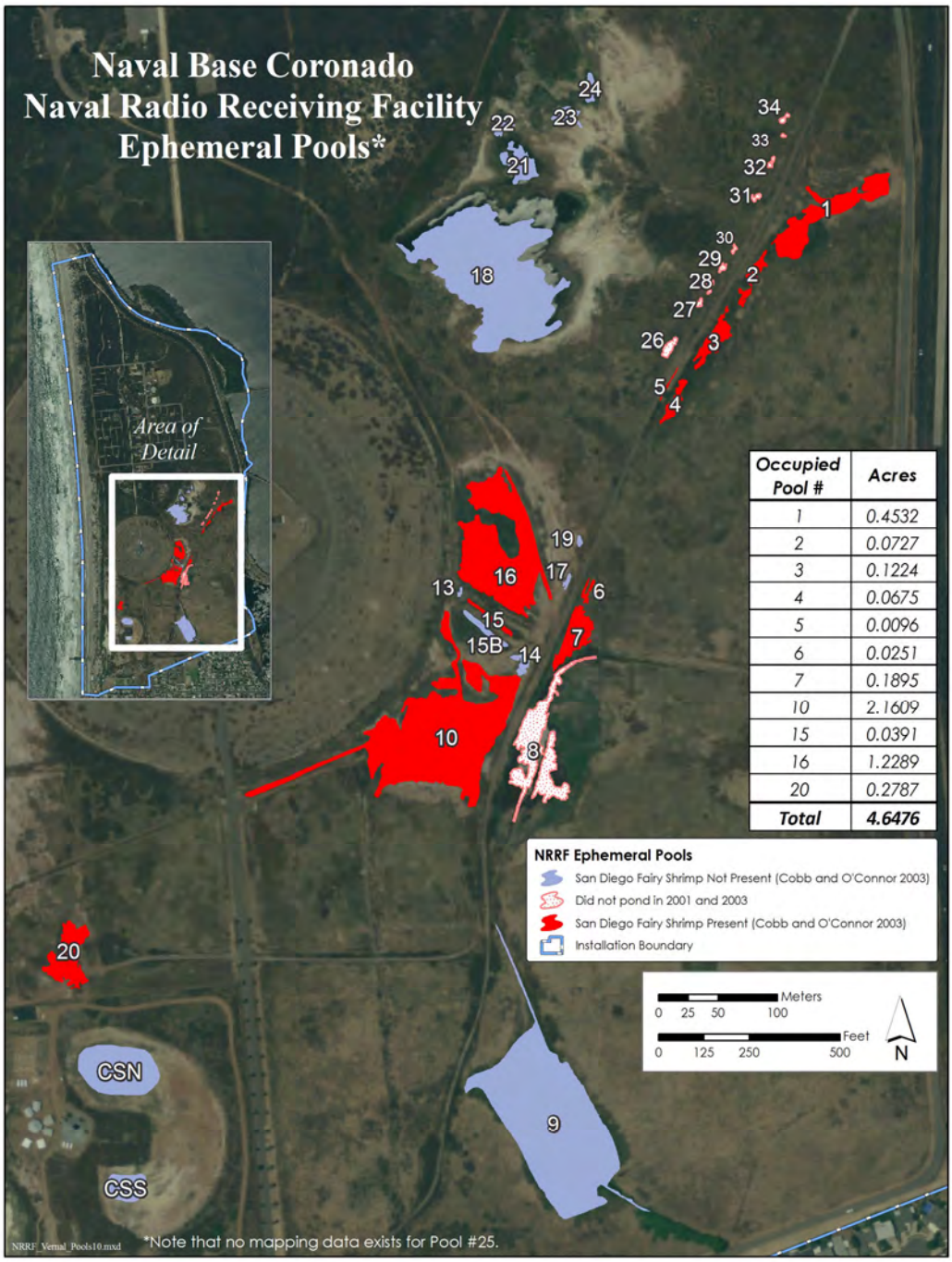
Table 15: Western Snowy Plover Winter Window Survey Results

Location	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
NASNI	37	60	81	59	60
Coronado	0	0	0	0	0
SSTC-N (NAB Ocean)	60	86	123	77	96
Delta Beaches	-	-	-	-	52
Silver Strand State Beach	-	14	0	0	0
SSTC-S	34	0	17	21	21
Action Area-Wide	131	160	221	157	229
San Diego County-Wide	518	466	671	405	349
Recovery Unit 6	870	895	1166	693	684
Pacific Coast	4522	3426	4261	3546	3290

San Diego Fairy Shrimp

The San Diego fairy shrimp surveys at the SSTC-S Inland were done during the winter of 2000-2001 and in February through May 2003. Of the 35 ephemeral pools surveyed, 11 pools [1.9 ha (4.6 ac)] were occupied by San Diego fairy shrimp (Figure 10) (DoN 2001, DoN 2003). However, six pools where San Diego fairy shrimp have not been found were not surveyed according to Service protocol and no other surveys have been completed to date, so the current distribution of San Diego fairy shrimp at SSTC-S Inland is uncertain. Most of the occupied pools are less than 0.08 ha (0.2 ac) in size, while 3 pools are 0.4 to 0.8 ha (1 to 2 ac) in size. Most of the smaller pools occur on either side of a road that traverses the area. The SSTC-S pools were not known to be occupied by the San Diego fairy shrimp at the time the VP recovery plan (Service 1998) was completed, and so they are not identified in that recovery plan as part of a recovery unit.

Figure 10. Location of Vernal Pools at SSTC-S



Under current conditions, no activity is allowed in vernal pools, and vehicle traffic adjacent to vernal pools is limited to paved roads, with the exception of infrequent emergency/security vehicles that may travel through pools 5 and 20, which lie within unpaved roads. SSTC-S is fenced, which helps prevent unauthorized public access to the vernal pools under baseline

conditions. Vehicle traffic has occurred within SSTC-S Inland, based on the presence of vehicle tracks observed during the site visits conducted in support of this consultation (Sandy Vissman, personal observation, 2009). With the exception of unauthorized activities and infrequent emergency/security vehicle use described above, San Diego fairy shrimp at SSTC-S Inland are not subject to direct human impacts under current conditions.

The vernal pools at SSTC-S are of interest because adjacent pools apparently have very different salinities. Immediately adjacent to some pools that support San Diego fairy shrimp are saline pools that support pickleweed (*Salicornia sp*) and brine shrimp (*Artemia sp.*). The baseline hydrology and water quality of the different pools on the base has not been determined. The pools likely benefit from the general weed monitoring and management activities that are conducted at SSTC-S Inland under baseline conditions; however, no focused assessment or management of the pools is conducted under baseline conditions.

EFFECTS OF THE ACTION

1. General Effects

Proposed changes in training activities and associated management strategies will increase the level of training activity and related disturbance in areas occupied by the least tern, snowy plover, and San Diego fairy shrimp. In general, the proposed increases in training will result in:

1) increased human and vehicle activity and disturbance on action area beaches and the SSTC-S Inland Area;
2) increased boating activity and training disturbance in the nearshore bay and ocean waters;
3) increased aircraft activity over land and water; and
4) introduction of military working dogs to SSTC-N Beach, SSTC-S Beach and SSTC-S Inland

Training may occur both day and night. The extent to which increased frequency of training and associated disturbance will affect the least tern, snowy plover and San Diego fairy shrimp is difficult to predict because the current location, timing, and frequency of training exercises is not tracked to determine whether or how a particular training activity or group of activities is impacting the specific distribution and abundance of terns, plovers and fairy shrimp within the action area. Thus, our ability to equate the observed level of incidental take under current conditions to a particular level of human activity is limited.

Increased Human and Vehicle Activity on Beaches and SSTC-S Inland Area

Although the exact number of terrestrial activities conducted in each part of the action area under current conditions is not available (Delphine Lee 2009a), an approximation of the “baseline” and future increased frequency of each terrestrial activity has been provided in the BA and included in Table 1. Each numbered training exercise identified in Table 1 includes a breakdown of the terrestrial activities that will occur as part of each training exercise.

We focused our analysis on the training activities that are proposed to occur during the peak tern and plover breeding season, which occurs roughly from April 1 through July 31, or approximately 4 months of each year. To approximate the baseline level of terrestrial activity within different parts of the action area and provide a basis for comparison to the proposed action, we used information provided in the BA and during consultation. For our analysis, we presumed that training activities take place at a constant rate throughout the year, so the number of activities expected to take place during the 4-month peak breeding season corresponds to one third of the annual total. Figures that depict an approximation of the footprint of each type of terrestrial activity are provided in Appendix A. We used the expected frequency and footprint of each activity to approximate the likely increase in use that would be expected given the proposed increases in training and the proposed scheduling priorities. Increase in the level of human disturbance will not occur immediately, but it is likely to occur gradually or intermittently as training needs change.

SSTC-N Beach

The effect of the increase in training disturbance associated with the proposed action will depend primarily on where the various activities are scheduled in relationship to distribution of the tern and plover. Each type of training exercise and associated marine or terrestrial activity typically occurs in beach or ocean lane(s) particularly suited for the exercise (Table 16, Table 17). For example, since the Yellow beach lanes are closest to classroom facilities, offices, quarters, and physical fitness equipment, many physical fitness training activities occur in these beach lanes. Many activities that entail heavy equipment use beach lanes Green 1, Green 2 and Blue 1 due to the proximity of the access gate off of Highway 75 and resulting lower transit time associated with accessing the beach. As a result of the higher suitability of particular training lanes for particular training activities, the level and type of human, dog and vehicle activity across the SSTC-N Beach varies by beach lane, so the increase in disturbance will vary accordingly. Many activities will occur primarily in the hard-packed beach area or on the beach above the high tide line, but below the beach crest. Based on the figures provided in Appendix A and information from Table 1, most training activities are conducted less than 60 m (196.85 ft) inland of the beach crest. The proposed continuation of the current scheduling preferences and practices (scheduling activities in suitable beach lanes that support fewer nesting birds when mission compatible) is likely to result in an overall training footprint that is similar to that observed under baseline conditions. However, the increase in the number of exercises is likely to increase the area affected, since training routes are not defined, and each exercise may result in foot or vehicle traffic over a slightly different area within the general footprint. In addition, the need for increased training flexibility is likely to contribute to some increase in the observed training footprint.

Information is available regarding specific impacts to terns and plovers (i.e., numbers of birds killed or injured, nests lost, etc.) from current levels of training activities within occupied nesting habitat. The effect of the increase in training disturbance associated with the proposed action will depend primarily on where the various activities are scheduled in relationship to distribution of the tern and plover. An analysis of the spatial distribution and frequency of baseline training

activities was not provided in the BA; however, information from the BA and provided during consultation was used to estimate the baseline frequency and distribution of training to allow comparison to anticipated future training.

At SSTC-N Beach, the level of training activity is likely to increase approximately 23 percent over the identified baseline, resulting in approximately 747 more activities on the SSTC-N Beach each year than occur under baseline conditions (Table 16). Thus, approximately one third of the annual total, or 249, more activities are expected to occur on the SSTC-N Beach during the 4-month peak breeding season under full implementation of proposed training increases. The biggest increase in the number of activities during the peak breeding season will result from an additional 141 training activities requiring logistical and safety vehicle presence on the beach, followed by a significant increase in foot traffic within beach lanes as part of reconnaissance, observation post, foot patrol and ambush, and vehicle patrol activities (Table 16).

Table 16. Anticipated Change in Frequency of Terrestrial Activities at SSTC-N Beach

Terrestrial Activity	**Total Baseline/ Proposed Annual Activities (from Table 1)**	**Percent of Total Activities that are on SSTC-N****	**Baseline SSTC-N Annual Activities***	**Baseline SSTC-N Activities April 1-July 31****	**Proposed SSTC-N Annual Activities**	**Proposed SSTC-N Activities April 1 - July 31**	**Anticipated Increase in Number of Activities April 1-July 31 (percent increase)**	**Anticipated Lanes Used, North to South*****
Beach Party Teams	**202/ 226**	**100%**	**202**	**68**	**226**	**75**	**7 (1)**	Red 1-Orange 1 (7 lanes)
MCM Beaching	**32/ 58**	**10%**	**3**	**1**	**6**	**2**	**1 (100)**	Blue 1 and 2 (2 lanes)
Beach Camps	**1/ 2**	**100%**	**1**	**0**	**2**	**0**	**0 (0)**	Green 1 and 2 (2 lanes)
Equipment Offload/Stage	**2/ 4**	**100%**	**2**	**1**	**4**	**1**	**0 (0)**	Green 1 and 2 (2 lanes)
Causeway/ ELCAS	**12/ 15**	**80%**	**10**	**3**	**12**	**4**	**1 (33)**	Green 1 and 2 (2 lanes)
LCAC Landing	**4/ 4**	**100%**	**4**	**1**	**4**	**1**	**0 (0)**	Green 2 (1 lane)
Beach Crossing and OTB	**444/ 526**	**50%**	**222**	**74**	**263**	**88**	**14 (19)**	Yellow 2-Blue 1 (6 lanes)
Raids	**60/ 60**	**50%**	**30**	**10**	**30**	**10**	**0 (0)**	Yellow 2-Green 2 (5 lanes)
Foot Patrol and Ambush	**139/ 238**	**50%**	**70**	**23**	**119**	**39**	**16 (70)**	Red 1-Blue 1 (5 lanes)
Vehicle Patrol	**1/ 51**	**75%**	**1**	**0-1**	**38**	**13**	12 (1200)	Yellow 1 and 2, Green 1 and 2 (4 lanes)
Observation Post	**50/ 84**	**100%**	**50**	**16**	**84**	**28**	**12 (75)**	Red 1-Green 2 (4 lanes)

Reconnaisance	**141/ 236**	**100%**	**141**	**51**	**236**	**80**	**29 (57)**	Red 1- Green 2 (4 lanes)
Logistic and Safety Vehicles	**2065/ 2628**	**75%**	**1549**	**516**	**1971**	**657**	**141 (27)**	Red 1-Blue 1 (5 lanes)
Running	**948/ 952**	**90%**	**853**	**284**	**857**	**286**	**2 (1)**	Yellow 1- Orange 2 (10 lanes)
Manual Excavation	**68/ 102**	**90%**	**61**	**20**	**92**	**31**	**11 (55)**	Red 1-Green 2 (4 lanes)
Visual Observations	**156/ 160**	**50%**	**78**	**26**	**80**	**27**	**1 (4)**	Yellow 1 and 2 (2 lanes)
SSTC-S Off road Foot		**0%**	**0**	**0**	**0**	**0**	**0**	none
Total	**4325/ 5346**		**3277**	**1092**	**4024**	**1341**	**249 (23)**	

** Number of annual terrestrial activities derived from Table 1 and Table 2. Annual number was determined by summing all training exercises that included the terrestrial activity. This does not calculate 'beach days', as some training exercises may entail more than 1 day of terrestrial activity. Annual number in SSTC was multiplied by the percentage conducted at SSTC-N to obtain number of activities at SSTC-N. This number was divided by 3 to determine the number proposed for the 4-month period that coincides with the peak of the breeding season (April 1-July 31).*

*** The percentage of activities anticipated at SSTC-N represents a "worst-case scenario" percentage breakdown with training activities biased towards SSTC-N Beach lanes.*

**** 'Anticipated Lanes used' include the two listed lanes and all lanes in between, e.g,. 'Red 1- Blue 1' indicates that the activity takes place in Red 1, Red 2, Green 1, Green 2, and Blue 1. Beach lanes listed are those anticipated for use for each type of activity, however training may occur in other lanes depending on the scenario and the lanes presented for each activity are not fixed training requirements/restrictions.*

Table 17: Anticipated Average SSTC-N Terrestrial Activities by Beach Lane ("Baseline" number of activities is indicated in parentheses*) From April 1-July 31

Training Activity	Y 1	Y 2	R 1	R 2	G 1	G 2	B 1	B 2	O 1	O 2	**SSTC-N Proposed Total**
1.Beach Party	0 (0)	0 (0)	2 (2)	5 (5)	19 (17)	37 (33)	11 (11)	1 (0)	0 (0)	0 (0)	75 (68)
2.Safety/Logistical Vehicles	**85 (69)**	**88 (71)**	**103 (79)**	**69 (51)**	**62 (46)**	**67 (50)**	**50 (41)**	**44 (36)**	**44 (36)**	**44 (36)**	**657 (516)**
3. Beach Camp	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
4.Patrolling (Vehicle)	3 (1)	3 (0)	0 (0)	0 (0)	3 (0)	3 (0)	0 (0)	0 (0)	0 (0)	0 (0)	13 (1)
5.Patrolling (Foot) and Ambushes	3 (2)	7 (4)	7 (4)	7 (4)	7 (4)	7 (4)	3 (2)	0 (0)	0 (0)	0 (0)	39 (23)
6.Beach Crossing (OTB)	0 (0)	7 (6)	29 (25)	29 (25)	7 (6)	7 (6)	7 (6)	0 (0)	0 (0)	0 (0)	88 (74)
7.Observation Posts	0 (0)	0 (0)	9 (5)	9 (5)	5 (3)	5 (3)	0 (0)	0 (0)	0 (0)	0 (0)	28 (16)
8.Reconnaissance	0 (0)	0 (0)	27 (17)	27 (17)	13 (9)	13 (9)	0 (0)	0 (0)	0 (0)	0 (0)	80 (51)
9.Raids	0 (0)	1 (1)	3 (3)	3 (3)	2 (2)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	10 (10)
10.Equipment Offload/Staging	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
11.Causeway/ELCAS	0	0	0	0	2 (1)	2 (2)	0	0	0	0	4 (3)
12.MCM Beaching Op	0	0	0	0	0	0	1 (1)	1 (0)	0	0	2 (1)
13.LCAC Landing	0	0	0	0	0	1 (1)	0	0	0	0	1 (1)
14.Running	286 (286)	286 (286)	286 (286)	159 (159)	159 (159)	159 (159)	159 (159)	159 (159)	159 (159)	159 (159)	286 (286)
15.Manual Excavations	0	0	10 (7)	10 (7)	5 (3)	5 (3)	0	0	0	0	31 (20)
16.Visual Observations	14 (13)	14 (13)	0	0	0	0	0	0	0	0	27 (26)

Total Number of Activities	Y 1	Y 2	R 1	R 2	G 1	G 2	B 1	B 2	O 1	O 2
A. Proposed Total	**391**	**405**	**477**	**319**	**286**	**309**	**232**	**205**	**203**	**203**
B. Baseline Total	**371**	**381**	**428**	**276**	**250**	**271**	**220**	**195**	**195**	**195**
C. Increase in Total Number of Activities (Row A minus Row B)	20	14	49	43	36	38	12	10	8	8
D. Increase in total number of activities per month (Row C/ 4)	5	4	12	11	9	10	3	3	2	2
E. Proposed Total not including safety vehicles (Row A minus Row 2)	306	317	374	250	224	242	182	161	159	159
F. Baseline Total not Including Safety Vehicles (Row B minus Row 2)	302	310	349	225	204	221	179	159	159	159
G. Proposed Total not including safety vehicles and running events (Row E minus Row 14)	**20**	**31**	**88**	**91**	**65**	**83**	**23**	**2**	**0**	**0**
H. Baseline Total not including safety vehicles and running events (Row F minus Row 14)	**16**	**24**	**63**	**66**	**45**	**62**	**20**	**0**	**0**	**0**
I. Increase in Total not including safety vehicles and running events (Row G minus Row H)	4	7	25	25	20	21	3	2	0	0
J. Monthly increase in number of events not including safety vehicles and running events (Row I/4)	1	2	6	6	5	5	1	1	0	0

The information provided in Table 17 allows for a rough assessment of the anticipated increase in the level of training activity in SSTC-N beach lanes that would be necessary to fully meet training requirements under the proposed action. The information included in the table is based on the number of activities provided in the BA, but it does not consider the length of various activities. Some activities could extend over more than one day, while others last for a shorter time period. In addition, the "baseline" information in the table may not reflect the actual level

of activity on the beach at the present time, since troops are currently deployed overseas and/or training in desert areas, and the training that is currently being conducted is considered below the baseline (DoN 2008). This assessment, however, provides a general depiction of the anticipated changes in the number of activities expected over the "baseline." No information is available on the actual current level of training for comparison to the "baseline."

Safety/logistical vehicle use and running events are the most frequent training activities at SSTC-N Beach (Table 17), and they occur primarily on the hard packed portion of the beach where the substrate is more stable and suitable for travel. Both of these activities entail primarily linear travel along the tide line, rather than travel from the water to the more landward portion of the beach above the crest. For safety/logistical vehicle activities, the focus of the activity is usually a swimming/boating event that is in the ocean, or a running event that is traveling along the beachfront. The anticipated frequency of SSTC-N Beach training activities that include use of logistical/safety vehicles (Table 17, Row 2) will increase from 516 events per year to 657 events per year. The frequency of running events (Table 17, Row 14) will not increase but will remain at 286 events per year. The route of travel for most of these activities is expected to avoid the portion of the beach used for nesting by terns and plovers. However, in instances where high tide or improved vantage point (for safety vehicles) necessitates use of the area above the beach crest, however, these activities may extend into the tern and plover nesting area.

Terrestrial activities that may involve use of heavy mechanized equipment on the beach include exercises with a mechanized Beach Party (Table 17, Row 1), Beach Camp (Row 3), Raids (Row 9), Equipment Offload (Row 10), Causeway/ELCAS (Row 11), and LCAC (Row 13). These activities are less frequent than running or logistical/safety vehicle use, but they have a footprint that is more likely to extend into tern and plover nesting areas above the crest (see Appendix A). In addition, mechanized equipment may produce noise that increases the sphere of disturbance associated with the activity. Most of these activities occur in beach lanes Green 1 and Green 2 and Blue 1 under current levels of training, and anticipated increases in these types of training are expected to remain primarily in these lanes. Based on discussion with training operators, Beach Party activities may also extend into beach lane Blue 2 on an infrequent basis to meet training needs. If such activities are conducted in beach lane Blue 2, the impact to terns and plovers is likely to be greater than in other beach lanes that support fewer nesting terns and plovers.

Vehicle Patrol (Table 17, Row 4), a new training activity for SSTC-N, is proposed within beach lanes Yellow 1, Yellow 2, Green 1, and Green 2. This activity entails groups of up to 20 people in 6 light-wheeled vehicles driving throughout the beach lane for familiarization with driving techniques and vehicle walk-through. The footprint for this activity includes the entire beach lane inland of the beach crest and thus will extend across tern and plover nesting habitat (Appendix A). This activity is likely to increase the amount of disturbance in these lanes. To minimize the higher degree of impact associated with this new activity, the Navy will only conduct this activity in the beach lanes that typically support fewer tern and plover nests and are already intensively used for other training activities (i.e., Yellow 1 and Yellow 2, Green 1 and

Green 2). Vehicle patrols could occur up to 13 times during the peak breeding season, dispersed through the 4 beach lanes in which they may be conducted.

Several types of terrestrial activity entail foot traffic and maneuvering or positioning personnel above the beach crest. Although these activities do not involve heavy equipment, they could potentially result in significant impacts to nesting terns and plovers depending on the exact route of travel. Terrestrial activities that involve foot traffic above the beach crest traveling in a non-linear fashion include Patrolling and Ambushes (Table 17, Row 5), Beach Crossing (Row 6), Observation Posts (Row 7), Reconnaissance (Row 8), and some Raids (Row 9). Approximations of the training footprints for these activities are provided in Appendix A. Activities that involve foot traffic above the beach crest are expected to increase in the northern 7 SSTC-N beach lanes (i.e., Yellow 1 to Blue 1), including Red 1 and Red 2. Beach lanes Red 1 and Red 2 support a higher nesting density than other active training lanes under baseline conditions, so the relative effect of increasing activities in these beach lanes is likely to be higher than the increases in other training lanes. In addition, the routes of travel for these training activities are expected to vary since there will be no defined routes of travel. Since the exact footprint may change each time the activity is conducted, the cumulative footprint of all of the training activities may be relatively large. Under current conditions, however, numerous foot traffic training activities occur in beach lanes Red 1 and 2, yet the abundance of least tern and snowy plover nests in these lanes is relatively high, approaching the abundance in the lanes that are currently protected from disturbance during the tern and plover breeding season. In summary, approximately 1 to 6 more training events each month during the tern and plover breeding season (not including the more frequent running and linear logistical/safety vehicle travel along the shore) could occur in the northern 7 SSTC-N beach lanes (i.e., Yellow 1 to Blue 1) under full implementation of the proposed increases in training frequency (Table 17).

Under baseline conditions, the Navy implements an impact minimization measure that excludes training on the southern 3 SSTC-N beach lanes (i.e., Blue 2, Orange 1, and Orange 2) during the tern and plover breeding season (FWS-SDG-3452.3). To accommodate the proposed increases in training, the southern 3 beach lanes may be needed for training activities during the tern and plover breeding season. The southern 3 beach lanes would only be needed infrequently for training since adequate space to accommodate most training exercises is available within the other 7 training lanes at SSTC-N (discussed above) and 4 training lanes at SSTC-S, and additional training in these lanes to increase flexibility is expected to be infrequent.

The Navy anticipates that under full implementation of the proposed action, training activities that include running and the use of logistical or safety vehicles could occur in the southern 3 lanes during the tern and plover breeding season, if other suitable lanes are unavailable, or in instances where flexibility or realism necessitates use of these lanes. We expect that most running and safety/logistical vehicle activities on beach lanes Blue 2, Orange 1, or Orange 2 will occur on the hardpack and in a linear fashion that parallels the beach outside of nesting areas. If these linear activities require access onto the nesting area inland of the beach crest, it will likely be infrequent and occur in a corridor parallel to the ocean extending approximately 15 m (16 yd) inland of the crest (Appendix A). These activities could still avoid tern and plover nests if

personnel conducting the exercise are aware of the nest locations; however, the proposed action does not include a marking technique for the southern 3 beach lanes, which will increase the potential for running foot traffic and vehicles to crush nests, chicks, or eggs. The Navy also anticipates that approximately one MCM beaching operation and six beach party team training activities may be necessary during the breeding season in beach lane Blue 2. The single anticipated MCM operation is expected to cause only minor impacts because it typically has a very small footprint, few personnel, and occurs on the hard-pack outside of nesting areas. The six beach party team activities could significantly disrupt tern and plover nesting on the beach due to the heavy equipment and number of people typically present during this type of operation, particularly if personnel are not aware of nest locations. The absence of some type of marking to notify personnel on the beach of the location of the densest nesting locations is likely to result in a higher level of foot traffic activity in these areas.

Increases in training activities associated with implementation of the proposed action are not anticipated until "after the war"; however, some use of the southern 3 lanes may be necessary prior to the anticipated increases to meet training requirements. The level of training at SSTC-N will likely be dynamic and vary between years. In some years, the southern 3 beach lanes may not be necessary for training, while in other years use could include more and different activities than predicted.

SSTC-S Beach and Inland

Data regarding the frequency of training activity at SSTC-S Beach was not provided during consultation; however, data was provided regarding the total number of terrestrial activities anticipated at SSTC and the percentage of the SSTC terrestrial activities that would be conducted at SSTC-N. To assess the level of baseline use at SSTC-S and the expected change in training frequency in this area, we assumed that all activities not conducted at SSTC-N would be conducted at SSTC-S. We recognize that this assumption is not completely accurate since some activities may actually be conducted in areas other than SSTC-N or SSTC-S; however, no other data is available to allow us to assess the anticipated increases in training in this area associated with the proposed action. With this assumption, we anticipate that training activity at SSTC-S Beach is likely to increase approximately 50 percent over the identified baseline, resulting in approximately 212 more activities on the SSTC-S beaches each year during the peak breeding season than occur under baseline conditions (Table 18). The most significant increase is expected to be in foot patrol and ambush activities, which will increase 243 percent from approximately 23 to 79 activities each peak breeding season. Although low in number, logistical and safety vehicle use and vehicle patrol activities are new activities expected to be introduced into the area above the beach crest at SSTC-S.

SSTC-S Inland includes a more developed northern section and a less developed southern section, as described in the Environmental Baseline section. Although many new operations are proposed for SSTC-S Inland, the majority of these operations will occur within the more developed northern section in order to use the facilities available in that part of the installation. Under baseline conditions, no foot traffic is allowed off road in and around the vernal pools

occupied by the San Diego fairy shrimp in the undeveloped southeastern portion of SSTC-S Inland SSTC-S Inland. The proposed action will, however, increase use of the less developed southern portion of SSTC-S and includes the potential for off-road foot traffic in SSTC-S when the vernal pools are dry, as determined by the NASNI NRO Botanist. For the purposes of our assessment, we estimated that pools would be dry for 7 to 11 months out of each year and that activities would occur evenly throughout the year. During this time period, the southern part of SSTC-S Inland could be subject to approximately 266 to 422 operations that could entail foot traffic, including parachute drops, through the area (Table 18). Parachute drop zones or other ingress and egress points have not been identified, so likely future travel patterns are unknown.

Table 18. Change in Anticipated Frequency of Terrestrial Activities at SSTC-S*

Terrestrial Activity	**Total Baseline/ Proposed Annual Activities (from Table 1**	**Percent of Total Activities that are on SSTC-S****	**Baseline SSTC-S Annual Activities***	**Baseline SSTC-S Activities April 1 - July 31**	**Anticipated SSTC S Annual Activities**	**Anticipated SSTC-S Activities April 1 – July 31**	**Anticipated Increase in Number of Activities April 1 - July 31 (percent increase)**
Beach Party Teams	**202/ 226**	**0**	**0**	0	0	0	0
MCM Beaching	**32/ 58**	**90%**	□□□□10	10	52	17	7 (70)
Beach Camps	**1/ 2**	**0**	**0**	0	0	0	0
Equipment Offload/Stage	**2/ 4**	**0**	**0**	0	0	0	0
Causeway/ ELCAS	**12/ 15**	**20%**	**0**	0	0	0	0
LCAC Landing	**4/ 4**	**0**	**0**	0	0	0	0
Beach Crossing and OTB	**444/ 526**	**50%**	**216**	72	263	87	15 (21)
Raids	**60/ 60**	**50%**	**30**	10	30	10	0
Foot Patrol and Ambush	**139/ 238**	**50%**	**70**	23	238	79	56 (243)
Vehicle Patrol	**1/ 51**	**25%**	**0**	0	13	4	4 (na)
Observation Post	**50/ 84**	**0**	**0**	0	0	0	0
Reconnaisance	**141/ 236**	**0**	**0**	0	0	0	0
Logistic and Safety Vehicle	**2065/ 2628**	**25%**	**569**	189	668	227	38 (20)

Running	**948/ 952**	**10%**	**95**	32	95	32	0
Manual Excavation	**68/ 102**	**10%**	**7**	2	10	3	1 (50)
Visual Observations	**156/ 160**	**50%**	**78**	26	80	27	1 (4)
Total	**4325/ 5346**	**NA**	**1094**	364	1449	486	122 (34)
SSTC-S INLAND FOOT TRAFFIC							
Activity	**Baseline/ Proposed**	**Percent at SSTC-S**	**Baseline Annual Activities**	**Baseline Annual Activities in Vernal Pool Area**	**Anticipated Annual Activities in vernal pool area and developed area)**	**Anticipated Activities during dry periods (i.e., 7 to 11 months of year)**	
SSTC-S Off road Foot	**422/459**	**100%**	**422**	*0*	459	*266 to 422*	

- ** This table assumes that all activities other than those at SSTC-N would occur at SSTC-S, and thereby potentially overestimates the number of activities at SSTC-S under baseline and proposed training frequencies. Specific data regarding the level of use at areas outside of SSTC-N was not available.*
- *** The estimated percentage is a maximum. The percentage of activities conducted in SSTC-N was subtracted from 100% to obtain the percentage in this column.*
- **** Pools are likely to be dry for7 to 11months of the year. This time period differs from the other numbers in the column, to reflect the time period of concern in the vicinity of vernal pools. The duration of dry conditions will vary from year to year, sometimes significantly. This number is used to provide a general estimate of the level of foot traffic anticipated,*

NASNI Beach

Information regarding the baseline and proposed level of use at NASNI Beach was not explicitly provided in the BA; however, based on Table 1, use of NASNI Beach is expected to increase as part of the proposed action. Three hundred twenty-four (324) training exercises, under baseline levels of use, include NASNI Beach as one of the potential locations where the exercise could be conducted (Table 1). Under the proposed action, the number of training exercises that include the NASNI Beach as a potential training location could potentially increase to 370, although no new activities are proposed for this part of the action area (Table 1, Table 2).

City of Coronado Beach

No numerical information is available regarding the baseline or proposed level of use at the City of Coronado Beach. Use of the City of Coronado Beach is infrequent and involves linear foot travel of small groups or individuals along the beach from NASNI to SSTC-N. The frequency of use is not expected to substantially increase, based on discussions during consultation (Tamara Conkle 2009).

Silver Strand State Beach

No numerical information is available regarding the baseline or proposed level of use at Silver Strand State Beach. Use of the Silver Strand State Beach is infrequent and involves linear travel of vehicles or foot travel by small groups or individuals along the beach from SSTC-N through SSSB en route to SSTC-S. Personnel and vehicles that use Silver Strand State Beach for transit stay outside of the marked and protected area. The frequency of use of SSSB is not expected to substantially increase, based on discussions during consultation (Tamara Conkle 2009).

Increased Boating Activity and Training Disturbance in San Diego Bay and Pacific Ocean Waters

Quantification of the current human use within action area bay and ocean waters is unavailable; however, the action area waters are already subject to a relatively high level of human activity associated with recreational use, commercial use, and military training. The proposed action will increase the level of in-water activity in waters that lie within the action area. Activities that are conducted exclusively in-water will increase from 999 to 1,584 activities per year (i.e., 59 percent) (from information in Table 1 and Table 2).

In-water activities include the operation of large motorized vessels, small watercraft, underwater demolitions, as well as swimming operations involving small groups of people. Specific information regarding the baseline level of activity and relative increases of various types of activity in different portions of the action area is not available. However, each individual training event in the marine portion of the action area will involve use of a relatively small discrete area compared to the overall size of the action area. We presume that the level of disturbance created by the increase in boating and swimming activity will be insignificant compared to the overall baseline level of boating and swimming activity within the action area. The increases associated with the proposed action will, however, contribute to the incremental increases in human disturbance in San Diego Bay and the nearshore ocean waters.

Exercises that include potential for underwater demolition activities will increase approximately 48 percent from approximately 398 to 759 times per year. Activities will be conducted in the ocean waters adjacent to SSCT-S and SSTC-N, but they will not occur within the waters of San Diego Bay.

Increased Aircraft Activity Over Land and Water

The number of activities that entail helicopter use is projected to increase as part of the proposed action. Under baseline conditions, approximately 754 sorties are flown per year for SSTC training with an estimated 80 percent of these activities extending over the water. Helicopter sorties would increase by approximately 110 percent to an estimated 1,508 sorties per year. Helicopter travel will increase over San Diego Bay as helicopters travel from NASNI and NAB to training areas in SSTC-N (bay-side boat training lanes) or SSTC-S Inland (Figure 1a). The number of sorties over San Diego Bay will increase from approximately 100 to 150 per year to

350 to 400 per year. Helicopters will travel below 152 m (500 ft) above ground level when enroute down the bay and will travel over waters that are within the boundaries of the South San Diego Bay Unit of the San Diego Bay NWR. Helicopters will not hover at low altitude directly over the beach and will land only within the existing designated landing area at NASNI and Turner Field (inside the Bayside compound of NAB) and the northern inland portion of SSTC-S.

Helicopter rotors create high velocity air movement and noise that may disturb birds or other wildlife. Some studies on shorebirds and seabirds have detected only minor, short duration disturbances associated with nearby helicopter activity (Kushlan 1979, Johnston 1995). Helicopters that are enroute to action area destinations will be travelling rapidly, primarily over the water. Birds may react to the passing helicopter by becoming alert, running, or flushing. Since these aircraft will: 1) not usually be passing directly over the nest sites on land; 2) will not hover over the beach, and; 3) will land only in the existing designated landing area, the potential disturbance associated with the aircraft travel and associated impacts to nesting birds will be reduced The noise and potential disturbance associated with aircraft travel is, however, expected to incrementally reduce the suitability of the adjacent nest sites by contributing to the level of human activity in the area. In addition, helicopters will pass over nest sites on the beach at NASNI and at SSTC-S. Birds that nest or forage under the flight path are likely to be subjected to increasing levels of disturbance as helicopter training increases. Aircraft may also hover over the water, which will lengthen the duration of the noise and rotor wash in discrete areas during training activities and may temporarily affect foraging behavior of birds in the bay or ocean.

Introduction of Military Working Dogs to SSTC-N, SSTC-S Beach, and Inland

The proposed action will result in regular presence of military working dogs on SSTC-N Beach and eventually at SSTC-S Beach once kennel construction is planned and completed. The presence of military working dogs is likely to disturb birds that use SSTC-Beaches for nesting, roosting, and foraging.

2. Species-Specific Effects

California least tern

Increased frequency training, and addition of new activities, will increase the level of human activity in the least tern breeding, roosting, and foraging areas within the action area and is likely to result in increases in disturbance, observed injury or death to individuals, and reduction in the reproductive success of least terns nesting at SSTC-N Beach.

Seabirds such as the least tern breed in colonies and are particularly sensitive to the presence of human activities within or near the colony (Chardine and Mendenhall 1998). Several studies have been done on the responses of seabirds and shorebirds to disturbance resulting from human activities (see reviews by Hockin et al. 1992, Carney and Sydeman 1999, and Nisbet 2000). In general, the responses of least terns to training activities are likely to be similar to the response of

other seabirds and shorebirds to similar human activities, although the responses of birds to human activities varies between species (Blumstein et al. 2005) and may depend on: the distance to and relative quality of other suitable sites; the relative risk of predation or density of competitors at alternate sites; and the investment that an individual has made in a site (Gill et al. 2001). Reactions to human activities in or around a seabird colony include: temporary changes in behavior or internal state such as heart rate; changes in habitat use; reduced adult attendance at nest sites; increased vulnerability to predation; alarm responses; decreased foraging and resting; increased movement and energy expenditure; reduced productivity; and permanent nest site abandonment (Smith and Visser 1993, Liley and Sutherland 2007, Ruhlen et al. 2003, Keller 1988, Chardine and Mendenhall 1998, Johnston 1995, Woodfield and Langston 2004). Population and/or fitness-enhancing behaviors, such as parental care and mating, may be detrimentally impacted in response to repeated disturbance, even when overt reactions to disturbance are not visible (Weston and Elgar 2007). Consequently, human activities may impact the reproduction, survival, and local population persistence of birds.

No assessment of least tern behavioral response to military training activities within or near nesting areas at SSTC-N has been conducted; however, examination of least tern response to military training activities was conducted at Camp Pendleton (Johnston 1995). Least terns nesting at undisturbed sites within Camp Pendleton spent significantly more time sleeping, brooding, and normally incubating than terns at training sites within Camp Pendleton. We expect that least terns nesting on SSTC-N beaches will exhibit behavioral responses similar to those observed at the training sites at Camp Pendleton. However, birds may also habituate to human activities (Baudains and Lloyd 2007, Lord et al. 2001), particularly if they do not result in predation events or nest loss. Based upon the continued use of the SSTC-N Beach for least tern nesting, roosting and foraging, it appears that some level of least tern habituation to the baseline level of human activity has occurred within the action area.

The effects of future changes in training activities on the least tern depend primarily on the footprint, timing, and frequency of training events during the breeding season in relationship to the least tern nest distribution. If the frequency of training activities in the immediate vicinity of tern nests increases, the potential for disturbance, harm or injury to least terns will increase. The dynamic nature of military training and least tern nesting complicates effects analysis regarding the proposed changes in training and management within the action area. Although generalities regarding the frequency and location of training activities may be estimated, as presented above (Table 16, Table 17), the exact number, timing, and location of future training events is unavailable. Likewise, baseline distribution of least tern nests is known, but future distribution within the action area may shift in response to reproductive failures or changes in topography or disturbance.

The Navy's ability to identify areas that are likely to support tern nests and schedule training activities outside of these areas is an important minimization measure that will reduce the impacts of future training activities. Due to the level of uncertainty regarding future training and tern distribution, our analysis regarding the effects of the proposed action is based on the following presumptions:

1) The models developed in support of the BA to predict future activity scheduling at SSTC-N Beach provide an accurate depiction of future activity levels and distribution of various training activities;
2) Training activities will be spaced evenly throughout the year;
3) Navy schedulers will be provided with weekly reports that depict nest abundance and distribution information and will use this information to bias activities with heavier beach use towards beach lanes with fewer nests, when it does not impact the realism of training or training needs;
4) Future terrestrial training needs in the southern 3 beach lanes at SSTC-N will be infrequent; and
5) Least terns will exhibit the same response to adjacent training activities that has been observed from 1994 to the present.

The proposed action will allow for increases in military training activities in and adjacent to the SSTC-N Beach and thereby reduce the suitability of this habitat to support least tern nesting. Approximately 51.92 ha (128.29 ac) of least tern habitat at SSTC-N Beach will be directly or indirectly affected by the proposed action (Table 6). The proposed action also calls for continued management of the Delta Beaches to encourage least terns to use of this site.

The effects of the proposed action on tern and plover nesting and roosting habitat that is included within the southern 3 beach lanes (i.e., Blue 2, Orange 1, and Orange 2 [6.44 ha (40.63 ac)] is of primary concern, since: 1) this area was marked and avoided during the breeding season under baseline conditions from 2005 to 2009 to provide an area free from human activity for nesting terns and plovers; 2) this area is used as a night roost by least terns; 3) this area supported an average of 6.3 percent of the U.S. rangewide least tern nests initiated annually from 2005 to 2009, and 4) no marking of this area and assurance of avoidance is proposed as part of the current Proposed Action.

From 2005 to 2009, the Navy trained in northern 7 beach lanes (i.e., Yellow1 to Blue 1) without marking or avoiding least tern nests that occur in these lanes. Frequent monitoring of the tern and plover nests within the beach lanes has been supported by the Navy, so information regarding recorded incidental take due to training activities is available. Information regarding the precise location and timing of training activities is, however, lacking.

Effects on Nesting

Proposed increases in the frequency and footprint of military training activities will result in increased frequency of foot, vehicle, and air traffic at SSTC-N Beach (Table 17) and increased air traffic in the vicinity of the Delta Beaches and the San Diego Bay NWR. The frequency of foot, vehicle, and air traffic will vary depending on the beach lane or location and is also likely to vary between years as training needs change. People and equipment may be present on the beach during the day and the night. Foot traffic, air traffic, and vehicle traffic at SSTC-N Beach and the Delta Beaches is likely to result in noise and/or potential disturbance that may affect the nesting behavior of least terns and reduce their ability to nest in some areas. Although an

increase in helicopter traffic is anticipated over South San Diego Bay Unit of Service's NWR, the distance between the route of travel and terns nesting at the NWR is approximately 2 km (1.2 miles). Therefore, we do not anticipate the increase in helicopter traffic over the bay to cause any appreciable disturbance to terns nesting at the NWR.

If terns nest in SSTC training lanes, nests may be crushed by foot or vehicle traffic, or left unattended or abandoned by adult terns due to disturbance. Nests that are unattended may also be exposed to increased predation risk, or reduced hatching rates from interruption of incubation. Least terns that are disturbed at night, particularly if vehicle headlights are approaching them, are likely to flush and fly erratically, sometimes towards the light (Brian Bonesteel 2009). Least terns that do flush and fly from nests will face increased exposure to nocturnal predators, such as burrowing owls *(Athene cunicularia*). If vehicles are driven through nesting areas at night without headlights, nesting adult terns may not flush in time to escape being run over. As the frequency of training increases at the SSTC-N Beach, it is likely that the overall suitability of the SSTC-N Beach for nesting will be reduced, particularly in beach lanes with frequent training activities above the beach crest. Beach lanes that continue to sustain low levels of training activity above the beach crest are likely to remain more suitable for nesting than other beach lanes due to the lower frequency of training activity.

The introduction of military working dogs to the SSTC-N Beach is of particular concern because seabirds and shorebirds respond more strongly to the presence of dogs than to the presence of people. Burger et al. (2007) reported that shorebirds studied in Delaware responded most strongly to the presence of dogs when compared to other types of disturbance and did not return to beaches following a disturbance by a dog. Dogs may respond to the presence of birds on the beach by chasing birds, causing further disturbance. The potential for military working dogs to chase shorebirds is reduced by the Navy proposal to keep the dogs on leash maximum of 3m (10 ft)] at all times, however Lord et al. (2001) provided experimental evidence that shorebirds perceive dogs, even leashed and muzzled, as posing more of a threat than humans and that shorebird avoidance response to dogs exceeds their response to humans. Dog walking may result in the displacement of native bird species (Banks and Bryant 2007).

The potential for military working dogs to encounter least terns during physical conditioning activities is reduced by the Navy proposal to enter and exit the beach only at beach lane Yellow 1, which is more intensively used under baseline conditions, supports little potential habitat, and does not currently support nesting least terns. Since military working dogs and dog handlers will not typically cross the beach with dogs, but will travel along the shoreline below the beach crest and mean high tide line, the potential for disturbing terns is also reduced. However, if training is conducted during at high tide, dogs will pass in proximity to tern nests and are more likely to illicit a behavioral response. In some instances, crossing the beach will be required and personnel and dogs will travel across the beach to the sand road along the inland border of the training lanes. Crossing the beach is likely to result in greater disturbance and impacts to least terns than running along the shoreline, since the dogs are likely to run toward and pass more closely to the tern nests. Traveling along some portions of the sand road is also likely to result in

disturbance to nesting terns, particularly in areas where there is a direct line of sight between the sand road and nearby nests.

As stated above, the Navy will conduct a study to assess the effects of military working dogs on tern and plover behavior and productivity prior to conducting exercising of the dogs in the southern 3 beach lanes at SSTC-N, or using military working dogs in OTB training activities at SSTC-N Beach. Results from this study will be used to determine whether use of dogs is likely to cause additional effects to terns and plovers and to develop additional conservation measures, if necessary.

If dogs are effectively restricted to areas below the crest and mean high tide line and the sand road, and if they maintain a rapid pace as they transit to the area, we do not anticipate that they will cause any measurable effect on tern use and productivity at SSTC-N Beach. However, if dogs come within proximity [i.e., 30 m (98 ft)] and in line of sight of nests, we anticipate that terns will flush from their nests and leave nests unattended for some period of time. It is unknown whether or not least terns will habituate to repeated exposure to passing leashed dogs over time. Based on studies of other bird species, it is likely that least terns will continue to exhibit a response to dogs that they see passing in proximity to their nests. Exposure of nests will increase the potential for predation by species such as the gull-billed tern and also increase the potential for other adverse effects from inadequate incubation or reduced parental care.

Least terns nesting at SSTC-N appear to be tolerant of some adjacent disturbances under the current levels of training (Table 10). Overall, the number of least tern nests on SSTC-N Beach has increased from 577 nests in 2004 to over 1,272 nests in 2009 (Table 10). Of this total, the number of nests within the northern 7 beach lanes increased from 294 to 469 (Table 10). This level of nesting activity has occurred at the site while the northern 7 beach lanes supported training activities during the breeding season, although the exact number of activities is unknown. During this time period, relatively few eggs or chicks have been recorded as harmed or killed as a result of training activities (Table 12) despite the training occurring in the northern 7 beach lanes. Under current conditions, the tern nests in the northern 7 beach lanes have not been marked for avoidance, but nest locations have been delineated with tongue depressors for monitoring purposes. Training personnel have been anecdotally reported to avoid tern nests in these lanes despite the lack of a requirement to do so (U.S. Navy 2009e). In addition, many of the training activities at SSTC-N Beach entail amphibious activities that may occur at adequate distance from the tern nesting activity to reduce the associated disturbance to a level acceptable by many least terns.

Least terns nesting at SSTC-N Beach also appear to respond to cumulative training disturbances by nesting more frequently on the portions of the training lanes that are subject to lower levels of disturbance (Table 10, Figure 7). From 2005 to 2009, the average nest density of 11.2 tern nests per ha (4.5 tern nests per acre) in the northern 7 beach lanes used for training during the breeding season (i.e., Yellow 1 to Blue 1) was lower than the average nest density of 31.1 tern nests per ha (12.6 tern nests per ac) observed in the southern 3 beach lanes that were not used for training during the breeding season (i.e., Blue 2, Orange 1, and Orange 2) (Figure 7) (Appendix E).

The lowest densities of terns at the SSTC-N Beach occur within beach lanes Green 1, Green 2, and Blue 1, where larger training activities are prioritized, and beach topography has been modified to discourage nesting, and at Yellow 1, which hosts a small beach and is frequently used for physical fitness training (Figure 7). The projected 23 percent increase in training exercises (Table 16) is likely to increase the training footprint in the area, thereby by reducing the suitability of the site for nesting and increasing the potential for injury or death of least terns. Based on the lane-by-lane assessment of baseline and proposed training activities given above, the increase in training footprint is not expected to be extensive since most beach lanes will continue to support the same types of training activities as they have in the past and the number of activities conducted during the breeding season will not increase significantly in most beach lanes (Table 17).

The observed distribution and abundance of least terns across the SSTC-N Beach is consistent with observations elsewhere that show least terns can occur at relatively high numbers and densities adjacent to heavy use areas at small sites that are predictably free from regular foot, vehicle, and dog traffic (e.g. Venice Beach, Huntington Beach, Lindberg Field; CDFG 2008). The lower density observed within the most frequently used areas at SSTC-N is consistent with the lack of least tern nesting observed on recreational beaches (Service 2006), which are likely to have unpredictable and intensive human presence. For example, terns do not currently nest within the action area on the City of Coronado Beach, Silver Strand State Beach, or the SSTC-S Beach, which host more extensive human recreation activities and a higher frequency of potential disturbances than the SSTC-N or Delta Beaches. If future training use at SSTC-N Beach increases the frequency of potential disturbance to the level observed in the most frequently used beach lanes, Silver Strand State Beach, or the City of Coronado Beach, tern density throughout SSTC-N Beach might decrease to the 0 to 5 nest per ha (0 to 2 nests per acre) observed in these high use areas. However, disturbance from level of training activity proposed throughout SSTC-N Beach is not expected to approach the level of disturbance observed in the most frequently used beach lanes, or at the nearby recreational beaches (Table 16, Table 17).

Based on the anticipated frequency of training events and proposed prioritized lane scheduling in beach lanes that support fewer tern nests, training patterns and the resulting disturbance footprint is expected to remain similar to baseline conditions, with some exceptions, including a small number of activities that may occur in new locations (e.g., vehicle patrol in Yellow 2, Green 1, Green 2 and introduction of limited activities in Blue 2, Orange 1, and Orange 2). The most intensive training activities are expected to occur primarily in the beach lanes that have supported intensive activities in the recent past (Green 1, Green 2 and Blue 1), due to the Navy's proposed scheduling priorities. In addition, there remains uncertainty about when any increases in training use will be observed, since troops are currently deployed overseas far from these training areas.

If intensive training activities are underway on the SSTC-N Beach when least terns arrive in April, we anticipate that the terns will respond to the disturbance present on site and will initiate most nests away from areas that are repeatedly disturbed. Least terns that nest within the training footprint may suffer nest failure as a result of training activities and are likely to re-nest

at adjacent less disturbed sites on the SSTC-N Beach or Delta Beaches, or disperse to other sites within the San Diego Bay area (e.g. Salt Works, D Street Fill). We anticipate that least tern numbers and nest density will decline over time in areas that are subjected to repeated disturbances associated with increased training frequency. The numbers and density of least terns in adjacent less disturbed habitat is likely to increase as terns re-nest in these areas. Over time, we anticipate that least tern distribution will mirror the activity patterns on the beach, and that terns will continue to nest on the beach predominantly on the portions of the beach where less training and other human activities occur. Under the proposed action, few training exercises are expected in the southern 3 beach lanes at SSTC-N; consequently, we expect these lanes to support a higher proportion of the least tern nests on the SSTC-N Beach.

We expect the number of least tern nests to decline in beach lanes Yellow 2, Green 1, and Green 2, due to the anticipated increase in training frequency and the introduction of Vehicle Patrol training exercises. Vehicle Patrol exercises will entail vehicle travel across the beach in lanes Yellow 1, Yellow 2, Green 1, and Green 2 and could occur approximately 14 times total, or 3 to 4 times in each lane, per breeding season. The scope of the activity is likely to result in an increase in the number of eggs and chicks that are crushed each year during training events. Increased foot traffic may also disturb terns and cause them to relocate to less disturbed portions of the SSTC-N Beach. The Navy's proposal to limit the Vehicle Patrol exercises to the beach lanes that typically have fewer nests during the breeding season (i.e. Yellow 2, Green 1, and Green 2) will reduce the likelihood of injury or mortality to eggs, chicks, and adults associated with the activity.

Beach lanes Red 1 and Red 2 are likely to experience an increase primarily in the frequency of training-related foot traffic that extends beyond the beach crest and into the nesting area. Under baseline conditions between 2005 to 2009, an average of 243 least tern nests (ranging from 117-317) were established in beach lanes Red 1 and Red 2 (Table 10). Increased foot traffic in these beach lanes is likely to result in an increase in the number of eggs and chicks that are crushed each year during training events. Nest failure or disturbance from increased foot traffic may cause least terns to relocate to less disturbed portions of the beach. Overall, we anticipate that the increase in foot traffic in beach lanes Red 1 and Red 2 is likely to result in a reduction in the number of least tern nests observed in these lanes. Under baseline conditions, however, beach lane Red 1 is subject to a relatively high frequency of foot traffic (Group 1) activities, yet supports many least tern nests (Table 10, Figure 7). This pattern may continue, particularly if foot traffic activities occur repeatedly within the same area that is utilized for these activities under baseline conditions.

The most significant potential effect of the proposed action on the least tern is from future human activities within the southern 3 beach lanes that under baseline conditions from 2005 to 2009 have been marked and avoided during the breeding season (i.e., Blue 2, Orange 1 and Orange 2). This area currently provides a relatively consistent disturbance-free site to encourage nesting away from the most desired training areas. Under the proposed action, the current nest area marking techniques (flexistakes around the perimeter of the lane) will no longer be used. Instead, the Navy will mark only the eastern edge of these lanes to deter pedestrians that enter

the area from Highway 75 and mark the boundary between the SSTC-N Beach and Silver Strand State Beach by installing improved signage, a temporary barrier, and a guard shack equipped with a camera. The proposed boundary marking measures are expected to provide some level of deterrence to would-be recreational users; however, the absence of visible delineation around the nesting area may allow for increased foot and vehicle traffic into the nesting area if people travel onto the SSTC-N Beach or if linear vehicle or foot exercises stray above the crest into the nesting area. Even with perimeter signage, human intrusion unrelated to training has occurred within the southern 3 beach lanes and resulted in losses of up to 7 eggs/chicks (up to 4 nests) per year since 1999 (Table 12). We expect that such losses are likely to continue and may increase in the absence of markers delineating the southern 3 beach lanes and without intensified security to protect nesting sites. Depending on the effectiveness of markers in reducing non-training uses, and the effectiveness of beach lane scheduling, the southern 3 beach lanes may continue to be relatively undisturbed. However, the ability to facilitate and enforce avoidance where possible and appropriate (e.g., recreational activity, as well as physical fitness training and linear vehicle travel supporting in-water activities) will be reduced by the absence of perimeter markers around the nesting area. Without any delineation of the nesting areas, loss of eggs and chicks, which might be avoidable with clear delineation of the area as a nesting area, is more likely to occur during linear terrestrial activities including running exercises and logistical/support vehicle use.

Least terns often re-nest at the same sites year after year (Atwood and Massey 1988). From 2005 to 2009, the Navy trained in beach lanes Yellow 1 to Blue 1 (i.e., the northern 7 beach lanes) without marking or avoiding least tern nests, and many least terns have continued to nest in these beach lanes. The combined total number of nests that occurred in the northern 7 training beach lanes averaged 398 nests per year from 2005 to 2009, and the density of nests averaged 11.2 nests per ha (4.5 nests per ac)(Appendix E). Since the types of training activities conducted under the proposed action will be similar to those conducted under baseline conditions, we anticipate that least terns will continue to nest in beach lanes Yellow 1 to Blue 1 in spite of the increased disturbance and possible nest loss resulting from increased frequency of military training operations.

Likewise, we anticipate that least terns will continue to nest in the southern 3 beach lanes despite increased human activities associated with recreational uses and introduction of infrequent training activities into these lanes. The frequency of training is likely to remain low in the southern 3 beach lanes when compared to adjacent training lanes. Expansion of training into these lanes to resolve scheduling conflicts does not appear imminent, since troops are currently deployed overseas and training in desert areas, and the current training at SSTC is not even at "baseline" levels. Rather, in the near term, it is likely that infrequent training will only occur in these lanes to meet needs for training realism. Even when training returns to "baseline" levels and increases to meet future training needs, we expect relatively few activities to be necessary in the southern 3 beach lanes. Based on the lower expected frequency of training in these lanes and the fact that least terns have continued to nest in the northern 7 beach lanes despite training, least terns can be expected to continue to nest in high numbers (e.g. hundreds of nests) within the southern 3 beach lanes, Blue 2, Orange 1, and Orange 2.

It is likely that damage or destruction of nests, eggs, and chicks will continue to occur during training exercises, since the cryptic nests are not marked for avoidance, and nests are likely to be initiated within active training lanes. Nests, eggs, and chicks may be injured or killed as a result of foot or vehicle traffic at or around active least tern nests. In the absence of empirical information regarding the potential for nest loss, we had previously exempted the loss of all least tern nests initiated within training lanes (FWS-SDG-3452.3). Since that time, the Navy has collected information regarding the actual loss of eggs and chicks that has occurred in beach lanes that support training activities during the breeding season. Prior to 2005, relatively few instances of egg or chick death or injury were observed on the SSTC-N Beach, primarily due to the Navy's successful avoidance of tern nests (Table 10). Between 2005 to 2009, when training activities were unconstrained and least tern nests were not marked for avoidance on beach lanes Yellow 1 to Blue 1, 23 to 45 least tern eggs/chicks (equal to12 to 22 nests assuming each nest produces approximately 2 eggs/chicks) were observed to be destroyed from training activities each year (primarily in Red 1) (Table 12). This represents 2.5 to 6.5 percent (average 4.5 percent) of the total eggs/chicks observed in the active training lanes each year during this time period (Table 12), which is much lower than the 100 percent take exempted in the past (FWS-SDG-3452.3).

Because of the uncertainties regarding the future least tern nest distribution, and location and timing of training activities during the breeding season, we cannot determine the exact number of tern eggs and chicks that will be crushed, injured, or killed, by future training activities. However, we anticipate that the number of tern eggs/chicks injured or killed as a result of training activities will increase as a result anticipated terrestrial training activity at SSTC-N Beach and the potential for a limited number of activities to occur in beach lanes Blue 2, Orange 1, and Orange 2. We also anticipate that the number of tern eggs/chicks injured or killed will remain low relative to the number of terns nesting on the SSTC-N Beach.

The Navy developed several models, described in the BA, to assess future impacts to terns from training activities. The Navy's models used anticipated training frequencies at the SSTC-N Beach (Table 1, Table 17) combined with the terrestrial activity footprint information (Appendix A) to generate a coarse estimate of the number of least tern nests (given 2006 baseline distribution) that would likely lie within the operational footprint over an entire breeding season. A general explanation of the models is included within the Navy's BA; however, the actual models were not provided during consultation. We have considered the Navy models, the level of incidental take observed under the current level of training, and the anticipated changes in training frequency and location to develop projections regarding the number of least tern eggs and chicks that we anticipate will crushed, injured, or killed as training increases.

The Navy's model originally estimated that 269 least tern nests (538 eggs/chicks) could lie within the footprint of all future training activities conducted at SSTC-N Beach during the 4-month peak breeding season (DoN 2008). However, when modified to account for temporal changes in nest presence and training activities during the breeding season, the Navy's model estimated that 88 tern nests (166 eggs/chicks) per year would be injured or killed under

"baseline" levels of training, and that 105 nests (210 eggs/chicks) per year would be injured or killed under future increased levels of training.

The "baseline" level of incidental take predicted by the Navy's models, even after refinement to account for temporal changes in nest presence and training activities, is far higher than the level of incidental take that has been observed under current levels of training. For example, the observed level of injury or death of eggs/chicks in 2006 was 14 eggs/chicks (i.e., 7 nests), which is far lower the loss of 166 eggs/chicks (88 nests) predicted by the model under "baseline" levels of training. Based on this comparison of modeled and actual loss in 2006, the Navy's model appears to considerably overestimate the likely levels of incidental take. However, the model is using expected "baseline" training data, which may not reflect the current level of training at SSTC.

Under the current level of training, a maximum of 6.5 percent of the eggs/chicks in northern 7 beach lanes were injured or killed by training activities from 2005 to 2009 (Table 12), when training was avoided in southern 3 beach lanes during the breeding season. The Navy's models indicated that nest loss will increase from the predicted "baseline" of 88 nests/year to 105 nests/year (i.e., 19 percent) due to increases in training activity. Applying the model's predicted 19 percent increase to the maximum observed loss of 6.5 percent of the eggs/chicks affected by existing training, we estimate that up to 8 percent of the eggs/chicks at the SSTC-N Beach could be killed or injured each year due to increased training activities. The estimated loss of up to 8 percent of the eggs/chicks at SSTC-N does not take into account the difference, which is unknown, between the current level of training activity, and the level of activity indentified as "baseline" in the BA. As training levels increase and approach the "baseline" identified in the BA, re-assessment of the anticipated levels of incidental take may be required.

The Navy proposes to continue its successful practice of moving least tern nests (eggs) small distances to safer locations when they are initiated in high risk training areas (e.g., in the Blue 1 Demo Pit, Beach Crossing Lanes).. Since 1999, between 0 and 15 eggs have been moved each year (39 eggs total) (Table 12), and most of these successfully hatched. Due to the proposed increases in training activities (including vehicle travel in the southern 3 beach lanes), we anticipate that more nests may require location, and up to 10 tern nests (20 eggs) will be moved small distances to safer locations at SSTC-N Beach**.**

The Navy has proposed to actively discourage tern nesting at SSTC-S Beach by destroying nest scrapes and removing any least tern eggs that are laid. Based on the estimated 34 percent increase in training activities anticipated at SSTC-S Beach (Table 18), we believe that the likelihood of least tern nesting will diminish as training increases, and this is not a measure we recommend or authorize to minimize impacts to the least tern. Should least terns attempt to nest in this area, the potential for incidental take of nests and chicks from training activities can be addressed by amendment to this biological opinion.

Beyond the direct impact to individual nests, eggs, and chicks described above, the proposed action could result in a change in the least tern distribution within the action area. For example,

it is possible that the relative distribution of least tern nests may increase at North Delta Beach and South Delta Beach as disturbance at SSTC-N Beach increases; however, habitat conditions at the Delta Beach sites appear less favorable to those of the oceanfront beach, given the shift in least tern distribution to favor the SSTC-N Beach in recent years (Table 11). The future status of South Delta Beach may also be affected by remediation needs, since this site is a Munitions Response Program site contaminated with an unknown level of historical munitions, and it may require future cleanup. We anticipate that without enhancement, least terns will continue to favor the oceanfront beaches at SSTC-N over the Delta Beaches.

The Navy proposes to develop and implement a Long Term Habitat Enhancement Plan, which is expected to improve the nesting conditions for terns in select areas of SSTC-N, Delta Beaches, and SSTC-S. Improving nesting conditions in selected areas at SSTC will provide additional nesting habitat and may allow terns to relocate within the action area if they are displaced by training activities. Habitat enhancement will include removal of non-native plants followed by revegetation with native plant species. The Long Term Habitat Enhancement Plan will include measures to ensure that any terns using sandy beach areas upon removal of non-native vegetation are not subsequently disturbed or harmed during restoration or site maintenance activities if they occur during the breeding season. These measures may include: coordination with tern/plover monitors, passive irrigation systems, timing planting, and maintenance to reduce conflict.

Predator management activities will continue to provide some benefit to terns on the Silver Strand on SSTC-S, STTC-N, and NASNI beaches. However, the effectiveness of predator management is likely to continue to be reduced by vandalism to traps and ME's and the inability to stop predation by the gull-billed tern.

At SSTC-N Beach, we expect a change in the distribution of least tern nesting activity with a smaller proportion of the SSTC-N Beach tern nests initiated in the northern 7 lanes**,** a greater proportion initiated in the southern 3 beach lanes (Blue 2, Orange 1, and Orange 2) and overall, a reduction in the number of nests initiated on the SSTC-N Beach. Management of these beach lanes in a manner that minimizes impacts (e.g., proposed scheduling of activities preferentially in beach lanes with fewer least tern nests) will continue to be important to the least tern. Based on the types and frequencies of training activities proposed, we do not expect the proposed change in the training footprint or frequency to significantly change the overall use of the SSTC-N Beach for nesting by the least tern. Thus, though shifts may occur in the distribution of nests, we expect the average density of nests across the beach as a whole to remain similar to that observed under baseline conditions between 2005 and 2009 [i.e., between 11 and 21.1 nests per ha (4.4 and 8.5 nests per ac) (Appendix E, Table E.1)]. The number of least tern nests initiated across all beach lanes each year under baseline conditions between 2005 and 2009 at SSTC-N Beach represented between 7 and 13.6 percent of the total U.S. rangewide least tern nests, averaging 11.3 percent of the rangewide nest number (Appendix E, Table E.2). Under the proposed action, we expect SSTC-N Beach to continue to support least tern nesting activity within this range. We recognize, however, that any future assessment of changes in the size and distribution of tern colony at SSTC-N must take into account gull-billed tern depredation and other factors that could affect the colony but are unrelated to training.

Effects on Night Roosting

Least tern night roosts in the action area have not been extensively studied, but a night roost has been observed in the southern 3 beach lanes at SSTC-N Beach (i.e., Blue 2, Orange 1 and Orange 2) and in area near the mudflats at Delta Beach North and South. The roosting site shifts within the 3 southern beach lanes (DoN 2009a, Brian Bonesteel 2009). Nighttime training activities could disturb roosting terns and result in mortality of individual adults. Least terns that are disturbed, particularly if headlights are approaching them, are likely to flush and fly erratically, sometimes towards the light (Brian Bonesteel 2009) Least terns that do flush and fly from the night roost will face increased exposure to nocturnal predators, such as burrowing owls *(Athene cunicularia*). If vehicles are driven through the night roost without headlights, the roosting terns may not flush in time to escape being run over. If the night roost is repeatedly disrupted by nighttime training activities, especially if lighting is used, least terns may discontinue roosting in the 3 southern beach lanes.

Only infrequent training activity is anticipated in the southern 3 beach lanes. The frequency of nighttime and daytime activities is not provided, so the likelihood of nighttime activity within this beach lane is unknown, but it is considered unlikely to occur on a regular basis. We anticipate, in most cases, nighttime training will cause roosting least terns to shift slightly and on rare occasions cause terns to fly to the roosting site near the mudflats at Delta Beach North and South. Due to the likely infrequency of nighttime training within the southern 3 beach lanes at SSTC-N Beach, we anticipate that terns will continue roosting in these lanes and that one adult least tern per year may be injured or killed as a result of nighttime training activities.

Effects on Foraging

Increases in training activities, including boating and helicopter activities, are proposed in or over waters that are foraging areas for least terns. The proposed increases in training frequency are expected to increase the level of human disturbance in foraging habitat within the action area, primarily in the nearshore ocean waters in the SSTC-N, SSTC-S, and NASNI boat lanes, but also in San Diego Bay. Least terns may respond by avoiding the areas of disturbance, and since some of the in-water training areas are adjacent to least tern nesting colonies, disturbance may result in deterrence of least terns from foraging in habitat that is closest to the nesting colonies.

Increases in disturbance to foraging areas in San Diego Bay are potentially more significant than in the ocean waters, since habitat within San Diego Bay is more limited than ocean foraging habitat and may provide resources not available in the ocean during years with less food supply (Service 2006f). Based on examination of the various proposed training activities, it appears that most training in San Diego Bay will entail transit of vessels between berths at NAB and nearshore ocean training areas in the SSTC-N, SSTC-S, and NASNI Boat Lanes. Helicopter transit between NASNINAB and SSTC-S will also increase the potential for localized disturbance within the San Diego Bay foraging areas. In addition, other limited training in San Diego Bay will usually include only a small number of boat or aircraft (e.g., no battalion sized landings).

Generally, increased disturbances associated with boating can displace waterbird access to feeding areas and may result in subsequent loss of production of young (Conservation Committee Report 1978, Huffman 1999, Manning 2002). Increased boating activity, particularly high speed boating, can reduce foraging by least terns.). Birds that forage slowly or ineffectively, such as fledglings, may not be able build the requisite fat reserves that are especially important to successfully make their upcoming migratory journey (Lafferty 2001). As such, survivorship of first-year least terns (i.e., recruits) could be affected by increased disturbances within foraging areas, especially in years when the food base is low.

The Navy (2003) found that least terns tended to forage in areas with relatively less boating activity. Bailey (1995) suggests that heavy boating activity in an estuary near Alameda Naval Air Station dissuades least terns from foraging in suitable habitat at this location. Though the least terns that are displaced from highly disturbed foraging habitat may fly to other areas to forage, resulting increases in the number of flights or flight times can result in energy inefficiencies. Energy inefficiencies can result in reduced productivity and fitness (Manning 2002.

Air traffic (i.e., helicopter sorties) over least tern foraging areas will also increase with implementation of the proposed action. Helicopter noise and air turbulence is likely to result in temporary displacement of foraging least terns. We expect that least terns will avoid helicopters that are training over the water, and the potential for air strike from increased helicopter activity to be low.

The level of activity and associated disturbance within bay and nearshore ocean waters of the action area is expected to increase over baseline conditions; however, activities within the nearshore bay and ocean waters are distributed between numerous sites throughout a large area, as are the foraging resources for the least tern. The level of increased activity at any particular location throughout the action area is unknown. We expect that temporary disturbances may result in displacement of terns, but we also expect that adequate resources will be available in the adjacent nearshore waters of the action area. If the boating and air traffic disturbance levels increase to an unknown threshold, they could result in a reduction in the foraging success of terns, negatively affect the fitness or reproductive success of some least terns within the colony by reducing clutch sizes, lowering chick weights, and increasing levels of egg abandonment and non-predator chick mortality (Atwood and Kelly 1984, Massey 1988, Massey et al. 1992). Due to the widely dispersed, temporary and intermittent nature of marine training events, we consider such effects to least tern possible, but unlikely.

Underwater demolition training could temporarily disturb, injure, or kill terns that may be foraging in the water near the planned training event. However, the Navy proposes to time sequential charges in a manner that minimizes the potential for impacts to diving birds, and to conduct underwater demolition activities only after pre-exercise surveys have assured that diving seabirds are not within the training area. It is possible that terns could be overlooked during pre-exercise surveys due to their small size and the large area that will require survey prior to each exercise. However, terns forage by quickly diving onto and removing prey from the water

surface. Based on the proposed minimization measures and least tern's foraging behavior, underwater demolition training is not expected to cause any measurable impact to the tern.

Effect on Recovery

The most recent least tern recovery plan was published in 1985 (Service 1985). Since completion of the recovery plan, new information about the least tern's distribution, numbers, population dynamics and threats to the species have been identified and discussed in the Service's 5-year review of the least tern's status. The Least Tern 5-Year Review recommends that the least tern be downlisted to threatened status based on recovery efforts (e.g., reduction in threats through management of nest sites) and increases in the species abundance from 600 pairs in 1973 to roughly 7,100 pairs in 2005 (Service 2006a). The management actions carried out for least terns on military lands in southern California, including the intensive management at SSTC-N and Delta Beaches, has contributed greatly to the improved status of the least tern. The Service's 5-year review recognizes the importance of maintaining management actions at least tern nest sites to effect recovery of the species.

Future increases in training are expected to increase disturbance to least terns and their habitat within the action area and result in additional loss of eggs, chicks, and adults. However, the Navy will continue to minimize the effects of their training activities on least terns (e.g., prioritization of training activities in lanes with fewer nests) and to actively manage least tern nesting sites within the action area. (e.g., predator management, site preparation, and monitoring). With implementation of these actions, the SSTC-N Beach and the Delta Beaches will continue to support abundant least tern nesting activity and thereby continue to make a substantial contribution to the recovery of the species.

Western Snowy Plover

The effect of future training on the snowy plover depends primarily on the footprint, timing, and frequency of training events. Although generalities regarding training are known, the exact number, timing, and location of future training events is unavailable. Likewise, baseline distribution of western snowy plover nests is known, but future distribution may shift in response to reproductive failures or changes in topography or disturbance.

The proposed action will increase military training activities and associated disturbance on a total of approximately 97.33 ha (240.54 ac) of action area beaches [51.92 ha (128.29 ac) at SSTC-N, 18.34 ha (45.35 ac) at SSTC-S, and 27.07 ha (66.9 ac) at NASNI]. This will incrementally reduce the suitability of this habitat to support snowy plovers. The area that is included within the southern three beach lanes at SSTC-N, Blue 2, Orange 1, and Orange 2 (i.e., 16.44 ha or 40.63 ac) is of particular concern, since this area is not disturbed during the breeding season under baseline conditions and provides a refuge for male plovers and their broods once they leave the protection of the nest.

Effects on Nesting

Increased human and dog activity, and associated disturbance on the action area beaches, is likely to affect the breeding activity of plovers and the location of plover nests. Plover nests occur within active training lanes at SSTC-N, where they will experience more frequent exposure to foot and vehicle traffic as training activities increase. Plovers also nest at SSTC-S and NASNI under the flight path used by military helicopters, where they will be more frequently exposed to noise and rotor wash. Plovers nesting at SSTC-N and SSTC-S are also likely to be disturbed by the introduction of military working dogs, as discussed above for the tern.

Under baseline conditions, the frequent presence of recreational dogs at SSTC-S Beach likely contributes to the lower overall nesting use by plovers at this beach. The introduction of military dogs may further reduce the plover use of SSTC-S Beach; however, if appropriately managed, the presence of leashed working dogs may result in a lower degree of impact than detected in previous studies (e.g., Burger et al. 2007) of less controlled situations involving dogs.

Military dogs will remain on a 3m (10 ft) leash to reduce the possibility that they will chase plovers; however, plovers are still likely to respond to the presence of dogs on the beach. Handlers with dogs will enter/exit the SSTC-N Beach only at beach lane Yellow 1, which is more intensively used, supports little potential habitat, and does not currently support nesting snowy plovers. Dogs will usually remain in transit, running, and on the hard pack; however, some use of the soft packed sand on the sand road or near the beach crest may occur. Plovers that are foraging or nesting near the beach crest, sand road, or near the demo pit, may observe or encounter dogs and react to their presence. Since dogs will be on-leash and in transit parallel to the shore, they will present less of a threat to nesting birds than they might if they were running in a freer more erratic fashion. Whether plovers at SSTC-N Beach will acclimate to the presence of military working dogs as they appear to have acclimated to some other types of disturbances at this beach remains unknown. Dogs may respond to the presence of birds on the beach by chasing birds, causing further disturbance, however the potential for chasing behavior may be limited by the wild animal avoidance training that the dogs will receive prior to exercising at SSTC Beach. The high number (i.e. hundreds) of birds present at the SSTC-N Beach during the breeding season, including terns and plovers, is likely to present a potential distraction to the dogs that are exercising. Dogs that are proposed to be exercised at SSTC-N and SSTC-S Beaches will, however, be trained to avoid wild animals, which may limit the response of the dogs to plovers and terns on the beach.

SSTC-S Beach experiences a significant level of recreational trespass, including off leash dog walking, under baseline conditions. Introduction of the exercise activities for up to 10 Military Working Dogs may, however, substantially increase the amount of canine activity at SSTC-S Beach and disrupt plover foraging and breeding activities. As stated above, the Navy will conduct a study to assess the effects of military working dogs on plovers that will be used to develop additional conservation measures, if necessary.

Plovers will be less likely to initiate nests in areas that experience significant increases in disturbance during the breeding season. For example, plovers currently nest at SSTC-S on the beach that is likely to experience an increase in foot and vehicle traffic as part of Amphibious Assault exercises, and will also experience an increase in helicopter traffic as helicopters travel from the ocean to SSTC-S Inland area. As frequency of training activity increases, we expect the likelihood of plover nest establishment in this area to diminish. Plovers may respond to increased activity by seeking alternative, less disturbed nest sites, potentially within the marked boundaries of the adjacent Silver Strand State Beach nesting area, the southern 3 beach lanes at SSTC-N, or more distant locations. Some plovers are, however, likely to continue to use SSTC-S Beach, since it will remain less disturbed than adjacent recreational beaches, even with the increased helicopter traffic, vehicle patrols and presence of dogs.

We anticipate that plovers will respond to increased activities in some parts of the beach by relocating and that the number of plover nests, over time, will increase in parts of the action area that receive less disturbance primarily within beach lanes Blue 2, Orange 1, and Orange 2, protected areas at NASNI Beach, and Delta Beaches. The presence of increasing numbers of least terns in these areas is also anticipated, as outlined above. High tern density may reduce the suitability of some area(s) for plover use, since plovers usually nest in association with terns, but outside of higher tern density nesting areas. This pattern has not been observed at the southern 3 lanes of SSTC-N Beach (i.e., plovers continue to nest predominantly in the southern 3 beach lanes despite higher tern density), however, so plovers may nest in high density tern colonies in the absence of other nearby undisturbed habitat.

The proposed increase in training activities is likely to result in an increase in the number of plover adults, chicks, or eggs that are killed or injured during training activities, particularly if the number of simultaneous nests exceeds 22, since avoidance measures (i.e., marking and buffering) will be implemented only for 22 concurrent nests. From 2005 to 2009, the maximum concurrent active plover nests at SSTC-N and SSTC -S Beaches ranged from 12 to 22 nests (Table 14). Therefore the proposed avoidance of up to 22 concurrent nests is likely to result in the continued protection of most of the plover nests at SSTC-N and SSTC -S Beaches, though plover chicks and adults will be at increased risk once they depart from their nests since more training activities will be occurring on the beaches.

Plover chicks often move extensively across the beach with the adult male parent (Fancher 2003), and the adult male parent is likely to lead the chicks to an area of reduced disturbance. Under current conditions, an area of reduced disturbance is provided by the marked buffers surrounding nests and the marking and avoidance of the southern 3 beach lanes at SSTC-N. In these areas chicks and adults are less likely to be crushed as they move across the beach. Limitations on the number of nests buffered and marked and introduction of training activities into the southern 3 beach lanes is likely to reduce the amount of available undisturbed area for movement across the beach. It is likely that the survivorship of plover chicks at SSTC will decrease as the frequency of training increases, particularly if no undisturbed area is available. Ruhlen et al. 2003, reported evidence of reduced snowy plover chick survival on recreational beaches during periods of peak human use.

The lack of a proposal to continue to mark the southern 3 beach lanes (when training is not occurring) to facilitate avoidance may also result in increased unscheduled or unauthorized uses, resulting in additional disturbance and impacts to adults, eggs and chicks. However, based on the Navy's commitment to use beach scheduling procedures to bias activities with heavier beach use towards beach lanes with fewer nests when it does not impact the realism of training or training needs, the southern 3 beach lanes are likely to remain less disturbed by training activities than the northern 7 beach lanes.

Under baseline conditions, up to one plover chick per year has been documented to be killed by training, with no documented plover death or injury during most years. In light of the proposed increase in training and changes in conservation measures, we anticipate that 1 active nest, including up to 3 eggs or 3 recently hatched chicks, and an additional 5 chicks (i.e., already mobile and out of the nest) per year could be killed or injured due to training activities at the SSTC-N and SSTC-S Beaches.

The Navy proposes to develop and implement a Long Term Habitat Enhancement Plan that is expected to improve the nesting conditions for terns and plovers in select areas of SSTC-N, Delta Beaches, and SSTC-S. Improving nesting conditions in selected areas at SSTC will provide additional nesting habitat and may allow plovers to relocate within the action area if they are displaced by training activities. Habitat enhancement will include removal of non-native plants followed by revegetation with native plant species. The Long Term Habitat Enhancement Plan will include measures to ensure that any plovers using sandy beach areas upon removal of non-native vegetation are not subsequently disturbed or harmed during restoration or site maintenance activities if they occur during the breeding season.. These measures may include: coordination with tern/plover monitors, passive irrigation systems, timing planting and maintenance to reduce conflict.

Predator management activities will continue to provide some benefit to plovers on the Silver Strand on SSTC-S, STTC-N, and NASNI beaches. However, the effectiveness of predator management is likely to continue to be reduced by vandalism to traps and ME's and the inability to stop predation by the gull-billed tern.

Overall, we expect plovers to continue to nest within the action area on the Silver Strand on SSTC-S, STTC-N, and NASNI beaches. We anticipate that nest numbers may decline at SSTC, but that the SSTC beaches will continue to support, as estimated using maximum active nest numbers, an average of 18 plover pairs (range of 11 to 22) over a 5-year period. We also anticipate that NASNI will continue to support an average of 10 plover pairs (range of 7 to 14) over a 5-year period. If unforeseen impacts to plovers occur as a result of disease, food supply, weather, or other unpredictable variables, the number of plovers may change. Under the proposed action, the NASNI Beach is expected to experience a slight increase in the level of training use. The slight increase in disturbance associated with training use is not expected to alter the habitat quality for the plover on the NASNI Beach. We anticipate that the Navy will continue to protect and manage adequate snowy plover habitat to support 12 to 13 pairs of plovers on NASNI Beach.

The Navy proposes to continue its nest relocation program. Under baseline conditions, few plover nests have been moved; however, the proposed increased training may modify plover nest placement on the beach and result in more nests that are at risk of crushing or tidal inundation. The Navy also proposes to continue to salvage eggs of abandoned nests and release juveniles reared from salvaged eggs in an effort to reduce nest losses associated with abandonment. The number of nests that have been abandoned under baseline conditions has been less than one per year; however, we anticipate the likelihood of nest abandonment to increase as human and dog activity levels on the SSTC-N Beach increases, especially if plover nest numbers exceed 22 and some nests are not marked with blue flexistakes and avoided. Consequently, we anticipate that up to three plover nests (nine eggs) will be abandoned each year within the action area and be brought into captivity for incubation, rearing, and release onto action area beaches. Relocating nests, incubating eggs and releasing juveniles onto the action area beach, as proposed, are expected to minimize the impacts of training that could occur as a result of the proposed action.

Effects on Foraging

Western snowy plovers forage within and around the surf cast beach wrack on the ocean and bay front beaches. Because plover adults and chicks forage on the beach and may transit between nests and foraging areas, they are more likely to encounter dogs and terrestrial training activities than terns. Plovers select sites that contain fewer people and dogs than the habitat as a whole. Increased disturbance from people and dogs within foraging areas is likely to result in increased time spent in vigilance, when plovers are not searching for food. Studies of piping plovers have found that in habitats with few people, plovers can spend 90 percent of their foraging time actively searching for prey and feeding, whereas on beaches with many people they may spend less than 50 percent of their foraging time in these activities (Burger 1989). Pets within 50 m (164 ft) of piping plovers caused birds to stop feeding 52 percent of the time (Hoopes et al. 1992). Although individual disturbances are seemingly inconsequential, the cumulative effect of disturbances may result in less foraging time and reduce the fitness or reproduction of plovers. We anticipate that the increased training will cause a reduction in the suitability of the SSTC-N and SSTC–S Beaches, but that these areas will continue to support plover foraging.

Effects on Wintering

Under baseline conditions in 2008, approximately 7 percent of the Pacific Coast plovers documented during winter window surveys occurred within the action area (Table 15). Increasing levels of human activity will incrementally reduce the suitability of the action area for use by wintering western snowy plovers. Activities may result in disturbance to plovers and cause plovers to interrupt foraging activities or fly from the area. No avoidance measures are included within the proposed action to avoid beach segments identified as roosting areas for wintering plovers. If disturbed by training, however, plovers are likely to move to adjacent, less disturbed beach segments within the action area. Since it is unlikely that the entire beach will be used for training at the same time, we presume that adequate undisturbed area would remain available to support the winter population.

Effect on Recovery

The beaches included in the action area provide important breeding, feeding, and sheltering habitat for the western snowy plover and therefore have value to the recovery of this species. The action area is in Recovery Unit 6 identified in the WSP recovery plan (Service 2007a). The WSP recovery plan identifies a Management Potential Breeding Number of 65 breeding adults for the Silver Strand (including SSTC and SSSB) to help meet the recovery criteria established for Unit 6. From 2005 to 2009, the maximum concurrent active plover nests at SSTC-N and SSTC -S Beaches ranged from 11 to 22 nests or 22 to 44 breeding adults (Table 14). Future increases in training are expected to increase disturbance and reduce the suitability of SSTC and NASNI Beaches for plover nesting. An increase in plover mortality (adults, chicks, and eggs) is also anticipated. The anticipated increase in disturbance, increased mortality, and limitations placed on plover protection (e.g., introduction of training into southern 3 beach lanes at SSTC-N during the plover breeding season, only protect up to 22 plover nests) are in turn expected to limit or reduce the recovery potential of the western snowy plover in the action area compared to baseline conditions.

Despite the expected increase in training and reduction in protections afforded the plover under the proposed action, future Navy management, including: scheduling training in lanes that support fewer nests to the extent consistent with training need; predator management; habitat enhancement at the Delta Beaches, SSTC-N, and SSTC-S; monitoring; and nest marking and buffering will continue to provide a contribution towards the recovery of the western snowy plover. The Navy's proposal is not expected to preclude recovery of the plover. However, it is expected to reduce the likelihood of future population growth within the action area due to the cap placed on nest avoidance (i.e., 22 concurrent nests) and the projected increase in human activities. Thus, the proposed action may necessitate additional conservation efforts within the action area or in other parts of Unit 6 to allow for population increases that meet the recovery criteria for Unit 6 (Appendix C).

San Diego Fairy Shrimp

The Navy will establish training area boundaries for specific groups of vernal pools at SSTC-S Inland. The Navy proposes to allow foot traffic in and around the vernal pools when all the pools in a particular training area are dry. Foot traffic could include transit, activities that entail stealthy movement, parachute drops. Past surveys in 2000, 2001 and 2003 detected San Diego fairy shrimp in 11 of the pools found on site [1.9 ha (4.6 ac)] (Figure 10). However, no other surveys have been completed to date, so the current distribution of San Diego fairy shrimp at SSTC-S Inland is uncertain.

Foot traffic, including stealthy movement, parachute drops, or walking, in and around the pools may alter the pools and their watersheds, affecting hydrology, water quality, chemistry, or salinity, and thereby indirectly affect San Diego fairy shrimp. Changes in the natural micro-topography of the vernal pools and their watersheds from foot traffic (e.g., trails) could alter pool hydrology by causing a breach, compacting the soil, or increasing sedimentation in the pools.

Activities that alter hydrology have the potential to limit the survivability of San Diego fairy shrimp (Service 1998). Foot traffic is also likely to increase the introduction and expansion of invasive plant species throughout SSTC-S Inland, including occupied vernal pools. Invasive plants could change the hydrology of occupied pools so that they no longer pond or pond less frequently so that fairy shrimp could not complete their life cycle (Marty 2005).

Under baseline conditions, an unpaved road runs through Pool 20, which is occupied by San Diego fairy shrimp. Pool 5, which is also occupied by San Diego fairy shrimp, is at the edge of another unpaved road and therefore subject to vehicle traffic. Limited emergency/security vehicle use may occur within these pools which may crush adult San Diego fairy shrimp or cysts and may also alter the pools and their watersheds, affecting hydrology, water quality, chemistry, or salinity, and thereby indirectly affect San Diego fairy shrimp.

The vernal pools occupied by San Diego fairy shrimp at SSTC-S Inland are interspersed with salt marsh vegetation and pools that support brine shrimp (*Artemia sp.)*, which occur in saline waters and soils. San Diego fairy shrimp are "osmoregulators" that maintain constant internal chemical concentrations, but cannot tolerate wide extremes in sodium or bicarbonate concentrations so they are vulnerable to runoff and watershed quality that alter levels of salts and alkalinity (Service 1998). Foot traffic could directly introduce saline soils or alter watersheds in a way that increases salinity in pools, and thereby reduce the viability of the San Diego fairy shrimp in the pools.

Foot traffic through occupied pools during dry periods may also crush San Diego fairy shrimp cysts within the pools or translocate cysts to drier, upland habitats thereby reducing their viability. Several of the smaller vernal pools occupied by San Diego fairy shrimp are located adjacent to a roadway, and these pools are more likely to suffer impacts from the proposed activities given their small size, location near the road, and nearby vegetation that might provide an attractive hiding place during military maneuvers in the area.

Approximately 268 training activities could occur when the pools are dry (Table 18). While the amount of foot traffic from these activities that will occur is uncertain, the Navy estimated that between 12 and 116 people might enter the vernal pools each year (BA). For most activities people will be walking through the area, but for some activities people could be moving on their knees or bellies or dropping in by parachute. The impact of the foot traffic on San Diego fairy shrimp will depend on the intensity and frequency of training exercises within individual vernal pools, but this information is not available. Thus, the Navy proposes to minimize the potential impacts to fairy shrimp by limiting training to time periods when the pools are dry as determined by a Navy Botanist or Wildlife Biologist. Under dry conditions, cysts will be less susceptible to crushing and translocation, since soils in the pools will be more stable and less susceptible to compaction or adhering to the boots of trainees than during wet conditions. However, training could still occur during the rainy season, and it is unclear how dry conditions will be determined (i.e., what threshold pool soil moisture will be used and how it will be measured). In addition, the number of dry pools at any given time will vary depending on the amount of rainfall with the larger pools staying wet longer in wet years and smaller pools staying wet longer in dry years.

For our analysis, we assumed that training will not be allowed in a training area if any one pool in the training area is wet.

The Navy also proposes to continue invasive species identification and control programs at SSTC-S as part of the INRMP for this area. This measure is expected to reduce the indirect effects of invasive plant species on the vernal pools occupied by San Diego fairy shrimp. However, the Navy does not propose any vernal pool restoration and/or enhancement to minimize potential impacts.

In summary, we expect that foot traffic will: 1) directly crush and translocate San Diego fairy shrimp cysts; and 2) cause minor changes in hydrology, salinity and invasive plant cover in occupied pools that will prevent cysts from hatching or completing their life cycle. We also expect that infrequent emergency/security vehicle traffic in pools 5 and 20 will: 1) directly crush adult fairy shrimp; 2) directly crush and translocate San Diego fairy shrimp cysts; and 3) cause minor changes in hydrology, salinity and invasive plant cover in occupied pools that will prevent cysts from hatching or completing their life cycle. However, with the conservation measures proposed by the Navy, we expect these impacts to be minimized such that only a small number of cysts are impacted annually and the currently occupied pools will continue to support viable fairy shrimp populations.

Effect on Recovery

The VP recovery plan that included the San Diego fairy shrimp was published in 1998 (Service 1998). Since completion of the recovery plan, new information about the San Diego fairy shrimp's distribution and genetics has become available. The San Diego fairy shrimp 5-Year Review (Service 2008a) recommends that the VP recovery plan be revised to include this new information. Therefore, when evaluating the impacts of specific actions or projects on the recovery of San Diego fairy shrimp, we no longer use the VP recovery plan alone to identify vernal pool complexes important to recovery of the San Diego fairy shrimp. Instead, we use an updated database of extant complexes occupied by the San Diego fairy shrimp (Appendix 1 of Service 2008a) and evaluate potential impacts to these complexes on a project-specific basis to determine the impact of the activity or project on the recovery of the San Diego fairy shrimp.

Eleven of the pools at SSTC-S Inland are occupied by the San Diego fairy shrimp and therefore have value to the recovery of the San Diego fairy shrimp because they support the breeding, feeding, and sheltering needs of this species. As discussed above, the proposed training activities and emergency/security vehicle could directly crush and translocate San Diego fairy shrimp cysts and cause changes in hydrology, salinity and invasive plant cover in occupied pools that will prevent cysts from hatching or completing their life cycle. However, a low frequency of foot and vehicle traffic is anticipated in and around the pools and only when they are dry. The Navy will monitor the pools to confirm the validity of this expectation, consistent with the VP recovery plan Task 5. In addition, the Navy will manage the pools, including invasive plant species control, consistent with the VP recovery plan Task 4. With implementation of these actions and the other conservation measures proposed by the Navy, we expect that the currently

occupied pools will continue to support viable fairy shrimp populations in support of recovery of the species.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, 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 consultation pursuant to section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Because most of the project area is under Navy control and we are not aware of any future non-federal actions in the project area outside of the Navy's control (i.e., City of Coronado and Silver Strand State Beach), we have not identified any cumulative effects in the action area that should be considered in this biological opinion.

CONCLUSION

After reviewing the current status of the California least tern, western snowy plover, and the San Diego fairy shrimp, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of these species. We reached this conclusion by considering the following:

California least tern

1) The status of the least tern has significantly improved since its listing in 1970 due to successful efforts rangewide to protect and manage least tern nesting and foraging areas. The Navy has contributed to the improved status of this species by successfully managing sites within the action area, including SSTC-N Beach and the Delta Beaches. While populations fluctuate annually, rangewide population estimates have increased to an estimated 7,124 pairs in 2009. The Service recommended downlisting the least tern to threatened status in our 2006 5-Year Review based on its improved status and a reduction of threats.

2) The ongoing and proposed minimization measures for SSTC-N Beach, including use of beach scheduling procedures to bias activities with heavier beach use towards beach lanes with fewer nests when it does not impact the realism of training or training needs, are anticipated to maintain the suitability of least tern habitat at this location over the long term.

3) The number of least terns injured or killed annually by training activities is expected to be small relative to the overall least tern population throughout its range and is not expected to result in an appreciable reduction in the numbers, reproduction, or distribution of the least tern;

4) The Navy's proposed action includes: ongoing nesting site preparation at the Delta Beaches; predator management; population monitoring; a Long Term Habitat Enhancement Plan; and efforts to eliminate unauthorized recreational trespass, which are all conservation measures that support the recovery of the least tern. We expect implementation of these conservation measures will maintain the suitability of least tern habitat within the action area over the long term.

5) We expect that maintenance of suitable habitat conditions for the least tern will result in continued presence of this species at Delta Beach South, Delta Beach North, and the SSTC-N Beach. We expect the percentage of the U.S. rangewide least tern nests initiated on the SSTC-N Beach and the Delta Beaches to remain within the range observed from 2005 to 2009 (i.e., 7 to 13.6 percent, averaging 11.3 percent; and 4.6 to 8.1 percent, averaging 6.0 percent, respectively) (Appendix E, Table E.2).

Western snowy plover

1) The Pacific coast western snowy plover population is widely distributed along the Pacific coast from Washington State to Baja California, Mexico;

2) The death or injury of 1 active nest and 5 chicks per year in association with the proposed training would reduce the productivity of less than 0.1 percent of the estimated Pacific coast western snowy plover population within the U.S. annually; this low-level impact is not expected to result in an appreciable reduction in the numbers, reproduction, or distribution of the Pacific coast population of the western snowy plover;

3) Although the suitability of beaches within the action area is likely to be reduced as a result of the proposed action, we anticipate that western snowy plovers will continue to use beaches within the action area for breeding foraging, and wintering; and

4) The Navy's proposed action includes ongoing predator management and population monitoring that support recovery of the snowy plover.

San Diego fairy shrimp

1) The proposed foot traffic impacts will impact less than 1 percent of the vernal pool complexes known to be occupied by the San Diego fairy shrimp throughout the range of this species;

2) We anticipate that the Navy will not allow foot traffic in or around the occupied vernal pools when they are wet, and that the level of foot traffic that will occur during dry periods is likely to be low;

3) We anticipate that foot traffic when the pools are dry will only injure or kill a small number of San Diego fairy shrimp cysts and cause only minor impacts to the occupied vernal pools and their watersheds; and

4) We anticipate that the occupied pools will continue to support viable populations of San Diego fairy shrimp thereby supporting recovery of this species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations issued pursuant to section 4(d) of the Act, prohibit take of endangered and threatened species without a special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral 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, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), such incidental taking is not considered to be a prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are nondiscretionary and must be undertaken by the Navy for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity covered by this incidental take statement. If the Navy (1) fails to adhere to the terms and conditions, (2) fails to require the enforceable terms that are added to the permit, and/or (3) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

To monitor the impacts of incidental take, the Navy must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

Amount or Extent of Take

California Least Tern

1. We anticipate that up to 8 percent of the least tern eggs/chicks at SSTC-N Beach per year may be injured, abandoned, or killed due to training activities;

2. We anticipate that up to one least tern adult per year may be killed or injured during night time training activities at the SSTC-N Beach; and

3. We anticipate that up to 10 least tern nests (20 eggs) per year may be moved small distances, as necessary and appropriate, to reduce the potential for crushing due to training.

The Navy has proposed to implement measures to eliminate recreational use of the SSTC Beaches. Thus, take of active least tern nests by recreational users is not considered "incidental to an otherwise lawful activity" and is not authorized by this incidental take statement.

Western Snowy Plover

1. We anticipate that up to 1 active nest per year will be destroyed by training activities at the SSTC-N and SSTC-S Beaches and result in injury or death of the nest's eggs or chicks.

2. We anticipate that up to 5 snowy plover chicks will be killed or injured per year by training activities at the SSTC-N and SSTC-S Beaches;

3. We anticipate that up to 3 snowy plover nests (9 eggs) per year at the SSTC-N and SSTC-S Beaches will be moved small distances, as necessary and appropriate, to reduce the potential for crushing due to training, or to avoid excessive tides; and

4. We anticipate that up to 3 nests (9 eggs) per year will be abandoned for unknown reasons within the action area and be brought into captivity for incubation, rearing, and release onto action area beaches.

The Navy proposes to implement measures to eliminate recreational use of the SSTC Beaches. Thus, take of active western snowy plover nests by recreational users is not considered "incidental to an otherwise lawful activity" and is not authorized by this incidental take statement.

San Diego Fairy Shrimp

1. We anticipate that San Diego fairy shrimp cysts are likely to: 1) be crushed or carried out of the occupied vernal pools at SSTC-S Inland by foot traffic during dry periods; and 2) fail to hatch or complete their life cycle due to changes in to pool hydrology, salinity and invasive plant cover. San Diego fairy shrimp in pools 5 and 20 may also be crushed, and cysts may be crushed or carried out of these pools, by infrequent emergency/security vehicle traffic. Estimating the precise number of San Diego fairy shrimp cysts that may be injured or killed as a result of the proposed action is difficult due to: 1) uncertainties regarding the precise level of impact that will be caused by future foot traffic; and 2) variability in the size of the San Diego fairy shrimp population in each occupied vernal pool. However, because training activities within vernal pools will be limited to periods when pools are dry, we anticipate that the overall loss of fairy shrimp cysts will be small and that all occupied pools will continue to support viable fairy shrimp populations. Thus, the take threshold will be exceeded if monitoring reveals that training impacts are impacting occupied pools in a manner that could lead to the extirpation of fairy shrimp in any individual pool.

Because the Navy will prohibit driving of vehicles off of established roads at SSTC-S Inland, no take of fairy shrimp is authorized or exempted for off-road vehicular activity at SSTC-S Inland.

EFFECT OF THE TAKE

In the accompanying biological opinion, we determined that the level of anticipated incidental take of California least terns, western snowy plovers, and San Diego fairy shrimp is not likely to result in jeopardy to these species.

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the impact of incidental take of California least terns, western snowy plovers, and San Diego fairy shrimp.

California Least Tern and Western Snowy Plover

1. The Navy will minimize the potential for incidental take of least tern and snowy plover nests and chicks at SSTC-N and SSTC-S Beaches during the breeding season;

2. The Navy will monitor training activities to ascertain the impact of training activities on least tern and snowy plover distribution within the action area and report any observed incidental take to the Service annually.

San Diego Fairy Shrimp

3. The Navy will use scheduling and/or planning measures to minimize the potential for incidental take of San Diego fairy shrimp;

4. The Navy will establish the baseline distribution and abundance of San Diego fairy shrimp and condition of their vernal pool habitat at SSTC-S Inland and monitor training activities to ascertain the impact of training activities on San Diego fairy shrimp distribution and abundance within the action area. The Navy will report the monitoring results and any observed incidental take to the Service annually, and

5. The Navy will manage the vernal pools occupied by San Diego fairy shrimp to minimize any training impacts detected by monitoring.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Endangered Species Act, the Navy must ensure that their military personnel, including all agents and contractors anticipated herein, comply with the following terms and conditions, which implement the reasonable and prudent

measures described above and outline the required reporting/monitoring requirements. These terms and conditions are non-discretionary.

California Least Tern and Western Snowy Plover

The following terms and conditions implement reasonable and prudent measures 1 and 2:

1.1 The Navy will consider the tide conditions when developing training schedules, and schedule training activities that could be conducted on the hardpack during low tides to the maximum extent consistent with training needs.

1.2 The Navy will mark and buffer, as described in the proposed action, up to 22 concurrent snowy plover nests established at SSTC-N and SSTC-S Beaches plus any additional nests that exceed 22 that are initiated in beach lanes Orange 1 and Orange 2.

1.3 Under baseline conditions, the southern 3 beach lanes are marked to facilitate avoidance of tern and plover nests. Since the Navy has determined that the level of marking done under baseline conditions presents an impediment to training, the Navy will develop a marking strategy to delineate least tern and snowy plover nesting areas that does not encumber training activities. Such a marking strategy may entail signage affixed to existing beach lane sign posts and a limited number of additional markers, as determined appropriate by Navy staff.

1.4 The Navy will delineate the boundary of SSTC-S that parallels the mean high tide line in a manner that does not encumber training exercises.

1.5 If relocation of any least tern or snowy plover nest/egg is necessary as a protective measure, each nest/egg will be relocated the shortest distance possible into suitable habitat by Service-approved monitors to increase the chances for nest success. The weekly reports to be submitted to the CFWO under the proposed project will include: a) date the nests/eggs were moved; b) number of nests/eggs moved; c) original and ending location of nests/eggs moved; and (d) distance the nests/eggs were moved.

1.6 NBC Natural Resources staff will brief all dog handlers, annually, or more frequently if necessary, of the following guidelines pertaining to the use of military working dogs on SSTC beaches.

1.6.1 Military working dogs and dog handlers will be notified weekly of the locations of plover nests and, to the maximum extent possible, remain a minimum of 30 m (90 ft) from markers that delineate the locations of nesting plovers.

1.6.2 If physical conditioning on soft pack sand is necessary, handlers and military working dogs will run on the sand road (SSTC-N) or within 20 feet of the hard pack sand to reduce the disturbance and impact to nesting tern and plovers.

1.6.3 At SSTC-N, military working dogs will exercise primarily between beach lanes Yellow 1 and Blue 1, where they may cross the beach to get to the sand road at the existing route immediately to the north of the demo pit. The Navy will not conduct physical conditioning using dogs in the southern 3 beach lanes until: a) completing a study to evaluate the effects of military working dogs on terns and plovers and b) coordinating with the Service to develop conservation measures to minimize any additional effects.

1.6.4 If military working dog training is requested as part of Platoon OTB activities at SSTC-N, the Platoon OTB activities will be scheduled in beach lanes Yellow 1, the northern half of Yellow 2, Green 1 or Green 2, pending the results of the Navy's study to evaluate the response of terns and plovers to military working dog presence.

1.6.5 The Navy will coordinate with the Service in the development of the study to evaluate the effects of military working dogs on terns and plovers and will submit the study design and scope of work to the Service for review and approval. The Navy will allow the Service 30 days to submit comments and an additional 30 days to approve the final study design and scope of work.

1.7 The Navy will coordinate with the Service in the development of the Long Term Habitat Enhancement Plan for SSTC and will submit the plan to the Service for review and approval. The navy will allow the Service 30 days to submit comments, and an additional 30 days to approve the final study design and scope of work.

2.1 The Navy will include the following information in the yearly reports to be submitted to the Service under the proposed project: a) the number and distribution of terns and plovers observed in each training lane; b) the number of any dead or injured least terns or snowy plovers (including eggs, chicks or adults) observed in each training lane; c) the hatching rate of terns and plovers in each beach lane; d) maps of the locations of tern and plover roosts within the action area; e) the timing and number of training events within the southern 3 beach lanes, and other beach lanes, to the extent available; f) the date and condition of any dead or injured tern or plover; g) the fledging numbers at NASNI, SSTC-N, and SSTC-S; and h) any measures taken to prevent additional tern or plover death or injury.

2.2 The Navy will ensure that biological monitors look for and document the location of least tern or snowy plover nests, eggs and chicks prior to and after all military training exercises, to allow assessment of take associated with training activities.

San Diego Fairy Shrimp

The following terms and conditions implement reasonable and prudent measures 3, 4 and 5:

3.1 The Navy will avoid vernal pools occupied by San Diego fairy shrimp and their watersheds when designating parachute drop zones in SSTC-S Inland. The Navy will identify the vernal pools and assure that drop zones are located at least 30 m (100 ft) from each occupied pool.

3.2 The Navy will consider the location of vernal pools occupied by San Diego fairy shrimp and their watersheds when planning training involving off-road foot traffic at SSTC-S Inland. To the maximum extent consistent with training need, off-road foot traffic will avoid the occupied vernal pools and their watersheds.

3.3 The Navy will avoid the occupied vernal pools and their watersheds adjacent to the road at SSTC-S Inland (i.e., pools 1 through 7) year round to the maximum extent consistent with training need. Avoidance may be accomplished using markers, maps, GPS coordinates or any other means consistent with training needs.

3.4 The Navy will assure that military dogs do not enter vernal pools at SSTC-S Inland year round.

4.1 The Navy will mark pools to facilitate monitoring, and monitor the occupied vernal pools and their watersheds at the SSTC-S Inland to determine the baseline and ongoing conditions regarding: San Diego fairy shrimp distribution and abundance; botanical resources; topography; hydrology; and water chemistry (including salinity). The Navy will submit a draft monitoring plan to the Service and allow the Service at least 30 days to review and approve this plan. The plan will include a map of SSTC-S Inland training area boundaries and vernal pools and their watersheds, and the following provisions to establish baseline conditions: a) focused invasive plant survey including visual/photopoint inspection of vernal pools and their watersheds; b) plant, topographic, hydrological and water quality surveys/data; and c) protocol fairy shrimp surveys of the vernal pools. The plan will outline the qualifications necessary for personnel that determine if all pools in a given unit are “dry”, as well as the methodology for determining that the pools are dry. The plan will include the following provisions for monitoring ongoing conditions to determine if training impacts have occurred: a) focused invasive plant monitoring and visual/photopoint inspection of vernal pools and their watersheds annually; b) plant, topographic, hydrological and water quality monitoring every 2 years; and c) protocol fairy shrimp surveys of the vernal pools every 3 years. Annual monitoring reports will identify management measures to minimize any training impacts detected by monitoring (e.g., spread of invasive weeds, change in pool topography). The plan will identify measures to minimize the potential for adverse effects to fairy shrimp from weed abatement, pool restoration or pool augmentation. The results of each year’s monitoring will be submitted to the Service annually. Baseline monitoring will be completed prior to initiating training activities in or around the vernal pools at SSTC-S Inland.

4.2 The Navy will install markers that indicate the pool number (as presented in DoN 2003) to aid monitoring.

5.1 The Navy will implement management measures identified in annual monitoring reports to minimize any impacts detected by monitoring (e.g., invasive weed control, correcting changes in pool topography).

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act 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 recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the Navy's responsibility for these species, pursuant to section 7(a)(1) of the Act.

1. We recommend that the Navy continue marking and avoiding suitable nesting habitat at the southern 3 beach lanes. As an option to the marking that has been successfully implemented and conducted in accordance with past consultations, we suggest markers be installed around the nesting area in a manner that accommodates linear travel along a corridor parallel to the beach crest. The markers could then be temporarily removed to accommodate training exercises that require use of one or more of the southern 3 beach lanes to meet the Navy's current need for increased training flexibility.

2. We recommend that the Navy continue to mark all plover nests on SSTC-N and SSTC-S Beaches with a buffer and avoid the buffered nest sites until they are not being used by plovers (e.g. until approximately 15 days post-hatch). If such marking cannot be done as in past consultations, we suggest that the size and configuration of buffered areas be adjusted to avoid impacts to training activities or that the Navy implement the measures used to move plover nests out of beach crossing lanes, to gradually relocate the plover nest so it does not affect the training activity.

3. Recreational use of the SSTC-Beach is occurring on the SSTC-Beaches and reducing the habitat suitability for snowy plovers and least terns. Recreational use of the beaches is counter to the NBC INRMP and the current proposed action. We recommend that the Navy obtain jurisdiction over SSTC-N Beach to facilitate improved enforcement within this area. We also recommend that the Navy improve delineations of base boundaries and increase enforcement to reduce the non-training uses of the Navy's beaches at SSTC. Specifically, we recommend that the Navy improve the delineation by: a) installing improved signage adjacent to the Carnation Avenue beach crossover, the jetty at SSTC-S, and the beach between SSTC-N and SSSB; b) installing a kiosk at Camp Surf, with security personnel stationed at the site to educate civilians about the need to keep dogs on leash and remain outside the boundaries of SSTC-S Navy-administered land; c) citing

violators and recording the number of violations, in collaboration with State Parks Rangers, City of Coronado Police, and Lifeguards; and d) installing a fence between Highway 75 and SSTC-N Beach to reduce the recreational trespass and other unauthorized entry. We recommend that the Navy improve enforcement by: a) preventing public access to SSTC-S where plovers nest; b) coordinating with the patrol assigned to Silver Strand State Beach (SSSB), the Imperial Beach Police Department, and the Coronado Police Department to enforce leash laws on any beach segments that are under State jurisdiction adjacent to the SSTC; c) contracting or hiring at least one full-time seasonal security position or Department of Defense Warden to eliminate recreational trespass and other unscheduled use onto the SSTC-N and SSTC-S Beaches.

4. Under the proposed action, the Navy, in coordination with the Service, will develop a Long Term Habitat Enhancement Plan for SSTC that will include portions of the Delta Beaches, SSTC-S, and SSTC-N Beach. In addition, cleanup and remediation activities are likely to be necessary at South Delta Beach (MRP site 5). We recommend that prior to initiating the breeding season training use of the southern 3 beach lanes at SSTC-N Beach, the Navy develop and implement the Long Term Habitat Enhancement Plan and remediate MRP Site 5. In this manner, additional suitable habitat will be available to offset the loss of habitat rendered unsuitable by increased frequency and extent of military training activity.

5. Plover habitat at NASNI Beach is increasingly affected by human uses, including dog walking, yet this area adjoins the currently designated "Coronado Dog Beach." The Coronado Dog Beach is within walking distance of the residences and Navy Lodge at NASNI. We recommend that the Navy re-establish the "no dogs" rule at NASNI Beach to improve conditions for the snowy plover. Individuals stationed on base could exercise dogs within Coronado Dog Beach to improve conditions for the plover and help the Navy meet the commitment to manage adequate habitat at NASNI to support 12 to 13 pairs of plovers (FWS-SDG-3908.3).

6. Increased foot traffic is expected at NASNI Beach as a result of Navy Lodge Expansion and increases in training. As foot traffic increases, less undisturbed area will be available for foraging plover chicks and adults at NASNI Beach. We recommend that the Navy reduce foot traffic at the western end of NASNI Beach, which lies within the surface danger zone of the small arms range, to improve the condiions for plovers. To reduce foot traffic into this area, we recommend that the Navy improve signage and improve delineation and enforcement of existing restrictions on pedestrian access. If these measures prove ineffective, we recommend that the Navy install a fence between the recreational beach and the western end of the NASNI Beach.

7. We recommend that the Navy, as previously recommended by the Service (FWS-SDG-3908.3), coordinate with the Army Corps of Engineers or other entities regarding sand replenishment on the western end of the NASNI Beach. This beach is used for plover nesting and foraging under baseline conditions; however, the narrow width of the beach results in inundation under high tides. Widening this beach by sand replenishment would

increase the area available for plover nesting and foraging that is not subject to recreational foot traffic.

8. We recommend that if lands adjacent to SSTC become available for acquisition or lease, the Navy explore the potential for acquisition or lease of these areas for their conservation and buffer values. Acquisition or lease of adjacent lands would allow the Navy to buffer training areas from adjacent recreational use and provide added ability to accomplish conservation objectives while reducing encumbrances on training areas.

9. We recommend that the Navy fence the limits of vernal pools that are occupied by the San Diego fairy shrimp at SSTC-S Inland. Fencing the pool boundaries would facilitate avoidance of the pools during training exercises.

10. This consultation on the effects of Navy training activities at SSTC has been complicated by the uncertainties associated with the frequency and location of training activities that occur under baseline conditions. The Navy has produced scheduling models that we used to project the future intensity of beach use and resulting impacts. However, uncertainty remains regarding the baseline distribution of training activities as it relates to the observed least tern and snowy plover nesting distribution, and the future training patterns and associated impacts of the proposed action. Based upon the available data, training activities at historical and proposed levels, if managed appropriately, appear compatible with persistence of the least tern and western snowy plover at SSTC. To improve future assessment of training activities and associated effects to the tern and plover, we recommend that the Navy annually report the timing, number, type and distribution of training activities in each training lane during the tern and plover breeding seasons, to the extent consistent with national security. This information may then be compared to that year's distribution of least terns and snowy plovers at SSTC-N when the Service and the Navy conduct a post-breeding season assessment of incidental take within the action area. Information about training will be useful to determine if any observed population declines were caused by training activities or some other factor such as predation.

REINITIATION NOTICE

This concludes formal consultation on the proposed action. 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.

We appreciate the Navy's efforts to improve the status of the endangered and threatened species on the Silver Strand Training Complex while implementing its military mission. We also

recognize the need for adaptive management of these sensitive resources to address the Navy's need for flexibility and realism in training. To facilitate this need, we have set anticipated levels of incidental take for least terns and western snowy plovers that will be monitored during the breeding season and provided as a cumulative total for assessment only at the end of the breeding season. In this manner, training scheduled for the year will continue as necessary to support the military mission and an annual assessment will be completed to determine whether the level of incidental take has been exceeded in any given breeding season.

Because we are providing this assurance to the Navy that training activities scheduled during a given year will not be interrupted, the Navy should continue to include the Service in ongoing coordination meetings during the least tern and snowy plover breeding season and meet with the Service after the breeding season to assess the status of the tern and plover and any incidental take that has occurred. If the end-of-year monitoring report reveals that the effects of the action exceed those anticipated in this opinion or if the authorized level of incidental take for the tern or plover was exceeded, the Navy and the Service should meet to evaluate the factors related to the exceeded level of anticipated take to determine whether: 1) our effects analysis and take authorization needs to be revised and/or 2) additional conservations measures should be implemented during future breeding seasons to further minimize any incidental take caused by training activities.

Overall, we anticipate that the proposed training, in conjunction with proposed conservation measures, will allow for the persistence of: 1) a large least tern nesting colony at SSTC-N Beach; 2) snowy plover nesting and wintering at SSTC-N, SSTC-S, and NASNI Beaches; and 3) San Diego fairy shrimp within all currently occupied vernal pool habitat at SSTC-S Inland. If new information reveals that the increased training is affecting the species addressed in this biological opinion in a manner inconsistent with this conclusion, reinitiation of consultation may be warranted.

For example, reinitiation of consultation may be warranted if monitoring indicates that the relative use of SSTC-N beach by breeding least terns declines to a level below that observed under baseline conditions between 2005 to 2009 [i.e., an average 11.2 of the U.S. range-wide population (ranging between 7.3 and 13.0 percent) during a 5-year period (Appendix E, Table E.3)]. If least tern use of SSTC-N Beach declines, Service and Navy biologists will evaluate alternative explanations for any observed decline (e.g., continuation of low productivity associated with predation) and the need for additional conservation measures.

Likewise, if monitoring indicates that the western snowy plover numbers within the action area decline below the 5-year average, as determined by maximum active nest numbers: average of 18 plover pairs at SSTC (range of 11 to 22); 10 plover pairs at NASNI (range of 7 to 14); and 8 plover pairs at SSSB (range of 5 to 9), reinitiation of consultation may be warranted. If snowy plover use of SSTC beaches declines, Service and Navy biologists will evaluate alternative explanations for any observed decline (e.g., continuation of low productivity associated with predation) and the need for additional conservation measures.

We look forward to continuing our partnership with the Navy to conserve the natural resources on the Silver Strand Training Complex. If you have any questions or comments concerning this biological opinion, please feel free to contact us. Future coordination efforts to implement this programmatic biological opinion should be directed to Sandy Vissman or David Zoutendyk of my staff at (760) 431-9440.

Sincerely,

Karen A. Goebel

for Jim A. Bartel
Field Supervisor

LITERATURE CITED

American Ornithologists' Union. 1957. Check-list of North American birds. 5th ed. American Ornithololologists Union, Washington, D.C.

Atwood, J. L. and D. E. Minsky. 1983. Least tern foraging ecology at three major California breeding colonies. Western Birds 14(2):57-72.

Atwood, J. L. and P. R. Kelly. 1984. Fish dropped on breeding colonies as indicators of least tern food habits. Wilson Bulletin. 96(1):34-47.

Atwood, J. L. and B. W. Massey. 1988. Site fidelity of least terns in California. Condor 90(2):389-394.

Atwood, J. L. 1986. Delayed nocturnal occupation of breeding colonies by least terns (*Sterna Antillarum*). Auk 103:242-244.

Bailey, S. F. 1984. California Least Tern Foraging and Other Off-Colony Activities Around Alameda Naval Air Station during 1984. Unpublished report. Dept. of Ornithology and Mammalogy, California Academy of Sciences, Golden Gate Park, San Francisco, California.

Baird, P. H. 1997. Foraging of the California least tern in San Diego Bay, California, Final Report. California State University, Long Beach.

Banks, P. B. and J. V. Bryant. 2007. Four legged friend or foe? Dog walking displaces native birds from natural areas. Biological Letters 3:611-613. 4 pp.

Bauder, E. T. 1986. San Diego vernal pools, recent and projected losses; their condition; and threats to their existence 1979-1990, volume I. Prepared for the Endangered Plant Program, California Department of Fish and Game, Sacramento, California.

Bauder, E. T. and S. McMillan. 1998. Current distribution and historical extent of vernal pools in Southern California and Baja Mexico. Ecology, Conservation and Management of Vernal Pool Ecosystems-Proceedings from a 1996 Conference, California Native Plant Society, Sacramento, California [C. W. Witham, E. Bauder, D. Belk, W. Ferron, and R. Ornduff (Editors)].

Blumstein, D. T., E. Fernandez-Juricic, P. A. Zollner, S. C. Garity. 2005. Intra-specific variation in avian responses to human disturbance. Journal of Applied Ecology. 42:943-953. 10 pp.

Boardman, C. J. 1988. Organochlorine pesticides in California least terns (*Sterna antillarum browni*). M.S. Thesis, California State University, Long Beach. 24 pp.

Bohonak, A. J. 2005. MSCP vernal pool inventory City of San Diego (USFWS) conservation genetics of the endangered fairy shrimp species *Branchinecta sandiegonensis*.

Bonesteel, B.. 2009. Email correspondence and telephone conversation with Sandy Vissman (Service) regarding least tern night roosting at SSTC-N Beach.

Brown, J. W., H. A. Wier, and D. Belk. 1993. New records of fairy shrimp (Crustacea: Anostraca) from Baja California, Mexico. The Southwestern Naturalist 38:389-390.

Brunton, D. 1999. "Optimal" colony size for least terns: an inter-colony study of opposing selective pressures by predators. Condor 101:607-615.

Burger, J., S. A. Carlucci, C. W. Jeitner, and L. Niles. 2007. Habitat Choice, Disturbance, and Management of Foraging Shorebirds and Gulls at a Migratory Stopover. Journal of Coastal Research 23(5):1159-1166. 2007.

Caffrey, C. 1993. Summary of monitoring activities of California least terns in southern Califorina. Final report PG 93-11, 35pp. California Department of Fish and Game, Sacramento, California.

Carney, K. M. and W. J. Sydeman. 1999. A review of human disturbance effects on nesting colonial waterbirds. Waterbirds 221, 68–79.

Center for Biological Diversity. 2009. Petition to list the western gull-billed tern *Gelochelidon nilotica vanrossemi* as threatened or endangered under the Endangered Species Act. 41 p.

Chardine, J. and V. Mendenhall. 1998. Human disturbance at Arctic seabird colonies. Technical Report No. 2 from the Circumpolar Seabird Working Group. January 1998. A publication of Conservation of Arctic Flora and Fauna.

Collins, C., K. Bender, and D. Rypka. 1979. Report on the Feeding and Nesting Habits of the California Least Tern in Santa Ana River Mouth Area, Orange County. Report to Corps of Engineers, Los Angeles District.

Collie, N. and E. W. Lathrop. 1976. Chemical characteristics of the standing water of a vernal pool on the San Rosa Plateau, Riverside County, California. In: S. Jain (ed.), *Vernal pools: Their ecology and conservation.* University of California, Davis, Institute of Ecology Publication, no. 9, Davis, California. Pp. 27-31.

Conkle, T. 2003a. Email correspondence and telephone conversations with Sandy Vissman (Service) regarding military training operations conducted at NASNI, NAB, and NRRF.

Conkle, T. 2003b. Email correspondence with Sandy Vissman (Service) regarding the area of beach lanes at NAB, NRRF and NASNI.

Conkle, T. 2009. Email correspondence and telephone conversations with Sandy Visssman (Service) regarding military training operations conducted at NASNI, NAB, and NRRF.

Conservation Committee Report. 1978. Management of National Wildlife Refuges in the United States: impacts on birds. Wilson Bulletin. 90:309-321.

Copper, E. 1986. A study of the breeding biology of the California least tern at Delta Beach, Naval Amphibious Base, Coronado and the Foraging ecology of the California least tern at Navy bases on San Diego Bay in 1986. Report for the Western Division, Naval Facilities Engineering Command.

Copper, E. 2002. Telephone conservation with Martin Kenney (Service) regarding the start of least tern egg in southern California.

Copper, E. 2008. Information sent via e-mail regarding beginning of breeding season in 2008.

Copper, E. 2009a. Information provided at snowy plover/least tern breeding season meeting in attendance by Sandy Vissman (Service) regarding a nest scrape at Coronado Beach.

Copper, E. 2009b. Information provided at snowy plover/least tern breeding season meeting in attendance by Sandy Vissman (Service) observations of predation by gull-billed terns.

Cornwell, G. 1986. Adopt-A-Tern-Nest project. Chat 50:12-13.

Ehrler, C. P., M. L. Elliot, J. E. Roth, J. R. Steinbech, A. K. Miller, W. J. Sydeman, and A. M. Zoidis. 2006. Oakland Harbor deepening project (-50'): Least tern, fish, and plume monitoring. Project year 2005 and four-year final monitoring report. Tetra Tech, Inc., San Francisco, California. July 2006.

Everett, W. T. and D. W. Anderson. 1991. Status and conservation of the breeding seabirds on offshore Pacific islands of Baja California and the Gulf of California, in Croxall, J. P. (ed.), Seabird status and conservation: a supplement: Cambridge, United Kingdom, International Council for Bird Protection Technical Publication 11, p. 15-139.

Eriksen, C. and D. Belk. 1999. Fairy Shrimps of California's Puddles, Pools, and Playas. Mad River Press, Inc., Eureka, California.

Fancher, J. M. 1992. Population Status and trends of the California least tern. Transactions of the western section of the Wildlife Society. 28:59-66.

Fugate, M. 1993. *Branchinecta sandiegonensis*, a new species of fairy shrimp (Crustacea: *Anostraca*) from western North America. Proceedings of the Biological Society of Washington. 106:296-304.

Garrett, K. and J. Dunn. 1981. Birds of southern California. Los Angeles Audubon Soc. 408pp.

Gill J. A., K. Norris, W. J. Sutherland. 2001. Why behavioral responses may not reflect the population consequences of human disturbance. Biological Conservation 97:265±268

Gonzalez, R. J., J. Drazen, S. Hathaway, B. Bauer, and M. Simovich. 1996. Physiological correlates of water chemistry requirements in fairy shrimps (Anostraca) from southern California. Journal of Crustacean Biology 16:315-322.

Grinnell, J. and A. H. Miller. 1944. The distribution of the birds of California: Pacific Coast Avifauna, v. 27, p. 1-615.

Hairston, N. G. Jr. and B. T. De Stasio. 1988. Rate of evolution slowed by a dormant propagule pool. Nature 336:239-242.

Hathaway, S. A. and M. A. Simovich. 1996. Factors affecting the distribution and co-occurrence of two southern California anostracans (*Branchiopoda*), *Branchinecta sandiegonensis* and *Streptocephalus woottoni*. Journal of Crustacean Biology 16:669-677.

Herzig, A. 1985. Resting eggs–a significant stage in the life cycle of crustaceans *Leptodora kindti* and *Bythotrephes longimanus*. Verhandlungen der Internationalen Vereinigung fur theorietische und angewandte Limnologie 22:3088-3098.

Hockin, D., M. Ounsted, M. Gorman, D. Hill, V. Keller, and M. A. Barker. 1992. Examination of the effects of disturbance on birds with reference to its importance in ecological assessments. Journal of Environmental Management Volume 36, Issue 4: 253-286

Holland, R. F. 1976. The vegetation of vernal pools: A survey. In: S. Jain (ed.), *Vernal pools: Their Ecology and Conservation.* University of California, Davis, Institute of Ecology Publication, no. 9, Davis, California.

Holland, R. F. and S. Jain. 1977. Vernal pools. In: M. G. Barbour and J. Major (eds.), *Terrestrial Vegetation of California.* John Wiley and Sons, New York.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished report. State of California, The Resources Agency, Department of Fish and Game, Natural Heritage Division. Sacramento, California.

Holland, R. F. and S. Jain. 1988. Vernal pools. In: Barbour, M.G. and Major, J. (eds), *Terrestrial Vegetation of California*. California Native Plant Society Special Publication No. 9:515-531. Sacramento.

Holtz, Janette. 2003. A life History Study of the San Diego Fairy Shrimp (Branchinecta sandiegonensis). Master's thesis, University of San Diego.

Hoopes, E. M., C. R. Griffin, and S. M. Melvin. 1992. Relationships between human recreation and Piping Plover foraging ecology and chick survival. Unpublished report. University of Massachusetts, Amherst, Massachusetts. 77 pp.

Johnston, S. M. 1995. The effects of human disturbance on time allocation of nesting California least terns. M.S. Thesis, UCLA. 38 pp.

Jones and Stokes Associates. 1987. Sliding toward extinction: the state of California's natural heritage, 1987. Commissioned by The California Natural Conservancy at the request of the California Senate Committee on Natural Resources and Wildlife. Chapter 3, pp. 9-47.

Keane, K. 1987. Sex roles in the parental care of least terns (*Sterna antillarum*). M.S. thesis. California State University, Long Beach, California. 70 pp.

Kushlan, J. A. 1979. Effects of helicopter censuses on wading bird colonies. The Journal of Wildlife Management, Vol. 43, No. 3, pp.756-760.

Lafferty, K. D. 2001. Birds at a Southern California beach: seasonality, habitat use and disturbance by human activity. Biodiversity and Conservation 10: 1949-1962. Lagoon, San Diego County, 1997 season. A report from Wetland Research Associates and Keane Biological Consulting for the Batiquitos Lagoon Enhancement Project. l7pp.

Latas, T. 2010. Discussion and map regarding routing and annual frequency of helicopter sorties over South Bay under baseline and future conditions. 1p.

Lee, D. 2009a. Email correspondence with Sandy Vissman (Service) regarding terrestrial activities conducted in the action area under baseline conditions indicating that there was not breakdown available for the baseline and proposed level of activity on the different segments of the action area.

Lee, D. 2009b. Communication in a meeting with Sandy Vissman (Service) regarding the appropriateness of SSTC-Beach for military training activities.

Lee, D. 2009c. Communication in a meeting with Sandy Vissman (Service) regarding the number of military activities likely to be necessary during the least tern and snowy plover breeding season within Beach Lanes Blue 2, Orange 1 or Orange 2.

Lee, D. 2009d. Communication in a meeting with Sandy Vissman and David Zoutendyk (Service) regarding the avoidance of plover nests by troops conducting training activities. September 21, 2009.

Manning J. A. 2002 *in review*. Distributions of wintering seabirds in a coastal bay: the influence of waterfront development-induced edge effects.

Marschalek, D. A. 2005, 2006, 2007, 2008, 2009. Annual Rangewide California Least Tern Status Reports.

Marschalek, D. A. 2006. California Least Tern Breeding Survey, 2005 Season. California Department of Fish and Game. Sacramento.

Marschalek, D. A. 2007 (Revised 19 February). California least tern breeding survey 2006 Season. California Department of Fish and Game, Wildlife Branch, Nongame Wildlife Program Report.

Marschalek, D.A. 2008. California least tern breeding survey 2007 season. California Department of Fish and Game, Wildlife Branch, Nongame Wildlife Program Report, 2008-01. Sacramento, California. 24 pp. + app.

Marty, J. T. 2005. Effects of cattle grazing on diversity in ephemeral wetlands. Conservation Biology 19:1626-1632.

Massey, B. W. 1974. Breeding biology of the California least tern. Proc. Linnaean Society. New York. 72:1-24.

Massey, B. W. 1987. California least tern foraging study, Los Angeles Harbor, 1986-1987. Port of Los Angeles, Environmental Division. Marine Ecological Consultants, Encinitas, California.

Massey, B. W. and J. L. Atwood. 1979-1985. Application of Ecological Information to Habitat Management for the California Least Tern. Annual report numbers: 1-7. U.S. Fish and Wildlife Service, Laguna Niguel, California.

Massey, B. W. and J. L. Atwood. 1981. Second-wave nesting of the California least tern: Age composition and reproductive success. The Auk. 98:596-605.

Massey, B. W. and J. M. Fancher. 1989. Renesting by California least terns. Journal of Field Ornithology. 60(3):350-357.

Massey, B. W., D. W. Bradley, and J. L. Atwood. 1992. Demography of a California Least Tern Colony Including Effects of the 1982-1983 El Niño. Condor 94:976-983.

Massey, B. W. 1988. California Least Tern Field Study. 1988. Breeding season: A report to the California Dept. of Fish and Game. Final report FG 7660. 22pp.

Minsky, D. 1984. A study of the foraging ecology of the California Least Tern at Camp Pendleton season of 1984. Purchase Order No. N62474-84-M-4561. U.S. Fish & Wildlife Service, Laguna Nigel, California.

Nisbet, I. C. T. 2000. Disturbance, habituation, and management of water bird colonies. Waterbirds 23(2):312-332.

Oberbauer, T. A. 1990. Areas of vegetation communities in San Diego County, Department of Planning and Land Use, County of San Diego, California.

O'Connor, K. 2009. Communication at a site visit with Sandy Vissman (Service) regarding vehicle tracks in vernal pool areas at SSTC-S Inland.

Palacios, E., L. Alfaro, and G. W. Page. 1994. Distribution and abundance of breeding snowy-plovers on the Pacific coast of Baja California. Journal of Field Ornithology. 65:490–497.

Palacio, E. 2009. Email correspondence with Sandy Vissman (Service) regarding unpublished data of 1991-2, 2007 and 2008 snowy plover surveys conducted in Baja California, Mexico.

Page, G. W. and L. E. Stenzel (eds.). 1981. The breeding status of the snowy plover in California. Western Birds. 12(1):1-40.

Page, G. W., F. C. Bidstrup, R. J. Ramer, and L. E. Stenzel. 1986. Distribution of wintering Snowy Plovers in California and adjacent states. Western Birds 17:145–170.

Page, G. W., J. S. Warriner, J. C. Warriner, and P. W. C. Paton. 1995. Snowy plover (*Charadrius alexandrinus*). In: The Birds of North America, No. 154 (A. Poole and F. Gill, eds.), The Academy of Natural Sciences, Philadelphia, Pennsylvania and The American Ornithologists' Union, Washington, D.C.

Patton, R. 2002. California Least Tern Breeding Survey 2000 Season. Final Report to the State of California Department of Fish and Game.

Patton, R. 2003. The status of western gull-billed terns at South San Diego Bay National Wildlife Refuge in 2003. Prepared for the U.S. Fish and Wildlife Service, San Diego National Wildlife Refuge Complex.

Patton, R. 2004a. The Status of Western Snowy Plovers, California Least Terns, and Breeding Waterbirds at South San Diego Bay National Wildlife Refuge in 2002. Prepared for the U.S. Fish and Wildlife Service, San Diego National Wildlife Refuge Complex.

Patton, Robert. 2004b. The Status of Western Gull-billed Terns at South San Diego Bay National Wildlife Refuge in 2003. Prepared for the U.S. Fish and Wildlife Service, San Diego National Wildlife Refuge Complex.

Patton, R. 2006a. The Status of Western Gull-billed Terns at South San Diego Bay National Wildlife Refuge in 2004. Prepared for the U.S. Fish and Wildlife Service, San Diego National Wildlife Refuge Complex.

Patton, R. 2006b. Foraging by Western Gull-billed Terns at Tijuana Slough National Wildlife Refuge and Border Field State Park in 2006. Prepared for the U.S. Fish and Wildlife Service, San Diego National Wildlife Refuge Complex.

Peregrin, C. 2009. Email correspondence and telephone conversation with Sandy Vissman (Service) regarding vehicle use at Silver Strand State Beach in 2008.

Powell, A. N., B. L. Peterson, and J. M. Terp. 1996. The status of western Snowy plovers (*Charadrius alexandrinus nivosus*) in San Diego County, 1996. Report to the California Department of Fish and Game, Sacramento, California, and U.S. Fish and Wildlife Service, Carlsbad, California and Portland, Oregon. 25pp.

Powell, A. N., J. M. Terp, C. L. Collier, and B. L. Peterson. 1997. The status of western snowy plovers (*Charadrius alexandrinus nivosus*) in San Diego County, 1997. Report to the California Department of Fish and Game and the U.S. Fish and Wildlife Service.

Powell, A. and C. Collier. 1994. The status of Western Snowy Plovers (Charadrius alexandrinus nivosus) in San Diego County, 1994. Report to the California Dept. of Fish and Game and U.S. Fish and Wildlife Serv. 23pp.

Powell, A., B. Peterson, and J. Terp. 1996. The status of western snowy plovers (Charadrius alexandrinus nivosus) at Camp Pendleton, 1996. A report for the Marine Corps Base, Camp Pendleton. 32pp.

Powell, Abby N. 1996. Western snowy plover use of State-managed lands in southern California, 1995. California Department of Fish and Game, Wildlife Management Division, Bird and Mammal Conservation Program Rep 96-03, Sacramento, California. 14 pp.

Powell, A. N. and C. L. Collier. 2000. The status of western snowy plovers (Charadrius alexandrinus nivosus) in San Diego County, 2000. Report to the California Department of Fish and Game and U.S. Fish and Wildlife Service.

(RECON) Regional Environmental Consultants. 1996. Integrated natural resources management plan for the Naval Amphibious Base, Coronado, California. Prepared for Southwest Division, NAVFACENGCOM. September. Revised October 1998.

(RECON) Regional Environmental Consultants. 2004. Final Biological Resources Survey Report for the Naval Radio Receiving Facility, Naval Base Coronado, San Diego, California. Prepared for Naval Resources Office Environmental Department (N45RN) Commander Navy Region Southwest. Contract Number: N68711-00-D-44144 0006.

(RECON) Regional Environmental Inc. Draft 2005. Natural Resources Inventory Report for Naval Air Station North Island, Naval Base Coronado, San Diego, California. Prepared for Commander, Navy Region Southwest Environmental Department, Natural Resources Office, under contract with Naval Facilities Engineering Command Southwest.

Ripley, B. J., J. Holtz, and M. A. Simovich. 2004. Cyst bank life-history model for a fairy shrimp from ephemeral ponds. Freshwater Biology 49:221-231.

Ryan, T. 2008. 2008 Summer Window Survey for Snowy Plovers on U.S. Pacific Coast with 2005-2007 Results for Comparison. Ryan Ecological Consulting.

Ruhlen, T. P., S. Abbott, L. E. Stenzel, and G. W. Page. 2003. Evidence that human disturbance reduces snowy plover chick survival. Journal of Field Ornithology. 74(3) 300-304.

Sawyer, J. O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. Sacramento: California Native Plant Society.

Schaal, B. A. and W. J. Leverich. 1981. The demographic consequences of two-stage life cycles: survivorship and the time of reproduction. American Naturalist 118(1):135-138.

Shepherd, T. 2009a. Meeting conversation with Sandy Vissman (Service) regarding an MOU between the Service and Navy for establishing a mitigation bank at SSTC-S Inland.

Shepherd, T. 2009b. Meeting conversation with Sandy Vissman (Service) regarding human disturbance at STTC beaches.

Shepherd, T. 2009c. Meeting conversation with Sandy Vissman (Service) regarding security at NAB.

Shepherd, T. 2010. Information provided at tern/plover meeting conducted on April 28, 2010.

Stenzel, L. E., J. C. Warriner, J. S. Warriner, K. S. Wilson, F. C. Bidstrup, and G. W. Page. 1994. Long-distance breeding dispersal of snowy plovers in western North America. Journal of Animal Ecology. 63:887-902.

Structural Decision Making Workshop. 2009. Notes from meeting to address management of gull-billed terns, western snowy plovers, and California least terns. San Diego Bay National Wildlife Refuge.

Templeton, A. R. and D. A Levin. 1979. Evolutionary consequences of seed pools. *American Naturalist* 114(2):232-249.

Terp, J. M. and M. Pavelka. 1999. Summary of Colonial Seabird Nesting at Western Salt Company 1998 Season. U.S. Fish and Wildlife Service, Coastal Program, Carlsbad, California.

Thompson, B. C., J. A. Jackson, J. Burger, L. A. Hill, E. M. Kirsch, and J. L. Atwood. 1997. Least Tern (*Sterna antillarum*). In: The Birds of North America, No. 290 (A. Poole and F. Gill, eds.), The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, D.C.

U.S. Department of the Navy (DoN) and U.S. Fish and Wildlife Service (Service). 1984. Memorandum of Understanding USFWS Relating to the Designation and Management of a Preserve for the California Least Tern at Naval Amphibious Base, Coronado.

U.S. Department of the Navy (DoN) and U.S. Fish and Wildlife Service (Service). 1987, 1993, 1999, 2000, 2004. Memorandum of Understanding between USFWS and the U.S. Navy Concerning Conservation of the Endangered California Least Tern in San Diego Bay, California.

U.S. Department of the Navy and U.S. Fish and Wildlife Service (DoN). 2001. Presence/Absence Surveys for Federally Listed Fairy Shrimp Conducted During 2001. 5 pp.

U.S. Department of the Navy (DoN). 2003. Presence/Absence Surveys for Federally Listed Fairy Shrimp Conducted During 2001 and 2003 at Naval Radio Receiving Facility, Imperial Beach. 8pp.+Appendix.

U.S. Department of the Navy (DoN). 2003b. Foraging behavior of the California least terns adjacent to piers in San Diego Bay, San Diego, California. Prepared by Merkel & Associates, Inc., San Diego, California.

U.S. Department of the Navy (DoN). 2004. Silver Strand Training Complex, Operations Training Plan.

U.S. Department of the Navy (DoN). 2005. Email communication with Sandy Vissman (Service) regarding the area of the SSTC N beach lanes.

U.S. Department of the Navy (DoN). 2008. Biological Assessment for Silver Strand Training Complex. 140 pp.

U.S. Department of the Navy (DoN). 2009a. Weekly reports sent to Sandy Vissman (Service) regarding the status of the least tern and snowy plover colonies within the action area. Also included within the weekly reports is information regarding issues observed at each site including; recreational trespass, predation, incidental take, etc.

U.S. Department of the Navy (DoN). 2009b. Email communication with Sandy Vissman regarding the number of snowy plover eggs collected and chicks released in the action area since 2004.

U.S. Department of the Navy (DoN). 2009c. Communication in a meeting with Sandy Vissman (Service) regarding controlling dogs in snowy plover nesting areas.

U.S. Department of the Navy (DoN). 2009d. Communications in meetings with Sandy Vissman (Service) regarding the status of South Delta Beach as Munitions Response Site 5.

U.S. Department of the Navy (DoN). 2009e. Navy Comments on Draft BO.

U.S. Fish and Wildlife Service (Service). 1970. Conservation of Endangered Species and other Fish or Wildlife. Bureau of Sport Fisheries and Wildlife, Fish and Wildlife Service, *Federal Register* 35:8491 8498.

U.S. Fish and Wildlife Service (Service). 1985a. Recovery Plan for the California Least Tern *(Sterna antillarum browni).* U.S. Fish and Wildlife Service, Portland Oregon. 112 p.

U.S. Fish and Wildlife Service (Service). 1993. Endangered and threatened wildlife and plants: determination of threatened status for the Pacific coast population of the Western Snowy Plover. *Federal Register* 58:12864-12874.

U.S. Fish and Wildlife Service (Service). 1996. Notice of Availability of Petition Management Guidance for Petitions Received Under the Endangered Species Act. *Federal Register* 61: 36075.

U.S. Fish and Wildlife Service (Service). 1997. Endangered and threatened wildlife and plants; determination of endangered status for the San Diego fairy shrimp. *Federal Register* 62:4925-4939.

U.S. Fish and Wildlife Service (Service). 1998. Vernal Pools of Southern California Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 113+ pp.

U.S. Fish and Wildlife Service (Service). 2004. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to Delist the Pacific Coast Population of the Western Snowy Plover and Initiation of a 5-Year Review. *Federal Register* 69:13326-13329. March 22, 2004.

U.S. Fish and Wildlife Service (Service). 2005a. Biological Opinion on Military Training Operations During 2005 and 2006 Breeding Seasons at Naval Base, Coronado and Naval Radio Receiving Facility, Imperial Beach, Naval Base Coronado, San Diego, California. (FWS-SDG-3452.3). March 10, 2005.

U.S. Fish and Wildlife Service (Service). 2005b. Biological Opinion on the Navy's proposed and ongoing operations and 2005 management strategy for the western snowy plover (*Charadrius alexandrinus nivosus,* snowy plover) and California least tern (*Sterna antillarum browni*) at Naval Air Station, North Island (NASNI)/Naval Base Coronado (NBC) located in San Diego County, California. (FWS-SDG-3908.3). June 20, 2005.

U.S. Fish and Wildlife Service (Service). 2006a. California least tern (*Sterna antillarum browni*) 5-Year Review Summary and Evaluation. Carlsbad Fish and Wildlife Office, Carlsbad, California. September 2006. 35 pages.

U.S. Fish and Wildlife Service (Service). 2006b. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to Delist the Pacific Coast Population of the Western Snowy Plover. *Federal Register* 71:20607-20624. April 21, 2006.

U.S. Fish and Wildlife Service (Service). 2006c. Endangered and Threatened Wildlife and Plants; Proposed Special Rule Pursuant to Section 4(d) of the Endangered Species Act for the Pacific Coast Distinct Population Segment of the Western Snowy Plover. *Federal Register* 71:20625-20636. April 21,2006.

U.S. Fish and Wildlife Service (Service). 2006d. Endangered and Threatened Wildlife and Plants; Proposed Special Rule Pursuant to Section 4(d) of the Endangered Species Act for the Pacific Coast Distinct Population Segment of the Western Snowy Plover. *Federal Register* 71:35406-35407. June 20, 2006.

U.S. Fish and Wildlife Service (Service). 2006e. San Diego Bay National Wildlife Refuge: Sweetwater Marsh and South San Diego Bay Units, Final Comprehensive Conservation Plan/Environmental Impact Statement. San Diego Bay National Wildlife Refuge Complex, Carlsbad, CA.

U.S. Fish and Wildlife Service (Service). 2007a. Recovery Plan for the Pacific Coast Population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*). In 2 volumes. Sacramento, California. xiv + 751 pages.

U.S. Fish and Wildlife Service (Service). 2007b. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Reviews of 58 Species in California and Nevada; Availability of Completed 5-Year Reviews in California and Nevada. *Federal Register* 72:7064-7068. February 14, 2007.

U.S. Fish and Wildlife Service (Service). 2008a. San Diego Fairy Shrimp (*Branchinecta sandiegonensis*) 5-Year Review: Summary and Evaluation September 2008. 82 pages.

U.S. Fish and Wildlife Service (Service). 2008b. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp.

U.S. Fish and Wildlife Service (Service). 2008c. FWS-SDG-08BO503-08TA0556. Correspondence dated May 20, 2008 extending analysis and coverage associated with biological opinion.

U.S. Fish and Wildlife Service (Service). 2009a. Environmental Assessment-Gull-billed Tern Population Management Project.

U.S. Fish and Wildlife Service (Service). 2009b. Summary data for gull-billed terns at San Diego National Wildlife Refuge. Excel spreadsheet.

Unitt, P. 1984. The birds of San Diego County. San Diego Society of Natural History. San Diego, California, USA.

Venable, D. L. 1989. Modeling the evolutionary ecology of seed banks. In: M. A. Leck, V. T. Parker, and R. L. Simpson (eds.), Ecology of Soil Seed Banks, pp. 67-87. Academic Press, San Diego, California.

Vissman, S. 2009. Observations during 2009 site visits with Navy and Service personnel to SSTC-S Inland area.

Widrig, R. S. 1980. Snowy Plovers at Leadbetter Point. An opportunity for wildlife management? Prepared for the U.S. Fish and Wildlife Service, Willapa NWR, Ilwaco, Washington. 14 pp.

Warriner, J. S., J. C. Warriner, G. W. Page, and L. E. Stenzel. 1986. Mating system and reproductive success of a small population of polygamous snowy plovers. Wilson Bulletin 98:15-37.

Watkins, Jim. 2010. Phone conversation on May 6, 2010 discussing the use of the 1.3 correction factor to develop annual population estimates, and applicability to southern California.

Welchell, A. and K. Keane. 1998. Western Snowy Plover Breeding Survey for Bataquitos Lagoon, San Diego County, 1997 Season. A report from Wetland Research Associates and Keane Biological Consulting for the Bataquitos Lagoon Enhancement Project. 17pp.

Widrig, R. S. 1980. Snowy plovers at Leadbetter Point. An opportunity for wildlife management? Prepared for the U.S. Fish and Wildlife Service, Willapa National Wildlife Refuge, Ilwaco, Washington. 14 pp.

Wilson, R. A. 1980. Snowy plover nesting ecology on the Oregon coast. M.S. Thesis, Oregon State Univ., Corvallis, Oregon. 41 pp.

Woodfield, E. and Langston, R. 2004. Literature Review on the Impact on Bird Populations of Disturbance due to Human Access on Foot. RSPB research report No. 9, Project Reference FST20-11-011.

Yuen, A. 2006. Email correspondence with Sandy Vissman regarding the necropsy work done on grebes that had washed up on Silver Strand State Beach in 2006.

Appendix A. Schematic representations of training activities proposed for SSTC beaches (from DoN 2008).

The Silver Strand beaches stretch inland and slope upward from the mean high tide line approximately 20 yards inland, towards a feature called the beach crest. The beach crest is a high point on the beach where the slope of the shore levels out. The beach remains generally flat, with gentle dunes in some areas, from the beach crest to Highway 75. The beach above the crest is about half as wide at SSTC-S compared to SSTC-N, and the dunes are intermittent along the length of the SSTC on the oceanside.

Least terns and snowy plovers generally nest above the beach crest, and nests may occur at higher density closer to the crest than further inland. Training activities use the beach below the beach crest in the intertidal area and hardpacked sand, and some use the beach above the beach crest in the in the area that supports nesting least terns and snowy plovers.

The figures and descriptions below provide general information regarding the general footprint for each type of training activity to aid in assessment of how each type of activity may affect nesting least terns and snowy plovers. Each training activity is described and the footprint and location is depicted as a line drawing or shape.

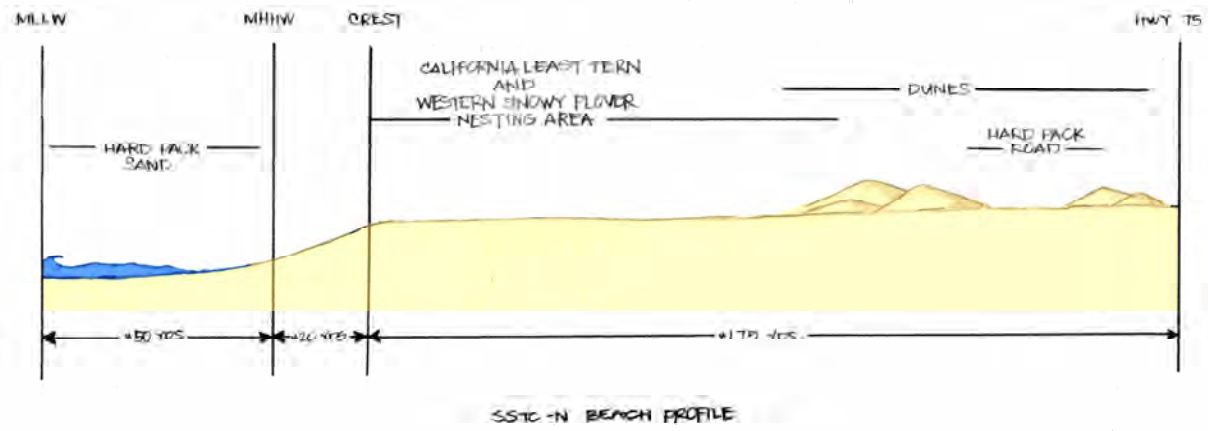


Figure A-1: Generalized Beach Profile for the Silver Strand Beaches (from DoN 2008)

A profile view of the beach is provided in Figure A-1, and an overhead view of the beach cross-section is provided in Figure A-2. These figures also show the water, crest, nesting area, and dunes. The red dashed line in Figure A-2 represents the area where actions were modeled for their effect on nesting birds. Because this area begins at the crest and extends to Highway 75, parts of the actions which take place below the crest are not indicated in the action diagrams. This is the area in which training activities may overlap with nesting birds on the beach.

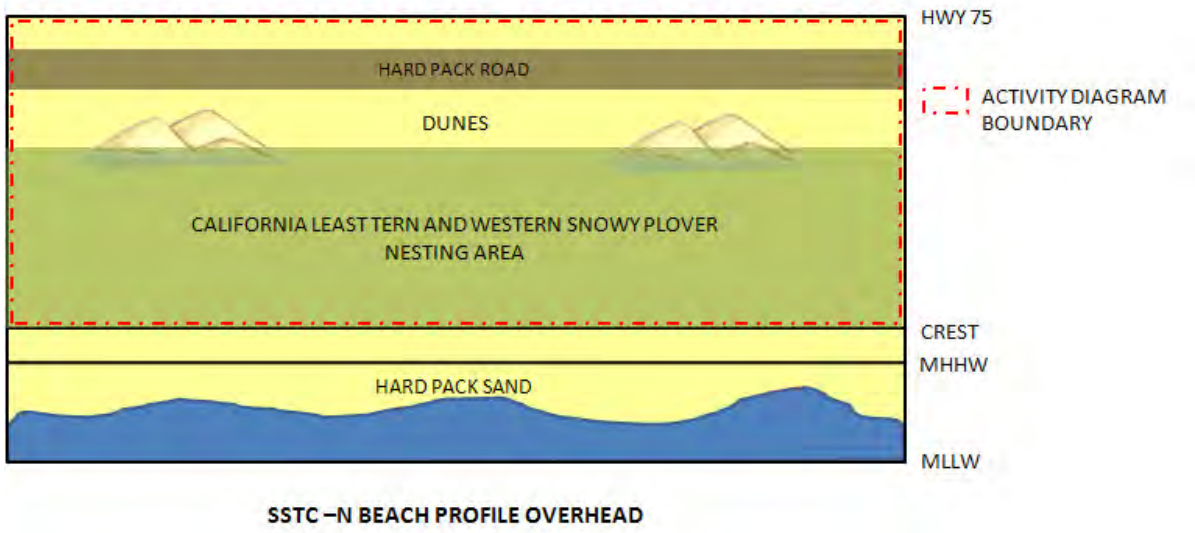


Figure A-2: Beach Profile Overhead Showing Outline of the Action Diagram Boundary

The area depicted as the footprint of each action below is the maximum extent of the footprint on the beach, which may result in an overestimate of the actual area that is likely to be impacted, since most training activities are not likely to extend across every square yard within their footprint perimeter.

Beach Party Teams. Training exercises that include a Beach Party Team are proposed only in SSTC-N, and would occur approximately 534 times per year under the Proposed Action. The beach party teams consist of support vehicles and heavy equipment that set up, operate, and maneuver along the beach to facilitate activities that are occurring in the water and during beaching activities. Beach party teams typically take place on the hard pack sand of the beach near the water line as well as along the crest, out of the water. Vehicles and equipment may operate on a segment of the beach lane width, or up to the full 500 yard width of the beach lane. This figure (A–3), as well as the rest of the action figures, represent the likely footprint of each action on the beach.

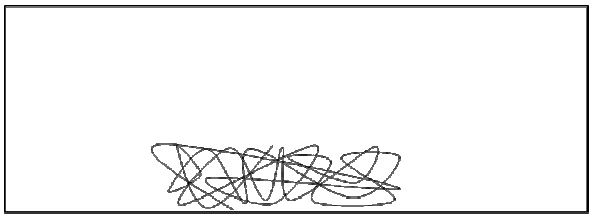


Figure A-3: Approximate Footprint of a Beach Party Team

Beach Camp. Training exercises that include a Beach camp are infrequent at SSTC, but have a large potential footprint and impact (Figure A-4) and are proposed at both SSTC-N and SSTC-S beach. Two training events are proposed per year. The number of beach lanes requested varies,

depending on the number of personnel that will take part in the particular camp. This training activity consists of setting up a self-sustaining field camp. Mock aggressions may also be included.

Figure A-4: Approximate Footprint of a Beach Camp

Equipment Offload and Staging. This infrequent training activity typically takes place at SSTC-N. Materials, equipment, and vehicles are unloaded from barge ferry sections onto the beach. The action footprint includes the area used to store items on the beach. Depending on the amount of equipment to be offloaded, this staging and maneuver area has the potential to impact the entire beach lane in which it is scheduled (Figure A-5).

Figure A-5: Approximate Footprint of Equipment Offload and Staging Action

Causeway and ELCAS. These activities involve the insertion of a causeway onto the beach. Most of the causeway remains floating offshore, anchored by driven piles; the onshore area includes the footprint of the front end of the landing unit as well as additional area that may be mechanically excavated for its landing or to remove it off of the beach at the conclusion of the activity (Figure A-6). Construction of ELCAS does not require the excavation of sand, but does require heavy equipment to level the sand where the causeway is planned for construction and prepare it for pile driving and anchoring. Causeway actions occur primarily on SSTC-N oceanside training lanes, but also periodically in the bayside training area Bravo.

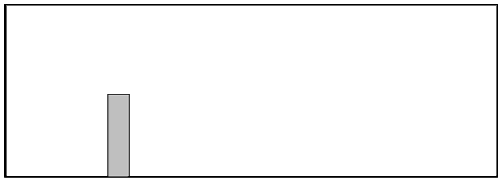


Figure A-6: Approximate Footprint of Causeway and ELCAS Action

MCM Beaching Action. These are Mine Countermeasure Beaching Actions and occur during MCM Activities, approximately 42 times per year under the Proposed Action. They occur occasionally on SSTC-N, primarily at SSTC-S. This portion of the MCM activity occurs after the mine shape has been neutralized offshore and involves towing the mine to shore for follow-on procedures. Vessels and the mine itself remain on the hardpack sand. Personnel dragging the mine onto shore with a rope may walk up onto the crest. In addition, logistical vehicles may park up along the crest (Figure A-7).

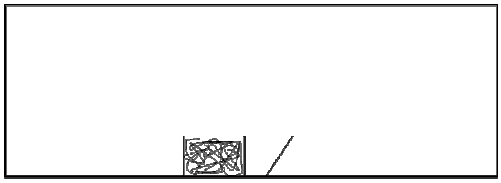


Figure A-7: Approximate Footprint of MCM Beaching Action

LCAC Landing. An LCAC, or hovercraft, landing action takes place as part of a single activity, four times per year under the Proposed Action. An LCAC is a large craft that uses fans to hover above the water or land. Its footprint includes its physical structure plus the area surrounding it, which is affected by the strong winds it produces. LCACs beach near the crest of the beach and have the potential to disperse sand along the full width and length of the beach lane (Figure A-8). Landings occur entirely on SSTC-N ocean training lanes.

Figure A-8: Approximate Footprint of an LCAC Landing

Vehicle Patrol. Vehicle patrolling takes place primarily on SSTC-N about 56 times per year during a single activity. It involves vehicles driving along the hard pack and soft pack sand patrolling the beach in directions determined by the trainees so that they can learn to drive and operate the vehicles in varying terrain. It is limited to SSTC-N beach lanes Yellow 1 and 2 and Green 1 and 2 because of the large potential impact it can have on nesting resources on the beach over the course of multiple patrolling actions. It is conservatively estimated to impact about half of the available beach lane over the course of the year (Figure A-9).

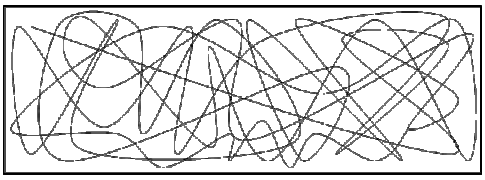


Figure A-9: Approximate Footprint of Vehicle Patrol Action

Raids. Raids consist of groups of people entering the beach from the water, spreading out, hiding, and moving across the beach. This action normally takes place in an east to west orientation (along the short axis of the beach) with troops moving inland from the water (Figure A-10). Under the Proposed Action this action would occur approximately 204 times per year, about half the time on SSTC-N oceanside training lanes, and the rest of the time on SSTC-S and in the designated NASNI training area.

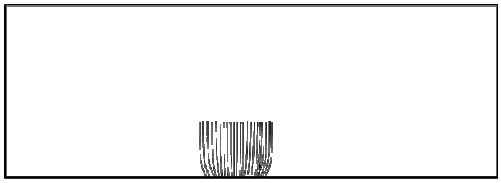


Figure A-10: Approximate Footprint of Raid Action

Foot Patrol and Ambush. This action involves groups of individuals walking in single file line formation on the beach. Individuals typically patrol walking north and/or south (along the long axis of the beach). Patrols sometime include ambushes, which often include pop-ups or individuals that hide in designated places. When ambushed, patrolling individuals retreat and retain formation where possible (Figure A-11). Foot patrol and ambushes are expected to take place 472 times per year under the Proposed Action. About half of these activities occur on the SSTC-N oceanside beach lanes, with the rest distributed between SSTC-N bayside lanes, SSTC-S, and the designated NASNI training area.

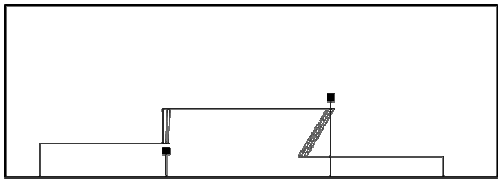


Figure A-11: Approximate Footprint of Foot Patrol and Ambush Action

Beach Crossing and OTB. This action is fairly common and involves small groups on foot transiting across the beach. The groups typically transit in a line formation (may include multiple lines of personnel), and individuals may be carrying inflatable boats (Figure A-12). This action is analyzed separately from Foot Patrolling and Ambush because individuals are moving across the

beach along a different axis (along the short axis). This results in a different footprint and potential impact. This action could take place 480 times per year under the Proposed Action, about half the time on the SSTC-N beaches and otherwise distributed across SSTC-S, bayside beaches, and the designated NASNI training area.

Figure A-12: Approximate Footprint of Beach Crossing and OTB Action

Observation Posts. This action involves individuals setting up 2 to 3 observation posts on the beach, approximately 10x10 sq yd in dimension. Equipment and vehicles typically remain on the sand road or along the hardpack sand. Personnel will station the observation posts, and communicate and sneak between posts (Figure A-13). The action often includes coordinated attacks from the observation posts on a target, which is evaluated under the patrolling and ambush action. Observation posts take place 84 times per year under the Proposed Action, 100 percent of the time on the SSTC-N beaches, and under one activity: Amphibious Warfare Activity.

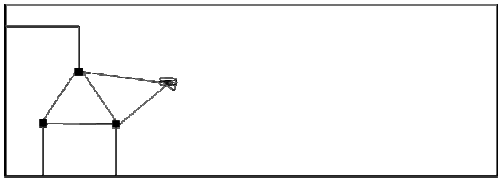


Figure A-13: Approximate Footprint of Observation Post Action

Reconnaissance. Reconnaissance takes place approximately 396 times per year under the Proposed Action, always on the SSTC-N beaches. It consists of individuals possibly entering the beach area from the water, and reconnoitering the beach for potential aggressors as well noting characteristics about the beach to aid follow-on activities. It is generally conducted by two or three persons who will circuit the beach on foot to check for enemy aggressors prior to a larger group landing on shore (Figure A-14).

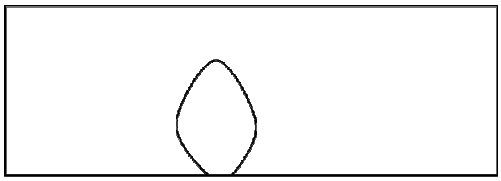


Figure A-14: Approximate Footprint of Reconnaissance Action

Logistic and Safety Vehicles. This action is common to most of the activities that occur on SSTC. Even activities which do not otherwise access the shore often require on-shore vehicles monitoring for safety and logistical reasons. Under the Proposed Action this action would take place 4,672 times per year, about 75 percent of the time on the SSTC-N beaches, the rest of the time dispersed throughout the action area. It consists of vehicles driving or sitting stationary on the beach from the best vantage point, and out of the way of other beach activities. If they are observing or supporting offshore activities they may transit along the beach crest or on the hard pack sand between the crest and high tide line (Figure A-15).

Figure A-15: Approximate Footprint of Logistic and Safety Vehicles

Running. Running takes place under physical fitness activities and consists of individuals or groups using the beach's varied sand conditions for physical conditioning. It typically takes place along the long axis of the beach in varied sand types depending on the type of conditioning desired. Individuals will run on the hard pack sand , along the crest where the sand is soft and challenging, and along the sand road at the back of the beach, which provides a medium level of difficulty (Figure A-16). It occurs approximately 976 times per year, about 90 percent of the time at SSTC-N and otherwise at SSTC-S and NASNI beaches.

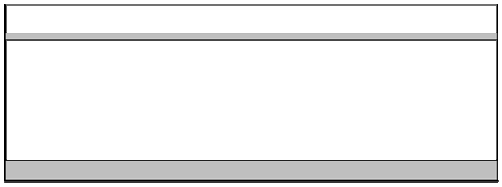


Figure A-16: Approximate Footprint of Running Action

Manual Excavations. Manual excavations take place 52 times per year under the Proposed Action, about 90 percent of the time on the SSTC-N oceanside beaches. They consist of individuals digging trenches, latrines, burying/excavating items hidden in the sand, and concealing beached boats. Individuals will often bury these items just below the crest of the beach where the slope face makes the burying easier. It is localized with a small (10 x 10 yard) footprint on the beach (Figure A-17).

Figure A-17: Approximate Footprint of Manual Excavations

Visual Observation. Visual observation takes place about 160 times per year under the Proposed Action, about 50 percent of the time at SSTC-N and the rest of the time at SSTC-S and NASNI. Individuals stand on the crest of the beach where they have a good view of the waves, offshore, and beach activities to observe and record their observations (Figure A-18). Trainees are fairly stationary and therefore the action does not cast a large footprint.

Figure A-18: Approximate Footprint of Visual Observation

Off Road Foot Traffic in the SSTC-S Inland Area. This action was identified from the Proposed Action specifically to analyze for the effect on San Diego fairy shrimp. Activities that include off-road foot traffic as an action and request access to the SSTC-S inland area amount to 460 times of potential foot training in the SSTC-S inland area. Activities that request the inland area as a training location could also potentially train at other SSTC locations; an estimated 5 percent of the training would actually occur in the SSTC-S inland area. This leaves 23 times of foot training that could potentially occur in vernal pools at SSTC. Effects on fairy shrimp are dependent on the actual level of foot traffic in the pools.

Appendix B: Biological Opinions and MOU's Regarding Activities Within the Action Area

2009 - Electronic mail message from USFWS that extended the findings of the 2005-2006 biological opinion and associated incidental take coverage to the 2009 breeding season.

2008 - Correspondence that extended the findings of the 2005-2006 biological opinion and associated incidental take coverage to the 2008 breeding season.

2007 - Biological Opinion (FWS-SDG-3452.3 July 16, 2007) on military training and conservation actions during 2007 breeding seasons at NAB Coronado, NASNI, and NRRF Imperial Beach, NBC.

2005 - Biological Opinion (FWS-SDG-3452.3 March 10, 2005) on military training during 2005 and 2006 breeding seasons at NAB Coronado, NASNI, and NRRF Imperial Beach, NBC.

2004 - Biological Opinion (FWS-SDG-3452.2 August 9, 2004) on military training during 2004 breeding seasons at NAB Coronado, NASNI, and NRRF Imperial Beach, Naval Base Coronado.

2003 - Biological Opinion (FWS-SDG-3452.1 May 15, 2003) on military training during the 2003 breeding seasons at NAB, Coronado, and NRRF, Imperial Beach, Naval Base Coronado. Amends BO FWS-SDG-3452.1 of 1 week earlier to correct the length of beach that would be staked with 3-foot tall markers delineating the Alpha crossing lane, and to incorporate by reference the scheduling procedures dated October 2002 that were developed in response to Term and Condition 2c of BO 1-6-02-2645.1 dated April 16, 2002. Also incorporated by reference procedures for incubating and hand rearing of collected least tern and snowy plover eggs.

2003 - Biological Opinion (FWS-SDG-3452.1 May 8, 2003) on military training during the 2003 breeding seasons at NAB, Coronado, and NRRF, Imperial Beach, Naval Base Coronado.

2002 - Biological Opinion (1-6-02-F-2645.1 April 16, 2002) on management strategies during the 2002 California least tern and western snowy plover breeding season at NAB Coronado beaches. Expanded beach crossing area and added raking as a deterrence measure.

2001 - Biological Opinion (April 16, 2001) extending BO 1-6-99-F-28 to add marking of all nests, introduce five beach crossing lanes and eliminate 500-yard coned off beach, establish a training schedule protocol during the breeding season.

2000 - Biological Opinion (June 12, 2000) extending BO 1-6-99-F-28 and take authorized under BO 1-6-97-F-37.

1999 - Biological Opinion (1-6-99-F-28 May 3, 1999) reinitiating consultation on management strategies during the 1999 California least tern and western snowy plover breeding seasons at NAB Coronado to extend the take authorization under BO 1-6-97-F-37 and add western snowy plover to the take permit coverage.

1997 - Biological Opinion (1-6-97-F-37 June 2, 1997) on military training on NAB Coronado beaches to reduce the protected area to a 500-yard (457-meter) section of Green 2. Service letter (8 April 1998) to Commanding Officer of NBC extended take authorization under BO 1-6-97-F-37.

Naval Base Coronado Biological Opinions and MOU Addressing Tern Foraging

2007 - Biological Opinion (FWS-SDG-4032.6) on the Fiddler's Cove Marina Repairs and Improvements Project, San Diego County, California.

2004 - Two-year, programmatic MOU (Service – U.S. Navy) establishing standards and conditions for in-water construction activities in San Diego Bay to prevent adverse effects to the endangered California least tern (DoN and Service 1993, 1999, 2000, 2004).

2002 - Biological Opinion (FWS-SDG-3025.1 August 7, 2002) Proposed Repelling Tower at the Naval Radio Receiving Facility.

NASNI Biological Opinions and MOU Addressing Construction, Airfield Operations and Training

2006 - Biological Opinion (FWS-SDG-3908.4 June 20, 2005) on military training during 2005 breeding seasons at NASNI.

2005 - Biological Opinion (FWS-SDG-3908.5 July 20, 2005) on the Navy Lodge Expansion on NASNI.

2005 - Letter of Amendment (FWS-SDG-3908.4 June 20, 2005) to BO FWS-SDG-3908.3, on ongoing operations and 2005 management strategy for the western snowy plover and California least tern at NASNI due to the elevated level of take on snowy plovers incurred on NASNI due to operations.

2005 - Biological Opinion (FWS-SDG-3908.3 April 1, 2005) on ongoing operations and the 2005 management strategy for the western snowy plover and California least tern at NASNI and expansion of the Navy Lodge on NASNI, including military operations on the NASNI beach.

1984 - MOU (March 12, 1984) between the Department of Navy and Service Relating to the Designation and Management of a Preserve for the California Least Tern at Naval Amphibious Base, Coronado.

1983 - Biological Opinion (1-1-82-F-123 March 2, 1983) regarding changes in the Maintenance and Training Facility (MAT) site (helicopter take-off and landing facility) repair project and construction of the Light Airborne Multipurpose Systems (LAMPS) helicopter maintenance and training facilities.

1980 - Biological Opinion (1-1-80-F-18 March 5, 1980) regarding displacement of tern nesting sites at a helicopter parking, landing, and takeoff area and around the airfield at NASNI.

Appendix C. Plover Data and Calculations

Table C.1. 2009 Summer Window Survey for Snowy Plovers on U.S. Pacific Coast.

2009 Summer Window Survey for Snowy Plovers on U.S. Pacific Coast with 2005-2008 Results for Comparison. Note: blanks indicate no survey was conducted.

REGION	SITE	OWNER	Total Adults 2005	2006	2007	2008	2009	2009 Adult Breakdown male	fem.	sex?	Date	Primary Observer(s)
Grays Harbor	Copalis Spit	State Parks		0	0	0	0	0	0	0	21-May	Cyndie Sundstrom
	Conner Creek	State Parks		0	0	0	0	0	0	0	21-May	Cyndie Sundstrom
	Damon Point/Oyhut	S.Parks, D. Nat R, F& W	5	0	0	0	0	0	0	0	20-May	Max Zahn, Warren Michaelis
County Total			5	0	0	0	0	0	0	0		
Pacific	Midway Beach	Private, State Parks	23	25	22	12	16	8	7	1	19-May	Cyndie Sundstrom, Kathy Gunther, Warren Michaelis
	Graveyard	Shoalwater Indian Tribe				1	0	0	0	0	22-May	Cyndie Sundstrom, Steve Spencer
	Leadbetter Point NWR	USFWS, State Parks	9	42	28	29	26	13	8	5	18-May	K. Gunther, Bill Ritchie, C. Sundstrom, Marie Fernandez, W. Michaelis
	South Long Beach	Private		0	0	0	0	0	0	0	18-May	Kathy Gunther
County Total			32	67	50	42	42	21	15	6		
Washington Total			37	67	50	42	42	21	15	6		
Clatsop	Fort Stevens State Park (Clatsop Spit)	ACOE, OPRD	0	0								
	Necanicum Spit	OPRD	0	0	0	0						
County Total			0	0	0	0	0	0	0	0		
Tillamook	Nehalem Spit	OPRD	0		0	0	0	0	0	0	18-May	Jay Schleier
	Bayocean Spit	ACOE	0	0	0	0	0	0	0	0	22-May	Herman Biederbeck
	Netarts Spit	OPRD	0	0	0	0	0	0	0	0	21-May	Liz Kelly, Fran Recht
	Sand Lake Spit (S)	USFS	0	0	0	0	0	0	0	0	21-May	Anne Walker
	Nestucca Spit	OPRD	0	0	0	0						
County Total			0	0	0	0	0	0	0	0		
Lane	Baker Beach/Sutton Creek	USFS	0	2	0	0						
	Sutton Cr/Siuslaw River N Jetty	USFS		0			0	0	0	0	23-May	
	Siuslaw River S Jetty to Siltcoos	USFS										
	Siltcoos Spits N & S	USFS	11	18	16	11	17	9	8	0	16&18 May	
County Total			11	20	16	11	17	9	8	0		
Douglas	Siltcoos-Tahkenitch (Dunes Overlook)	USFS	9	2	19	7	6	3	3	0	18-May	
	Tahkenitch Spit N & S	USFS	5	1	5	0	3	2	1	0	27-May	
	Umpqua River S Jetty to Tenmile Spit	USFS				0	11	5	6	0	19-May	
County Total			14	3	24	7	20	10	10	0		
Coos	Tenmile Spits	USFS	13	15	27	24	24	11	13	0	20-May	
	Coos Bay N Spit	BLM, ACOE	27	27	26	30	41	23	18	0	28-May	
	Whiskey Run to Coquill River	OPRD	0	0	0	0						
	Bandon State Park to New River	OPRD, Private, BLM	22	12	15	8	14	8	6	0	24-May	
County Total			62	54	68	62	79	42	37	0		
Curry	New River to Floras Lake	BLM, Private, County	13	14	17	25	24	15	9	0	24&26 May	
	Blacklock Point to Sixes River (C. Blanco)	BLM, OPRD		0								
	Elk River	Private			0	0	0	0	0	0	19-May	Stuart Love, Dean Headlee
	Euchre Creek to Greggs Creek	OPRD, Private	0	0								
	Myers Creek to Pistol River	OPRD, Private			0							
County Total			13	14	17	25	24	15	9	0		
Oregon Total			100	91	125	105	140	76	64	0		
Total Unit 1			137	158	175	147	182	97	79	6		

Del Norte	Smith River	Private, CDPR[2]	0	0	0	0	0	0	0	0	17-May	J. Harris
	Lake Earl/Talawa	CDFG[1]	0	0	0	0	0	0	0	0	17-May	J. Harris
	Crescent Beach	Crescent City	0	0	0	0	0	0	0	0	18-May	J. Watkins
County Total			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
Humboldt	North Gold Bluffs Beach	USNPS, CDPR	0	0	0	0	0	0	0	0	18-May	RNP staff
	South Gold Bluffs Beach	USNPS, CDPR	0	0	0	0	0	0	0	0	18-May	RNP staff
	Freshwater	USNPS[3], CDPR	0	0	0	0	0	0	0	0	15 May	RNP staff
	Stone Lagoon	CDPR	0	0	0	0	0	0	0	0	22-May	A. Transou
	Dry Lagoon	CDPR	0	0	0	0	0	0	0	0	22-May	A. Transou
	Big Lagoon	CDPR	3	0	0	0	0	0	0	0	22-May	A. Transou
	Moonstone Beach	County			0	0	0	0	0	0	18-May	J. Watkins
	Little River, Clam Beach North	County, CDPR, Private	10	15	7	0	4	3	1	0	19-May	M. Colwell, M. Hardy, K. Sesser, W. Pearson
	Clam Beach South	County	12	5	2	12	5	2	2	1	18-19 May	M. Colwell, M. Hardy, K. Sesser, W. Pearson
	Lanphere to Mad River	County, Private	0	0	5	2	0	0	0	0	19-May	S. Neel-Goodsir
	Gun Club to Lanphere	BLM/USFWS[4]	0	0	0	0	0	0	0	0	19-May	S. Neel-Goodsir
	Power Pole to Gun Club	USBLM, Private		0	0	0	2	2	0	0	19-May	D. Anthon, Jesse Irwin
	North Spit Humboldt Bay	BLM		0	0	0	0	0	0	0	19-May	D. Anthon, Jesse Irwin
	Elk River Spit	City of Eureka		0	0	0	0	0	0	0	22-May	J. Watkins
	Eel River Gravel Bars	County, CA State	5	10	9	4	3	2	1	0	24-May	M. Colwell, J. Muir, M. Hardy, K. Sesser, W. Pearson
	South Spit Humboldt Bay	BLM	2	4	0	0	0	0	0	0	19-May	R. Smith
	Eel River Wildlife Area, North	CDFG	0	0	0	0	0	0	0	0	20-May	M. Colwell, M. Hardy, M. Shriver
	Eel River Wildlife Area, South	CDFG	0	5	0	0	1	0	1	0	20-May	M. Colwell, M. Hardy, M. Shriver
	Centerville Beach	County, Private	0	3	0	0	0	0	0	0	20-May	K. Sesser
	McNutt Gulch	Private					NS					
	Mattole River	BLM[1]		0	0		0	0	0	0	19-May	D. Anthon, Jesse Irwin
County Total			**32**	**42**	**23**	**18**	**15**	**9**	**5**	**1**		
Mendocino	Usal Beach	CDPR		0	0							
	MacKerricher SB, 10 Mile	CDPR	7	0	1	0	0	0	0	0	21-May	A. Liebenberg, B. Bowen
	Virgin Creek	CDPR	0	0	0	0	0	0	0	0	20-May	A. Liebenberg, B. Bowen
	Manchester SB, Alder & Brush Cm	CDPR	0	0	0	0	0	0	0	0	19-May	A. Liebenberg
	Manchester SB, Brush C. to Garcia R.	CDPR	2	3	2	0	0	0	0	0	19-May	A. Liebenberg
County Total			**9**	**3**	**3**	**0**	**0**	**0**	**0**	**0**		
Total Unit 2			**41**	**45**	**26**	**18**	**15**	**9**	**5**	**1**		
San Francisco Bay												
Alameda	Baumberg/Eden Landing	CDFG	91	84	162	94	88	39	29	20	18-May	SFBBO - Caitlin Robinson
	Coyote Hills	USFWS NWR	0	0	0	0	0	0	0	0	25-May	SFBBO - Caitlin Robinson
	Dumbarton	USFWS NWR	0	0	2	0	0	0	0	0	25-May	SFBBO - Caitlin Robinson
	Hayward	City of Hayward	0	0	0	1	4	2	2	0	19-May	SFBBO - Caitlin Robinson
	Warm Springs	USFWS NWR	23	7	0	3	14	10	4	0	19-May	SFBBO - Caitlin Robinson
Napa	Napa	CDFG	0			0	12	0	0	12	19-May	CDFG - Karen Taylor
San Mateo	Ravenswood/West Bay	USFWS NWR	3	3	23	24	21	5	5	10	25-May	SFBBO - Caitlin Robinson
Santa Clara	Alviso	USFWS NWR	7	8	20	11	8	5	3	0	20-May	SFBBO - Caitlin Robinson
Total Unit 3			**124**	**102**	**207**	**133**	**147**	**62**	**43**	**42**		
Sonoma	Salmon Creek SB	CDPR	5	0	0	1	8	5	3	0	18-May	Lynne Stenzel
	Doran County Park	County	0	0	0	0	0	0	0	0	20-May	Lynne Stenzel
County Total			**5**	**0**	**0**	**1**	**8**	**5**	**3**	**0**		
Marin	Dillon Beach	Private	0	0	0	0	0	0	0	0	20-May	Lynne Stenzel
	Kehoe Beach	USNPS	7	1	9	12	9	4	4	1	19-May	Lacey Hughes, Amanda Bell

	North Beach	USNPS	15	9	11	13	12	7	5	0	19-May	Lacey Hughes, Amanda Bell
	South Beach	USNPS	0	0	0	0	0	0	0	0	21-May	Amanda Bell
	Lighthouse Beach	USNPS	0	0	0	0	0	0	0	0	21-May	Amanda Bell
	Drakes Beach	USNPS	0	0	0	0	0	0	0	0	18-May	Amanda Bell, Jeff Wilkinson
	Limantour Spit	USNPS	0	0	0	0	0	0	0	0	20-May	Amanda Bell
	Bolinas Lagoon	County	0	0	0	0	0	0	0	0	19-May	Lynne Stenzel
County Total			**22**	**16**	**20**	**25**	**21**	**11**	**9**	**1**		
San Francisco	Ocean Beach	County	1	0	0	0	0	0	0	0	20-May	Patrick Furtado (altern contact: Bill Merkle)
	Crissy Field	GGNRA				0	0	0	0	0	28-May	Patrick Furtado (altern contact: Bill Merkle)
County Total			**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
San Mateo	Pacifica SB	CDPR	0	0	0	0	0	0	0	0	18-May	R. Fischer, E. Geer
	Pillar Point	County	0	0	0	0	0	0	0	0	18-May	C. Carr, P. Reilly
	Half Moon Bay SB (Francis Beach)	CDPR	2	1	2	1	0	0	0	0	18-May	A. Boutell, S. Black, L. Ellis, E. Glines, B. Alderson, J. Baxter, W. Sheet
	Tunitas Creek	Private	0	4	0	0	0	0	0	0	18-May	A. Riley, C. Masterson
	San Gregorio	CDPR	0	0	0	0	0	0	0	0	18-May	C. Fahy, L. Lee, R. Williman
	Pomponio	CDPR	0	0	0	0	0	0	0	0	18-May	C. Fahy, L. Lee, R. Williman
	Pescadero SB	CDPR	0	0	0	0	0	0	0	0	18-May	L. Joseph, D. Baker
	Pigeon Point	CDPR?	0	0	0	0	0	0	0	0	18-May	L. Joseph, D. Baker
	Gazos Creek	CDPR	0	2	1	0	0	0	0	0	18-May	R. Jennings, P. Neumann
	Ano Nuevo	CDPR	0	0	0	0	0	0	0	0	18-May	R. Jennings, P. Neumann
County Total			**2**	**7**	**3**	**1**	**0**	**0**	**0**	**0**		
Santa Cruz	Waddell SB	CDPR, Private	0	0	0	0	0	0	0	0	19-May	B. Payne
	Scott Creek Beach	County	3	4	4	2	0	0	0	0	17-May	J. Erbes
	Laguna Creek	CDPR	0	0	0	0	0	0	0	0	18-May	B. Payne
	Wilder SB	CDPR	0	0	0	0	0	0	0	0	18-May	B. Payne
	Seabright SB	CDPR	0	0								
	Private Beaches	Private		13	1	0	2	1	1	0	18-May	D. Dixon
	Sunset SB	CDPR	17	9	18	7	8	2	6	0	18-May	D. Dixon
	Palm Beach	CDPR		5	0	4	3	2	1	0	18-May	D. Dixon
	Pajaro Spit	CDPR	48	55	52	23	17	11	3	3	18-May	K. Neuman, L. Henkel
County Total			**68**	**86**	**75**	**36**	**30**	**16**	**11**	**3**		
Monterey	Zmudowski SB	CDPR	12	8	0	17	24	16	8	0	18-May	C. Eyster
	Moss Landing SB	CDPR	28	20	11	20	27	18	7	2	18-May	J. Erbes, K. Neuman
	Moss Landing Salt Ponds	CDFG	30	41	21	32	31	20	10	1	18-May	C. Eyster
	Salinas SB	CDPR	57	56	37	36	30	14	10	6	19-May	K. Neuman
	Salinas River North Spit	CDPR	19	25	22	15	17	9	8	0	19-May	J. Erbes, R. Hurt
	Salinas River NWR	USFWS	44	36	29	23	39	25	13	1	19-May	J. Erbes, R. Hurt
	Martin/Lone Star Areas	Big Sur Land Trust, Private	30	20	31	26	21	12	2	7	19-May	L. Henkel
	Marina SB (Reservation Rd & Fort Ord)	CDPR	12	26	15	17	24	15	8	1	19-May	A. Palkovic
	Sand City	Private	0	1	0	1	1	0	0	1	19-May	C. Eyster
	Monterey SB	CDPR	0	2	0	2	0	0	0	0	19-May	C. Eyster
	Carmel River SB	CDPR		0	0	0	0	0	0	0	19-May	B. Weed
	Asilomar	CDPR		0	0	0	0	0	0	0	19-May	B. Weed
	Point Sur Beach	CDPR	7	13	6	5	6	4	2	0	17-May	D. Dixon, C. Eyster
	Little Sur Beach	Private					0	0	0	0	17-May	D. Dixon, C. Eyster
County Total			**239**	**248**	**172**	**194**	**220**	**133**	**68**	**19**		
Total Unit 4			**337**	**357**	**270**	**257**	**279**	**165**	**91**	**23**		
San Luis Obispo	San Carpoforo Creek	USFS[8], CDPR	1	3	0	0	0	0	0	0	16-May	B. Barandon
	Sydneys Lagoon	CDPR	3	2	1	0	4	1	0	3	16-May	B. Barandon
	Arroyo Laguna Creek	CDPR	2	3	1	1	0	0	0	0	16-May	B. Barandon

	San Simeon State Beach	CDPR	6	7	2	0	0	0	0	0	16-May	B. Barandon
	Santa Rosa Creek	CDPR	0	0		0	0	0	0	0	16-May	B. Barandon
	Estero Bluffs State Beach	CDPR	33	23	17	12	16	7	9	0	19-May	K. Paradis & T. Schingler
	Toro Creek	Private	0	0	0	0	0	0	0	0	19-May	K. Paradis & T. Schingler
	Morro Strand SB	CDPR	21	24	17	17	18	10	8	0	19-May	K. Paradis & T. Schingler
	Morro Rock City Beach	City of Morro Bay	0	0	0	0	0	0	0	0	19-May	K. Paradis & T. Schingler
	Morro Bay Sandspit: State sector	CDPR	181	96	84	59	97	56	41	0	19-May	A. Woodson, J. Long & R. Orr
	Morro Bay Sandspit: City of Morro B. sector	Private	24	24	0	11	9	6	3	0	19-May	A. Woodson, J. Long & R. Orr
	Pismo State Beach	CDPR	0	0	0	0	0	0	0	0	19-May	S. Little & K. Duffield
	Oceano Dunes SVRA	CDPR	92	58	46	89	83	49	23	11	19-May	M. Przbylski, D. Costello & D. Murray
	ODSVRA Oso Flaco Natural Area	CDPR		29	14	13	15	10	4	1	19-May	M. Przbylski, D. Costello & K. Tokatlian
	Guadalupe-Nipomo Dunes NWR	USFWS	25	32	7	25	14	9	5	0	19-May	T. Applegate & G. Greenwald
	Chevron (Unocal) Property	Private	25	29	17	35	14	8	6	0	19-May	C. Holmes
County Total			**413**	**330**	**206**	**262**	**270**	**156**	**99**	**15**		
Santa Barbara	Rancho Guadalupe Dunes Co. Park	County	43	38	46	35	30	12	13	5	19-May	T. Applegate
	Mussel Rock beach	Private	6	13	10	17	11	5	5	1	19-May	T. Applegate
	Paradise beach	Private	9	12	12	0						
	Point Sal SB	CDPR	0	0	0	0	0	0	0	0	19-May	A. Abela
	Vandenberg AFB North beaches	US Air Force	103	110	65	100	81	38	38	5	19-May	R. Butala & J. Smietanik
	Vandenberg AFB Purisima Point	US Air Force	0	3	2	0	3	1	2	0	19-May	R. Butala & J. Smietanik
	Vandenberg AFB South beaches	US Air Force	156	132	87	107	78	37	37	4	19-May	J. Hyder
	Jalama Beach County Park	County	0	0	0	0	0	0	0	0	19-May	A. Abela
	Gaviota State Beach	CDPR	0	0	0	0	0	0	0	0	21-May	Alexis
	Refugio State Beach	CDPR	0	0	0	0	0	0	0	0	21-May	Alexis
	El Capitan State Beach	CDPR	0	0	0	0	0	0	0	0	21-May	Alexis
	Haskell's beach	Private	0			0	0	0	0	0	19-May	C. Bowdish
	Ellwood Beach	City of Goleta	3	0	8	2	0	0	0	0	19-May	C. Sandoval
	Coal Oil Pt. Reserve	Univ. of Calif.	26	39	39	25	29	0	0	29	19-May	C. Sandoval
	Isla Vista beach	Univ. of Calif.	0	0	0	0	0	0	0	0	19-May	C. Sandoval
	Campus Beach	Univ. of Calif.	0		0	0	0	0	0	0	19-May	P. Walker
	Goleta Beach	County	0		0	0	0	0	0	0	21-May	K. Lafferty
	West Beach	City of S. Barbara	0	0	0	0	0	0	0	0	29-May	S. Kirkland
	Santa Barbara Harbor Beach	City of S. Barbara	1	0	0	0	0	0	0	0	29-May	S. Kirkland
	East Beach	City of S. Barbara	0	0	0	0	0	0	0	0	29-May	S. Kirkland
	Santa Claus Lane- Carpinteria spit beaches	Private	0	0	0	0	0	0	0	0	29-May	S. Kirkland
	Carpinteria City Beach	City of Carpinteria	0	0	0	0	0	0	0	0	29-May	S. Kirkland
	Carpinteria State Beach	CDPR	0	0	0	0	0	0	0	0	29-May	S. Kirkland
	Santa Cruz Island	Nature Conservancy		0	0	0	0	0	0	0	17-May	L. Laughrin
	Santa Rosa Island	USNPS	37	19	17	5	9	5	4	0	19-May	D. Richards
	San Miguel Island	USNPS		0	0	0						
County Total			**394**	**366**	**286**	**291**	**241**	**99**	**99**	**44**		
Ventura	San Buenaventura State Beach	CDPR	0	0	3	0	0	0	0	0	19-May	J. Lewison
	McGrath State Beach	CDPR	3	17	15	7	5	5	0	0	21-May	R. Smith & R. Villemarie
	Mandalay State Beach	CDPR	3	7	2	5	16	12	4	0	21-May	R. Smith & R. Ziegler
	Hollywood County Beach	County of Ventura	0	0	14	15	10	7	3	0	19-May	R. Smith & N. Ziegler
	Ormond Beach	City of Oxnard, CCC, Private	21	22	27	33	28	23	5	0	19-May	C. Hartley, S. Kirkland & R. McMorran
	Point Mugu NAS	US Navy	83	79	55	60	68	35	30	3	19-May	M. Ruane, et. al.
	San Nicolas Island	US Navy	62	96	68	44	69	37	24	8	25-May	G. Smith, M. Ruane, C. Hartley, et. al.
County Total			**172**	**221**	**184**	**164**	**196**	**119**	**66**	**11**		
Total Unit 5			**969**	**917**	**676**	**717**	**707**	**373**	**264**	**70**		
Los Angeles	Leo Carillo Beach	CDPR*			0	0	0	0	0	0	20-May	Greg Ainsworth
	Nicolas Canyon	CDPR*			0	0	0	0	0	0	20-May	Greg Ainsworth

	R.H.Meyer State Beach (entire)	CDPR*			0	0	0	0	0	0	21-May	Stacey Vigallon
	Zuma SB	CDPR*	0		0	0	0	0	0	0	17-May	Stacey Vigallon, Aurelio Albaisa, Allan Kotin
	Paradise Cove	CDPR				0	0	0	0	0	19-May	Sandra Albers
	Dan Blocker State Beach	CDPR*				0	0	0	0	0	24-May	Stacey Vigallon, Robert Jeffers
	Malibu Lagoon	CDPR	0		0	0	0	0	0	0	23-May	Laurel Jones, Mary Loquvam
	Carbon to Big Rock Beach	CDPR	0		0	0	0	0	0	0	21-May	Lisa Fiminani, Margery Nicholson
	Las Tunas State Beach	CDPR*	0			0	0	0	0	0	17-May	R.C. Brody
	Topanga State Beach	CDPR*	0		0	0	0	0	0	0	17-May	R.C. Brody
	N.Will Rogers State Beach	CDPR*	0		0	0	0	0	0	0	21-May	Chris Lord, Hank Borenstein
	S.Will Rogers State Beach	CDPR*			0	0	0	0	0	0	21-May	Stacey Vigallon
	N.Santa Monica State Beach	CDPR*	0		0	0	0	0	0	0	21-May	Lu Plauzoles
	S.Santa Monica Beach	CDPR*			0	0	0	0	0	0	23-May	Allison Brandin
	N. Venice Beach	CDPR*			0	0	0	0	0	0	21-May	Dan Cooper
	S.Venice Beach	CDPR*			0	0	0	0	0	0	21-May	Dan Cooper
	Marina del Rey	CDPR*			0	0	1	0	0	1	27-May	Christian Alvez, Hank Borenstein
	Playa del Rey	CDPR*	0		0	2	0	0	0	0	19-May	Eleanor Osgood
	N. Dockweiler State Beach	CDPR*	0		0	0	0	0	0	0	18-May	Laurel Scott
	S. Dockweiler State Beach	CDPR*	0		0	0	0	0	0	0	19-May	Barbara Courtois, Garry George
	El Segundo Beach	CDPR*	0		0	0	0	0	0	0	19-May	Barbara Courtois
	Manhattan Beach	CDPR*	0		0	0	0	0	0	0	19-May	Barbara Courtois
	Hermosa State Beach	CDPR*	0		0	0	0	0	0	0	19-May	Ron Melin
	Redondo/Torrance Beach	LA County?			0	0						
	Cabrillo State Beach	CDPR*			0	0	0	0	0	0	19-May	Jess Morton
	Long Beach State Beach	CDPR*			0	0	0	0	0	0	20-May	Thomas Ryan
	San Clemente Island	US Navy				0						
	* managed by LA County											
County Total			**0**	**0**	**0**	**2**	**1**	**0**	**0**	**1**		
Orange	Seal Beach	City of Seal Beach				0						
	Seal Beach NWS	US Navy				0	0	0	0	0	21-May	Bob Schallman
	Surfside	City of Seal Beach	0			0	0	0	0	0	21-May	Peter Knapp
	Sunset	County	0			0						
	Bolsa Chica SB	CDPR	0			0	0	0	0	0	21-May	David Pryor
	Bolsa Chica ER/wetlands	State Lands Comm.	66	62	36	50	47	22	25	0	21-May	Peter Knapp
	Huntington City Beach	City of Huntington B.										
	Huntington SB	CDPR	0		0	0	0	0	0	0	21-May	David Pryor
	Newport Beach	City of Newport B.										
	Upper Newport Bay	CDFG	0									
	Balboa Beach	City of Newport B.	0			0	1	1	0	0	21-Jan	Peter Knapp, a first nesting
	Corona Del Mar	CDPR										
	Crystal Cove State Park	CDPR				0						
	Laguna Beach	City of Laguna Beach										
	Salt Creek	County				0	0	0	0	0	21-May	David Pryor
	Doheny SB	CDPR			0	0						
	Capistrano	County				0						
	San Clemente City	City of San Clemente				0						
	San Clemente SB	CDPR				0						
County Total			**66**	**62**	**36**	**60**	**48**	**23**	**25**	**0**		
San Diego	San Onofre/Trestles	CDPR	0			0	0	0	0	0	21-May	D. Pryor
	Camp Pendleton	US Marine Corps	94	127	94	117	120	57	49	14	20&21 May	B. Foster
	Oceanside	City of Oceanside				0						
	Buena Vista Lagoon	CDFG				0						
	Agua Hedionda	Private	0			0						
	Carlsbad SB	CDPR		0	0							

	S. Carlsbad S.B.	CDPR	1	0	0	1	1	1	0	0	22-May	S. Wolf
	Batiquitos Lagoon	CDFG	12	14	8	5	3	1	2	0	21-May	S. Wolf, L. Squires, D. Zaldivar
	San Elijo Lagoon	County/CDFG	0	0	0	0	0	0	0	0	16-May	R. Patton, J. Lesley, J. Wilson
	Cardiff SB	CDPR	0	0	0	0	0	0	0	0	16-May	R. Patton
	San Dieguito Lagoon	State	0	0	0	0	0	0	0	0	16-May	S. Wolf, J. Lesley
	Del Mar City Beach	City of Del Mar										
	Los Penasquitos Lagoon	CDPR	0	0	0	0	0	0	0	0	17-May	S. Wolf
	Torrey Pines SB- Blacks	CDPR				0	0	0	0	0	17-May	S. Wolf
	La Jolla	City of S. Diego										
	S. Mission Beach	City of S. Diego	0		0	0	0	0	0	0	19-May	J. Lesley
	San Diego River Channel (Incl. Dog Beach)	City of S. Diego	0	0	0	0	0	0	0	0	18-May	J. Lesley
	Ocean Beach	City of S. Diego	0									
	Mariner's Point	City of S. Diego	0			0	0	0	0	0	19-May	J. Lesley
	Fiesta Island	City of S. Diego	0			0	0	0	0	0	22-May	V. Johnson
	Sweetwater NWR	USFWS/Port of SD	0	0	0	0	2	2	0	0	19-May	R. Patton
	Chula Vista Wildlife Reserve	SDCo. Airport Authority	0	0	0	0	0	0	0	0	19-May	R. Patton, J. Jackson
	SD NWR/Salt Works	USFWS	0	4	0	6	3	2	1	0	20-May	R. Patton, M. Sadowski, B. Collins, J. Daynes
	NAS North Island	US Navy	4	22	4	15	17	8	6	3	20-May	L. Squires
	Coronado Beach	City of Coronado										
	Naval Amphibious Base-Ocean	US Navy	21	36	11	33	28	11	3	9	20-May	M. Lahre, C. Ray, T. Myers, L. Randall
	NAB Bay-Delta Beach	US Navy	0	2	2	0	0	0	0	0	20-May	R. Mendez, P. Kilpatrick, B. Mulrooney
	Silver Strand SB-Ocean	CDPR	5	9	7	15	10	6	2	2	20-May	S. Wolf
	Silver Strand SB-Bay	CDPR	0	0		0	0	0	0	0	20-May	S. Wolf
	Naval Radio Receiving Facility	US Navy	0	8	3	8	8	5	3	0	18-May	D. Parker
	South Bay Biological Reserve	County of San Diego	0									
	Imperial Beach	City of Imperial Beach	0									
	Tijuana Estuary/Tijuana Slough NWR	USFWS	3	12	10	8	5	2	3	0	21-May	R. Patton, M. Sadowski, B. Collins
	Border Field SP	CDPR	3	2	2	9	11	5	6	0	21-May	R. Patton, M. Sadowski, B. Collins, B. Stewart
County Total			**143**	**236**	**147**	**217**	**208**	**100**	**80**	**28**		
Total Unit 6			**209**	**298**	**183**	**269**	**257**	**123**	**105**	**29**		
California Total			**1680**	**1719**	**1362**	**1394**	**1405**	**732**	**508**	**165**		
Pacific Coast Total			**1817**	**1877**	**1537**	**1541**	**1587**	**829**	**587**	**171**		

CDFG = California Department of Fish and Game
CDPR = California Department of Parks and Recreation
BLM = US Bureau of Land Management
USFWS = US Fish and Wildlife Service
USNPS = US National Park Service
USFS = US Forest Service
USACE = US Army Corps Engineers
ORPD = OR Parks and Recreation Dept
GGNRA = Golden Gate Nat. Recreation Area
CCC = California Coastal Conservancy

Table C.2.
U.S. Rangewide, Recovery Unit 6, and Action Area Breeding WSP Observed During Breeding Season Window Surveys and Estimated Abundance

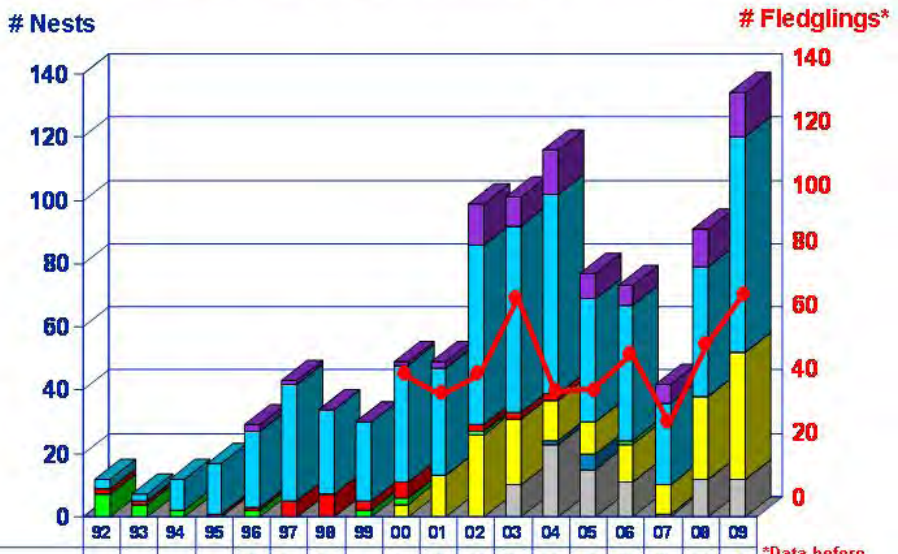
Year	U.S. Rangewide WSP Adults Observed	Estimated U.S. Abundance (observed x 1.3)	Recovery Unit 6 WSP Observed	Estimated Recovery Unit 6 Abundance (observed x 1.3)	Action Area WSP Observed (% of plovers observed in RU 6)	
1991	1371	1782	88	114	na	
2000	976	1269	171	222	na	
2002	1517	1972	195	254	na	
2003	1575	2048	264	343	76 (29)	
2004	2039	2651	250	325	75 (30)	
2005	1817	2362	209	272	30 (14)	
2006	1877	2440	298	387	76-77 (26)	
2007	1537	1998	183	238	27-33 (15-18)	
2008	1541	2003	269	350	71(26)	
2009	1587	2063	257	334	63 (25)	

C.3. Plover Abundance Calculations

An average of 60 to 61 snowy plover adults were detected in the action area during breeding season window surveys conducted from 2005 to 2009 (based on data in Table 13a.). Not all plovers are detected during the window surveys, however the number detected (i.e., average 60 to 61) can be used to estimate the number present by multiplying by a correction factor. A site-specific correction factor has not been developed to address potential differences across the range of the snowy plover, however the Service has used a correction factor of 1.3 (Service 2007a) to provide a rough estimate of the rangewide population. Using this method, an estimated average of 78-79 adult plovers inhabited the action area during breeding seasons 2005-2009. Another method used to estimate the minimum number of breeding plovers on site is to determine the number of nests that are active each day throughout the breeding season, then find the maximum number of nests that were active at the same time. Since one female and male are associated with each active nest, the number of active nests can be multiplied by 2 to provide an estimate of the minimum number of plovers actually present onsite. Using this method, the number of breeding adults within the action area averaged 61 between 2005 -2009 (based on data in Table 14).

C.4. NBC Total Plover Nest Numbers and Fledgling Numbers

Naval Base Coronado
Western Snowy Plover Nesting Data



	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09
NRRF					2	1	0	0	1	2	13	9	14	8	6	6	12	14
NAB OCEAN BEACHES	3	2	10	16	24	37	27	25	37	34	57	59	63	39	43	26	41	68
NAB DELTA BEACH SOUTH	2	1	0	1	1	5	7	3	5	0	2	2	2	0	0	0	0	0
NAB DELTA BEACH NORTH	7	4	2	0	2	0	0	2	2	0	1	0	0	0	1	0	0	0
NASNI OCEAN									4	13	26	21	13	10	12	9	26	40
NASNI FIELD or UNKNOWN													1	5	0	0	0	0
NASNI AIRFIELD												10	23	15	11	1	12	12
TOTAL	12	7	12	17	29	43	34	30	49	49	99	101	116	77	73	42	91	134

*Data before 2000 unavailable. Some years had estimates for # fledged. Higher number used if estimate given.

Appendix D. 2007 Least Tern U.S. Rangewide Breeding Season Data.

2007- Preliminary Data	Estimated Number of Breeding Pairs		Number of Nests	Estimated Number of Fledglings		Fledgling per Pair Ratio	
Site	Minimum	Maximum		Minimum	Maximum	Minimum	Maximum
San Francisco Bay Area							
Pittsburg Power Plant	7	8	7	0	0	0.00	0.00
Alameda Point	355	358	394	148	311	0.41	0.88
Hayward Regional Shoreline	35	35	35	49	49	1.40	1.40
San Luis Obispo/Santa Barbara Counties							
Oceano Dunes SVRA	54	54	66	70	70	1.30	1.30
Guadalupe-Mussel Rock	1	1	1	1	1	1.00	1.00
Vandenberg AFB	18	18	18	16	16	0.89	0.89
Coal Oil Point Reserve	4	4	6	0	0	0.00	0.00
Ventura County							
Santa Clara River/McGrath State Beach	56	77	77	76	76	0.99	1.36
Ormond Beach	49	50	52	35	35	0.70	0.71
Hollywood Beach	1	1	1	2	2	2.00	2.00
Pt Mugu- Totals	349	428	431	139	139	0.32	0.40
Holiday Beach	57	63	65	4	4	0.06	0.07
Holiday Beach Salt Panne	4	6	6	0	0	0.00	0.00
Ormond Beach East	286	350	351	134	134	0.38	0.47
Eastern Arm	2	9	9	1	1	0.11	0.50
Los Angeles/Orange Counties							
Venice Beach	449	453	547	446	446	0.98	0.99
LA Harbor	669	669	710	186	186	0.28	0.28
Seal Beach NWR - Anahiem Bay	164	166	166	12	12	0.07	0.07
Bolsa Chica Ecological Reserve	200	200	226	15	15	0.08	0.08
Huntington State Beach	445	445	485	215	215	0.48	0.48
Burris Sand Pit	8	9	8	9	9	1.00	1.13
Upper Newport Bay Ecological Reserve	37	37	42	12	18	0.32	0.49
San Diego County							
MCB Camp Pendleton- Totals	1422	1422	1530	243	267	0.17	0.19
Red Beach	12	12	14	1	2	0.08	0.17
White Beach	109	109	117	5	7	0.05	0.06
Santa Margarita River - North Beach North	266	266	288	10	14	0.04	0.05
Santa Margarita River - North Beach South	922	922	984	226	243	0.25	0.26
Santa Margarita River - Saltflats	74	74	85	1	1	0.01	0.01
Santa Margarita River - Saltflats Island	39	39	42	0	0	0.00	0.00
Batiquitos Lagoon Ecological Reserve- Totals	579	579	594	138	190	0.24	0.33
W1	40	40	40	15	19	0.38	0.48
W2	371	371	379	110	158	0.30	0.43
E1	163	163	170	13	13	0.08	0.08
E2	0	0	0	0	0	0.00	0.00
E3	5	5	5	0	0	0.00	0.00
San Elijo Lagoon Ecological Reserve	0	0	0	0	0	0.00	0.00
Mission Bay							
FAA Island	22	22	28	2	2	0.09	0.09

2007- Preliminary Data	Estimated Number of Breeding Pairs		Number of Nests	Estimated Number of Fledglings		Fledgling per Pair Ratio	
Site	Minimum	Maximum		Minimum	Maximum	Minimum	Maximum
North Fiesta Island	20	30	39	6	8	0.20	0.40
Mariner's Point	75	75	105	20	30	0.27	0.40
Stony Point	30	40	45	8	10	0.20	0.33
San Diego River Mouth	20	20	30	8	10	0.40	0.50
San Diego Bay							
Lindbergh Field & Former Naval Training Center	120	127	135	34	42	0.27	0.35
USN- Totals	1149	1149	1285	231	232	0.20	0.20
NI MAT	115	115	123	31	32	0.27	0.28
Delta Beach North	207	207	224	50	50	0.24	0.24
Delta Beach South	147	147	156	35	35	0.24	0.24
NAB Ocean	680	680	782	115	115	0.17	0.17
D Street Fill/Sweetwater Marsh NWR	100	115	130	25	28	0.22	0.28
Chula Vista Wildlife Reserve	33	39	46	0	0	0.00	0.00
South San Diego Bay Unit, SDNWR - Saltworks	50	73	97	13	18	0.18	0.36
Tijuana Estuary NERR	188	239	291	29	47	0.12	0.25
San Diego Bay (excluding Tijuana Estuary) Subtotal	**2789**	**2891**	**1693**	**563**	**599**	**2**	**2**
Totals:	**6709**	**6943**	**7627**	**2188**	**2484**	**0.32**	**0.37**

Appendix E. Calculations Pertaining to Relative Least Tern Abundance and Density

Table E.1 Average Density of California Least Tern Nests at SSTC-N

	2005	2006	2007	2008	2009	Average
Number of Tern Nests in Northern 7 Lanes[a]	**294**	**455**	**330**	**443**	**469**	**398**
Area of Northern 7 Lanes[b]	35.46 ha (87.66 ac)	35.46 ha (87.66 ac)	35.46 ha (87.66 ac)	35.46 ha (87.66 ac)	35.46 ha (87.66 ac)	**35.46 ha (87.66 ac)**
Tern Nest Density in Northern 7 Lanes	8.3/ha (3.4/ac)	12.8/ha (5.2/ac)	9.3/ha (3.8/ac)	12.5/ha (5.1/ac)	13.2/ha (5.4/ac)	**11.2/ha (4.5/ac)**
Number of Tern Nests in Southern 3 Lanes[a]	276	592	452	612	624	**511**
Area of Southern 3 Lanes[b]	16.44 ha (40.63 ac)	16.44 ha (40.63 ac)	16.44 ha (40.63 ac)	16.44 ha (40.63 ac)	16.44 ha (40.63 ac)	**16.44 ha (40.63 ac)**
Tern Nest Density in Southern 3 Lanes	16.8/ha 6.8/ac	36.1/ha 14.6/ac	27.6/ha 11.1/ac	37.3/ha 15.1/ac	38.0/ha 15.4/ac	**31.1/ha 12.6 /ac**
Total Number of Tern Nests in SSTC N Lanes	**570**	**1047**	**782**	**1055**	**1093**	**909**
Total Area of STTC-N Lanes	51.92 ha (128.29 ac)	51.92 ha (128.29 ac)	51.92 ha (128.29 ac)	51.92 ha (128.29 ac)	51.92 ha (128.29 ac)	**51.92 ha (128.29 ac)**
STTC-N Lane Density	11/ha 4.4/ac	20.2/ha 8.2/ac	15.1/ha 6.1/ac	20.3/ha 8.2/ac	21.1/ha 8.5/ac	**17.5/ha 7.1/ac**

a; data from DoN, unpublished reports 2005, 2006, 2007, 2008
b; data from Conkle,T. pers. comm., 2005.

Appendix E Continued.

Table E.2. Percentage of Rangewide Tern Nests Initiated at SSTC-N

	2005	2006	2007	2008	2009	Average
Rangewide Total Nests[a]	8124	8173	7627	8223	8026	8035
Number Tern Nests within Northern 7 lanes[b]	294	455	330	443	469	398
Percent of Rangewide Total in Northern 7 Lanes	3.6	5.6	4.3	5.4	5.8	4.9 percent of rangewide
Number of Tern Nests in Southern 3 Lanes[b]	276	592	452	612	624	511
Percent of Rangewide Total in southern 3 lanes[b]	3.4	7.2	5.9	7.4	7.8	6.3 percent of rangewide
Number of Tern Nests on SSTC-Beach Including all beach lanes	570	1047	782	1055	1093	909
Percent of Rangewide Total on SSTC-N Beach	7.0	12.8	10.3	12.8	13.6	11.3 of rangewide
Number of Tern Nests on Delta Beaches	566	378	380	469	648	488
Percent of Rangewide Total on Delta Beaches	6.7	4.6	5.0	5.7	8.1	6.0 of rangewide

a: data from CDFG reports: Marschalek 2006, 2007, 2008, 2009
b. data from unpublished Navy reports 2005, 2006, 2007, 2008, 2010

Appendix E Continued.

Table E.3. California Least Tern Minimum Pair Estimates, Rangewide and Within Action Area

	Rangewide Min Pair Estimate[a]	SSTC-N Beach Min Pair Estimate[a]	% of Rangewide Estimate	Delta Beach Min Pair Estimate[a]	% of Rangewide Estimate	Action Area Min Pair Estimate[b]	% of Rangewide Estimate
2005	6865	502	7.3	507	7.4	1009	14.7
2006	7006	884	12.6	342	4.9	1226	17.5
2007	6744	680	10.1	354	5.2	1034	15.3
2008	6998	912	13.0	535	7.6	1447	20.7
2009	7124	914	12.8	550	7.7	1464	20.6
AVG	6947	778	11.1	458	6.6	1236	17.8

a from CDFG reports; Marschalek, D. 2006, 2007, 2008, 2009

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

In Reply Refer To:
FWS-SDG-3452.1

MAY 0 8 2003

Captain David R. Landon
Commanding Officer
Department of the Navy
Naval Air Station North Island
P.O. Box 357033
San Diego, California 92135-7033

Attn: Tammy Conkle, Wildlife Biologist

Re: Endangered Species Consultation on Military Training Operations on the Silver Strand and Naval Air Station North Island (NASNI) and Associated Management Strategies for the California Least Tern and Western Snowy Plover during 2003 Breeding Season at Naval Amphibious Base, Coronado; Naval Radio Receiving Station, Imperial Beach; and NASNI, San Diego; San Diego County, California

Dear Captain Landon:

This biological opinion responds to your request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C.1531 et seq.) for proposed military training operations on the Silver Strand and associated management strategies for California least tern (Sterna antillarum browni, least tern) and western snowy plover (Charadrius alexandrinus nivosus, snowy plover) at Naval Amphibious Base, Coronado (NAB); Naval Radio Receiving Station, Imperial Beach (NRRF); and Naval Air Station North Island, San Diego (NASNI). Your request for formal consultation was dated April 4, 2003, and was received by the Service on April 7, 2003. This biological opinion addresses the effects of military training operations and associated management strategies for the least tern and snowy plover. This biological opinion also addresses effects of training operations on the NAB and NRRF ocean beaches that have been designated critical habitat for the snowy plover.

CONSULTATION HISTORY

This biological opinion is based on information provided in: (a) the Service's 1997 Biological Opinion (1-6-97-F-37) on military training operations and associated management strategies for least terns at NAB; (b) the Service's 1999 Biological Opinion (1-6-99-F-28) on military training operations and associated management strategies for least terns and snowy plovers at NAB; (c) a

Navy letter dated April 5, 2000, requesting an extension of the incidental take authorized in the Service's Biological Opinion (1-6-99-F-28) and concurrence from the Service that continuation of Naval training operations on NAB ocean beaches would not adversely modify designated critical habitat for the snowy plover; (d) a Service letter dated June 12, 2000, concurring with the Navy's opinion that military training operations in general do not result in adverse modification of critical habitat for the snowy plover with a few exceptions that are identified in the Service's letter; (e) the Copper and Patten (2001) draft report on The Status of the California Least Tern at Navy Bases on San Diego Bay in 1999; (f) the Service's Biological Opinion (1-6-02-F-2645.1) dated April 16, 2002, on military training operations and associated management strategies for the least tern and snowy plover on NAB; (g) a Service letter dated July 29, 2002, that was an amendment to Biological Opinion (1-6-02-2645.1) and permitted an increase in the number of least tern eggs that could be collected on the ocean front beach lanes at NAB Coronado for captive rearing; (h) a September 11, 2002, meeting between the Service, Navy, and Wildlife Services to discuss results of the 2002 least tern and snowy plover nesting success at NAB, NASNI, and NRRF; (i) a November 1, 2002, meeting between the Service and the Navy in which the Navy presented a 2003 Management Strategy for California Least Terns and Western Snowy Plovers on Naval Base Coronado; (j) continued informal section 7 consultation meetings held between the Service and the Navy on December 9, 2002, January 8, 2003 (e.g., this meeting included California Department of Fish and Game), January 14, 2003, January 31, 2003, and February 25, 2003, to clarify Naval training needs and locations and collectively identified conservation measures that could be incorporated into the project description to avoid and minimize effects associated with military training operations to least terns and snowy plovers; (k) an April 4, 2003, letter from the Navy to the Service requesting formal section 7 consultation; (l) an April 25, 2003, Service e-mail to the Navy's Natural Resources Office, NASNI which included a draft biological opinion as an attachment for their review and comment; (m) a May 1, 2003, Navy e-mail to the Service that provided comments on the draft biological opinion and (n) a May 7, 2003, Navy e-mail to the Service that provided suggested revisions to the biological opinion. A complete administrative record of this consultation is on file at Carlsbad Fish and Wildlife Office.

The history of the Service and Navy's interactions regarding the management of the least tern and snowy plover nesting colonies at NAB Coronado, and more recently at NRRF Imperial Beach and NASNI San Diego, is summarized below. An initial change in the management strategies for least terns and snowy plovers at NAB was described in the Navy s Biological Assessment dated April 18, 1997, and the Service s Biological Opinion (1-6-97-F-37) dated June 2, 1997. However, the Biological Opinion (1-6-97-F-37) only provided incidental take for the least tern associated with military training. Under the proposed action the Navy limited the protection of nesting least terns on the Pacific ocean beaches of NAB to a 500-yard, coned-off section of beach, primarily along the beach lane designated as Green 2. However, least terns successfully nested on other beach lanes outside the 500-yard protected area as a result of minimization and avoidance measures employed by the Navy. Snowy plover nests were protected by four cones set on the edge of a 30-meter diameter from any nest scrape made within any of the 10 boat training lanes (Figure 1). No incidental take of snowy plovers was given in this biological opinion. This management strategy was proposed as an interim measure until a more long-term programmatic

Silver Strand Beach Training Lanes

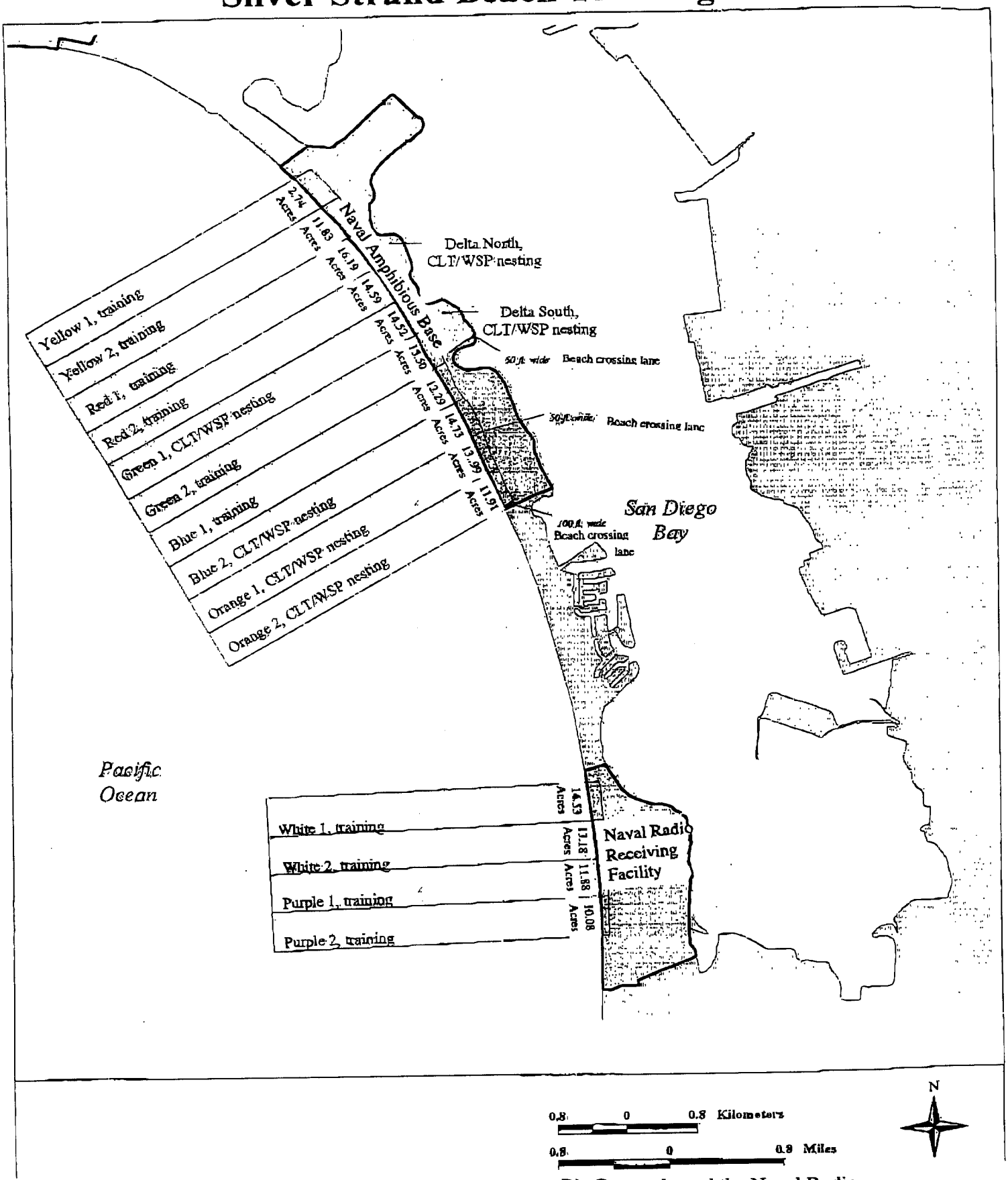


Figure 1. A map showing Naval Amphibious Base (NAB), Coronado and the Naval Radio Receiving Facility (NRRF), Imperial Beach and the designated beach training lanes associated with each facility. At NAB, the California least tern (CLT) and western snowy plover (WSP) utilize the ocean front beach and the shoreline of North and South Delta Beach. At NRRF, the WSP utilizes the ocean front beach.

approach could be developed that addressed the management of the least tern and snowy plover nesting colonies in conjunction with the Navy s operations and training activities at NAB. The long-term programmatic approach for the management of the least tern and snowy plover will be addressed by the Navy in an Environmental Impact Statement (EIS) that is currently being prepared on training operations that need to occur on the Pacific Ocean beaches of the Silver Strand and beach and the nearshore marine waters of San Diego Bay. The evaluation of training operations and the development of project alternatives will include NAB Coronado and NRRF Imperial Beach (Figure 1).

In a letter dated March 30, 1998, the Navy requested a 1-year extension of the Service's Biological Opinion (1-6-97-F-37) and incidental take levels established for the least tern. The Service, in a letter dated April 8, 1998, authorized the Navy's request for a 1-year extension provided the "Reasonable and Prudent Measures" and "Terms and Conditions" of the above referenced Biological Opinion were met.

In 1999, the Navy requested to reinitiate formal consultation with the Service in a letter dated February 24, 1999. With the presence of snowy plover nests on the Pacific Ocean beach where military training operations were annually occurring, the Navy wanted incidental take coverage for the snowy plover. To address this specific issue the Service issued a Biological Opinion (1-6-99-F-28) dated May 3, 1999, which analyzed the management and monitoring strategies for the least tern and the snowy plover and provided incidental take levels for the least tern and the snowy plover associated with military training. This consultation was extended annually by mutual agreement between the Service and the Navy between 1999 and 2001.

As a result of the Service's designation of critical habitat for the western snowy plover on December 7, 1999, which included the Pacific Ocean military training beaches of NAB, the Navy in a letter dated April 5, 2000, requested confirmation that the continuation of Naval training exercises would not adversely modify critical habitat. In a June 12, 2000, response, we stated that training operations, in general, do not result in adverse modification of critical habitat. We cited examples of adverse modification of critical habitat to include expansion of existing demolition pit, construction of concrete pads, buildings or storage sheds on the beach, creation of new roads, placement of fencing, or the removal of kelp racks that are washed up on the beach.

During the breeding season in 2000, training activities on two separate dates resulted in take of least terns. The first incident resulted in a broken or damaged egg in two separate least tern nests. On a later date, training activities, as evidenced by footprints and vehicle tracks, was documented throughout an area supporting approximately 12 least tern nests. On a separate occasion, a dead snowy plover chick was found in a vehicle tire track. In an attempt to minimize future similar incidences, the Navy, in consultation with the Service in 2001, installed five beach crossing lanes that provided a designated path for military personnel and vehicles to cross the NAB ocean-side training beaches during the nesting season.

On August 6, 2001, the Navy published in the Federal Register a notice of intent to prepare an EIS for "Optimizing Current and Future Operations, Training, and Maintenance at Beaches at

Captain David R. Landon (FWS-SDG-3452.1)

NAB and Naval Radio Receiving Facility (NRRF) Imperial Beach, San Diego County, California". The Service provided a letter of comment dated September 14, 2001, to the Navy on the proposed action, potential natural resources that could be affected, and alternatives that should be evaluated.

At a July 23, 2001, meeting between the Navy and the Service, the Navy expressed concern that large numbers of least tern nests on the ocean-front beaches were constraining military operations. On September 12, 2001, the Navy and the Service verbally exchanged ideas through informal consultation on how to reduce possible restrictions on Navy activities while avoiding and minimizing the potential take of least terns and the snowy plovers. These strategies were presented by Tammy Conkle, Commander Navy Region Southwest, Natural Resources Office, to California Department of Fish and Game and San Diego Audubon Society in a September 27, 2001, meeting. As a result of this informal consultation between our respective agencies, the Navy requested, in a letter dated November 20, 2001, to initiate formal consultation with the Service regarding military training performed on the ocean beaches of NAB Coronado and the implementation of a revised management strategy for least terns and snowy plovers. In summary, the Navy's proposal included a strategy to discourage nesting of least terns from two boat training lanes on ocean front beaches (Green 2 and Blue 1) and to maximize nesting substrate and site conditions for least terns and snowy plovers at South Delta Beach. North Delta Beach and South Delta Beach, which are adjacent to San Diego Bay, are existing least tern management areas that were established under the Navy's Biological Assessment dated July 23, 1982, and the Service's Biological Opinion (1-1-82-F-123), dated March 2, 1983.

The primary management actions addressed in the Service's Biological Opinion (1-6-02-F-645.1) dated April 16, 2002, included the collection of 50 least tern eggs for captive rearing by Project Wildlife from beach training lanes Green 2 and Blue 1, coupled with active raking of these beach lanes to discourage further least tern nesting attempts. However, all snowy plover nests in Green 2 and Blue 1 were protected by a 30-meter buffer. To minimize the loss of suitable least tern nesting area by raking beach lanes Green 2 and Blue 1, the Navy agreed to: (1) prepare an additional 15 acres of suitable nesting habitat on South Delta Beach for the least tern and snowy plover (e.g., this enhancement was in addition to the 15 acres that had been prepared at this location since 1996); (2) remove an existing chain-link fence along the southern end of South Delta Beach to provide snowy plover access to foraging habitat adjacent to San Diego Bay and to eliminate a potential perch site for avian predators; and (3) reconfigure a gate and fence at the southwest corner of South Delta Beach to deter unauthorized trespassers attempting to gain access to the nesting colony from the Silver Strand Highway. During site preparation, the Navy and Service recognized that additional beneficial measures could be conducted at South Delta Beach beyond what was mutually agreed to during informal consultation. Additional conservation measures implemented at South Delta Beach between January and February 2002 included the removal of a 900-meter long by 2 foot high sand berm, 1.47 to 1.94 acres of ice plant (Carpobrotus edulis) on the southern end of the nesting colony, 0.14 to 0.22-acre of ice plant along the western shoreline of the site, and the grading of approximately 4.3 acres of additional area that could potentially be used for least tern and snowy plover nesting habitat.

This grading was performed south of where the existing chain-link fence (e.g., the chain-link fence that ran in an east-west direction located at the very southern end of south Delta Beach).

In a letter dated June 5, 2002, the Navy requested authorization to collect additional least tern eggs at beach lanes Green 2 and Blue 1. They also requested the incidental take authorized for snowy plovers at NAB Coronado be expanded to include military training operations at NRRF. The Navy also wanted credit for the additional site preparation performed at South Delta Beach described above. In a letter dated July 29, 2002, the Service amended Biological Opinion (1-6-02-F-2645.1) to allow the Navy to collect an additional 25 least tern eggs from beach lanes Green 2 and Blue 1 for captive breeding at Project Wildlife. The Service requested additional information on training exercises being performed at NRRF and what measures the Navy was incorporating into the training exercises to minimize the potential for incidental take of snowy plovers at this location. We also acknowledged the Navy's additional site preparation at South Delta Beach. The Service stated it would recognize and address this effort in the 2003 section 7 consultation that was prepared for NAB Coronado.

DESCRIPTION OF THE PROPOSED ACTION

The description of the proposed action is based on a Navy letter, dated April 4, 2003, to the Service requesting initiation of formal consultation on military training on the Pacific Ocean beaches of the Silver Strand at NASNI San Diego, NAB Coronado, NRRF Imperial Beach and the nearshore marine waters of San Diego Bay adjacent to NAB, Coronado. The management strategies for 2003 were developed to support historic and current military training requirements at NAB, NASNI, and NRRF. The Navy has identified that operational requirements for all military lands may change based on the status of world events and deployed units (e.g., given, for example, the current military effort being conducted in Iraq).

These beaches provide amphibious training operations for several Navy and Marine Corps installations throughout the region and are utilized by troops and various types of motorized vehicles and watercraft. The proximity of Navy lands at NAB to the Pacific Ocean and San Diego Bay provides varied conditions in rough and calm water marine environments for amphibious and special warfare training. The Naval facilities along the Silver Strand, known as the Silver Strand Training Complex, supports amphibious and clandestine military personnel in the basic, intermediate, and advance phases of the Interdeployment Training Cycle (IDTC). The IDTC training components are outlined in the Fleet Exercise Publication (FXP) that specifies skill, success criteria, and annual training frequency necessary to meet fleet readiness standards. The Silver Strand Training Complex supports 13 commands and addresses the training components of FXP's that have been subdivided into three general categories that include warfare training, strategic sealift operations, and physical conditioning (Department of the Navy 2003).

Warfare training is primarily comprised of clandestine maritime operations and amphibious warfare exercises. Maritime operations is a general category of training in which military personnel swim or are deployed by helicopters or special boat units in the ocean or San Diego bay waters with the objective to proceed to the beach and conduct "over-the-beach" drills. These

drills involve scouting, patrolling, stalking, intelligence collection, and conflicts with staged enemy opposition forces. Amphibious warfare exercises consist of training operations conducted by explosive ordnance disposal units on land and in the water whereby military personnel learn to detect, locate, neutralize, and dispose of inert ordnance and improvised explosive devices. Currently, operations involving use of land-based explosives are not conducted in the Silver Strand Training Complex because there is no authorized location to detonate explosives (Department of the Navy 2003). However, blank ammunition, blank grenade simulators, and low charge detonation cord is used as part of various training operations (Conkle 2003).

Strategic sealift operations provide the Navy with a deployable system for transporting materials and equipment from ship to shore. FXP's comprising these operations are divided into general categories that include Container Offloading and Transfer System (COTS) and Offload Bulk Fuel System (OBFS). COTS uses a mix of pontoons, water jet propulsion assemblies, and ancillary hardware to transport personnel and equipment from ship to shore. Representative training operations include the use and deployment of an Elevated Causeway System (ELCAS) and the Causeway Pier Insertion/Retraction. OBFS is designed to provide military personnel with the ability to offload large quantities of petroleum and other products from military or commercial offshore vessels. The OBFS has two major elements that include Amphibious Assault Bulk Fuel/Water System and the Amphibious Bulk Liquid Transfer System, which are used to transport fuel and water from ship to shore during assault echelon of a military operation. Strategic sealift training operations are frequently conducted in conjunction with Beach Master Unit command post training (Department of the Navy 2003).

While all 13 commands incorporate physical conditioning as part of their training, Naval Special Warfare Center (NSWC) has FXP physical conditioning requirements associated with the Basic Underwater Demolition/School (BUD/S) Program. With six BUD/S classes a year going through the program, the NSWC conducts over 1200 physical conditioning exercises, including combat runs, swims, and endurance operations (Department of the Navy 2003).

The training beach at NASNI is approximately 1.56 miles (2,500 meters) in length and includes the entire Pacific Ocean beach from the tip of Zuniga Point to northern city limit boundary of Coronado. This beach area is approximately 66.9 acres (Conkle 2003a) (Figure 2). The training beach at NASNI is separate and not part of the Silver Strand Training Complex described above. NASNI supports specific training operations that include Mobile Inshore Undersea Warfare Training, Swimmer Scout, Escape and Recovery Training, "Around the World" Paddle Evolutions, Combat Hydrographic Reconnaissance, Stealth and Concealment training, a variety of research and development exercises (e.g., electromagnetic sensor array), Naval Special Warfare Over the Beach Field Training exercises, underwater swimmer training operations, and physical conditioning, as well as recreational use for military personnel and their families (Department of the Navy 2003).

The ocean front training beach of NAB is approximately 2.92 miles (4,705 meters) in length and is divided operationally into 10 boating lanes, each of which is approximately 500 yards in width. The boat training lanes are identified by color and are referred to from north to south as Yellow 1

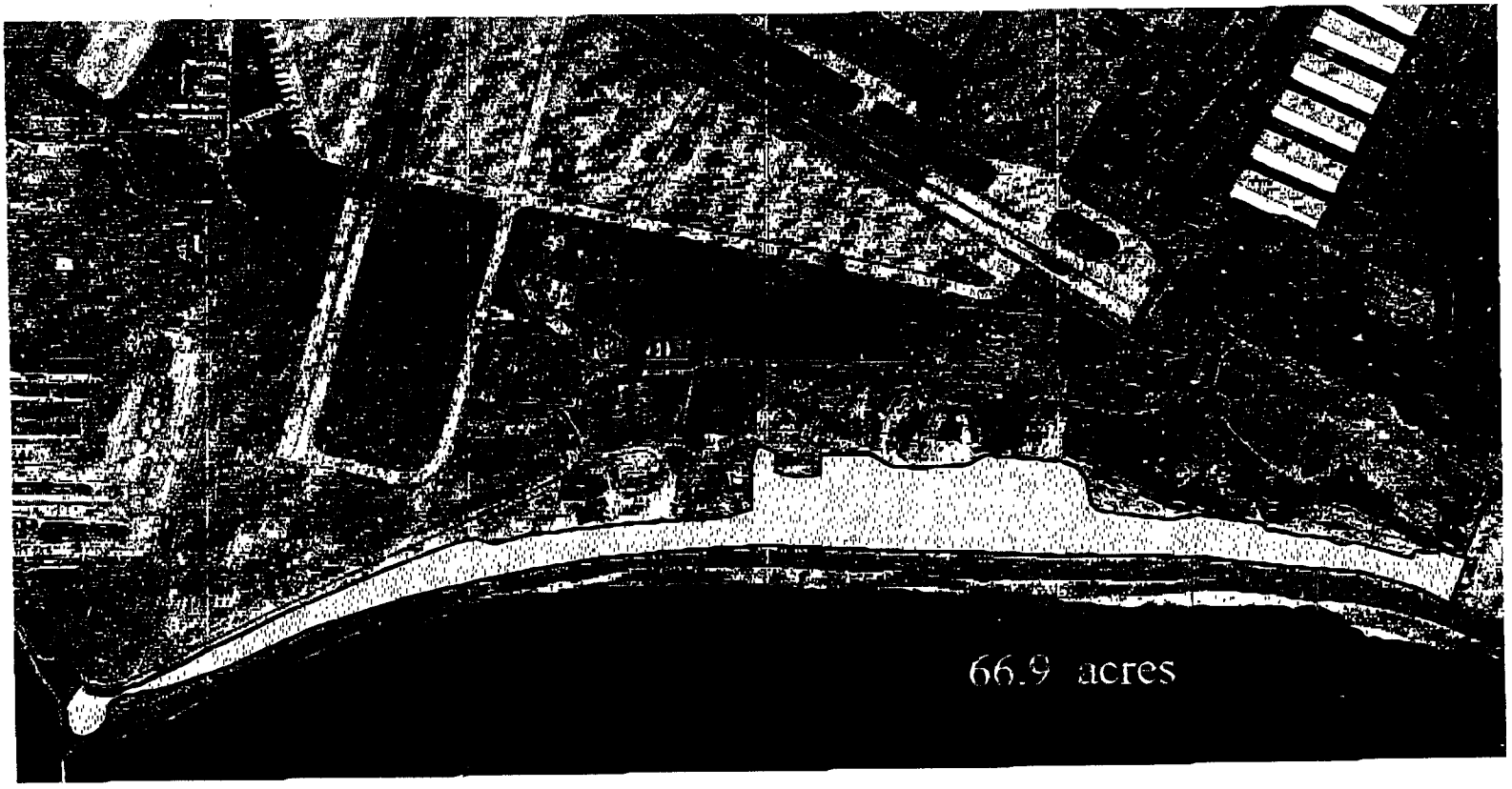


Figure 2. A map of the shoreline area at Naval Air Station North Island (NASNI) where military training operations occur. This shoreline is utilized by the western snowy plover.

and 2, Red 1 and 2, Green 1 and 2, Blue 1 and 2, and Orange 1 and 2 (Department of the Navy 1998; Figure 1). The approximate total acreage of the training beach that comprises the 10 boat lanes at NAB is 128.29 acres (Conkle 2003b). Upon request, military training units are assigned one or more boat lanes, including the onshore sandy beach front, to conduct various training activities. NAB has designated ocean and bay training activities. A special feature at the NAB ocean beach is a permanent demolition pit used by Naval Special Warfare that was constructed in the northern end of training beach Blue 1.

The ocean beach at NRRF is approximately 1.1 miles (1,768 meters) in length and is divided operationally into 4 boating lanes, each of which is approximately 500 yards in width. The boat lanes are identified by color and are referred to from north to south as White 1 and 2 and Purple 1 and 2 (Figure 1). The approximate acreage of the training beach that comprises the 4 boat lanes at NRRF is 49.67 acres (e.g., White 1 = 14.53 acres, White 2 = 13.18 acres, Purple 1 = 11.88 acres, and Purple 2 = 10.08 acres) (Conkle 2003b).

Management of California Least Tern and Western Snowy Plover at NAB, NASNI, and NRRF

Ocean-side Activities

For the 2003 least tern and snowy plover breeding season, Navy training operations will utilize the ocean beach at NASNI, beach lanes Red 1 and 2, Green 2, Blue 1, and a segment of beach identified as "Alpha Transition Area" at NAB (i.e., Alpha Area) and beach lanes White 1 and 2 and Purple 1 and 2 at NRRF. The Alpha Area at NAB has been defined as a stretch of beach that is 35 feet landward of the mean tide mark and extends from boat lanes Red 1 to Blue 1. This 35-foot corridor, which the Navy will use to move people and equipment, is typically includes the area between the wave-washed portion of the beach and first sand crest or bench.

All snowy plover nests on the ocean beaches of NASNI, NAB, and NRRF will be marked with blue stakes with a 30-meter buffer surrounding the nest. Troops and vehicles will be instructed to avoid these areas. Predator control by Wildlife Services, Department of Agriculture will be conducted on the ocean beaches of NASNI and NRRF, but not at NAB. In lieu of the use of Wildlife Services at the NAB ocean beach, the Navy will employ "mini-exclosures" to protect snowy plover nests. A mini-exclosure consists of galvanized, welded 18-gauge wire with 2 inch by 4 inch openings that is cut to form five 20-inch square panels that can be fastened together to make a cube with an open bottom (Fancher et al. 2002). Zip ties can be used to secure the panels to form a rigid structure. These mini-exclosures are designed to protect the eggs from predation. Any snowy plover nests with eggs that are found by biological monitors in Alpha Area will be relocated to beach lane Green 1, a protected area for nesting least terns and snowy plovers.

All least tern nests within beach lanes Green 1, Blue 2, Orange 1, and Orange 2 at NAB will be fully protected from all training events by delineating the perimeter of these areas with blue stakes or cones. Military troops conducting training events at NAB will be told to avoid these protected areas. Least tern decoys will be placed throughout these protected areas to encourage

tern nesting at these locations. Military training will occur in Red 1, Red 2, Green 2, and Blue 1. Least tern nests within beach lanes Red 1 and Red 2 will be marked with tongue depressors or wooden stakes, however, military training activities will occur in these areas when needed. These areas will be monitored five days a week and on weekends when necessary to document the extent of take. Least terns nests within beach lanes Red 2 and Green 2 that are within 10 meters of the protected beach lane Green 1 will be relocated.

Least terns will also be discouraged from nesting in Green 2 and Blue 1 by smoothing out all new nest scrapes (without eggs) and placing wooden stakes with mylar strips in areas that are attracting nesting least terns as evidence by freshly made nest scrapes. If least tern eggs are found within beach lanes Green 2, Blue 1, and the Alpha Area, biological monitors will collect the first 50 least tern eggs found. These eggs will be collected for captive rearing purposes and turned over to SeaWorld, San Diego. Once 50 least tern eggs are collected from Green 2, Blue 1, and Alpha Area, any further nests made in Green 2 and Blue 1 will be marked with tongue depressors or wooden stakes. Least tern nests with beach lanes Green 2 and Blue 1 that are within 10 meters of the protected beach lanes Green 1 or Blue 2 will be relocated. Military training will occur within these latter beach lanes with biological monitors documenting the extent of take associated with training.

Two beach crossing lanes will be established at the ocean beaches of NAB. These crossing lanes will be designated between Blue 2 and Orange 1 (e.g., 50-foot crossing lane) and between Orange 2 and Silver Strand State Beach (e.g., 100-foot crossing lane). These lanes are aligned from west to east and are annually designated to facilitate the movement of military troops, vehicles, and equipment from the wave-washed portion of the ocean beach to a permanent road that has a north/south alignment and parallels Highway 75. Beach crossing lanes will be marked with white metal stakes and green tape.

Biological monitoring for the least tern and snowy plover will be conducted by qualified experts at all nesting sites on NASNI, NAB, and NRRF. Monitoring at NAB will be three to five days a week and on weekends when necessary to correlate with military training schedules (e.g., NAB ocean beach monitoring three to five days per week with three days per week from April 15 to April 30, five days per week from May 1 to July 21, three days per week from July 22 to August 31and North and South Delta Beach monitoring three to four days per week with three days per week from April 15 to April 30, four days per week from April 30 to July 31, and three days per week from July 31 to August 31) . Monitoring at NASNI for the snowy plover on the ocean beach will be 2.25 days per week from March 1 to August 31. Monitoring for the least tern at the NASNI "MAT" site will be three to four days a week (e.g., three days per week from April 15 to April 30, four days per week from April 30 to July 31, and three days per week from July 31 to August 31). Monitoring at NRRF for the snowy plover will be three days per week from March 1 to August 31. Banding of least terns and snowy plovers will be done in conjunction with monitoring of all nests established on the ocean beaches. Monitoring for least terns and snowy plovers will include when adult birds arrive, number and location of nests, number of eggs per nest, an estimated number of fledglings produced, number of nests relocated, level of

incidental take associated with training, and the amount and type of predation events that are documented.

Additional management activities to conserve least terns and snowy plovers include: (a) notification of Navy personnel of the location of individual nests within the boat lanes made by these listed species; (b) placement of signs every 500-feet from the Naval training scheduler along the ingress/egress road that parallels Highway 75 on cones to inform military training personnel of the need to protect least tern nests along the beach; and (c) annual predator management. The Navy will provide administrative messages that advise commands of least tern and snowy plover breeding seasons and provide pre-training briefing sessions in which the various military groups that conduct training activities on the beach are advised of measures needed to be incorporated into programs to be in compliance with the Conservation Measures and Terms and Conditions of the most current biological opinion they are operating under. The Navy has also sent out an annual public notice to NAB housing and marina users that advised pet owners of the need to control their animals, particularly dogs and cats.

Bay-side Activities

Delta Beach is an area of Bay fill extending for approximately 6,000-feet along the bay-side of the Silver Strand that has been conserved as a permanent least tern nesting area as partial compensation for the Navy's Light Airborne Multipurpose System (LAMPS MKIII) facilities development program (on the MAT) at Naval Air Station North Island (NASNI). The use of Delta Beach as tern nesting area was addressed in the Navy's Biological Assessment of the Impact of the MAT Development Program at NASNI on the California Least Tern, dated July 23, 1982, and the Service's Biological Opinion on MAT Development Program (1-1-82-F-123) dated March 2, 1983. Delta Beach is divided into North Delta Beach and South Delta Beach, which are separated by an expansive intertidal mudflat with saltmarsh vegetation. A chain-link fence separates Delta Beach from Highway 75. Active management of Delta Beach for least tern nesting has included depositing beach sand to enhance nesting substrate, clearing non-native vegetation, and controlling avian and mammalian predators. Berms have been constructed on Delta Beach to minimize flooding and protect nests from inundation by tidal waters during high tide events. Grading and removing non-native vegetation is done annually prior to the nesting season. In addition, bait to discourage predatory ants, including southern fire ant (Solenopsis xyloni), field ant (Formica pilicornis), Argentine ant (Linepithema humile), and Pyramid ant (Conomyrma bicolor), has been used on North and South Delta Beach prior to breeding seasons. Furthermore, ceramic tiles have been placed on the beach to provide shade and shelter for least tern and snowy plover chicks and a permanent grid system using small diameter plastic pipe has been established to aid monitors who census the colony throughout the nesting season with the mapping of the annual distribution of nests.

A single beach crossing lane will be established on South Delta Beach to provide access for military training activities conducted in San Diego Bay. This crossing lane would be located on the southern end of South Delta Beach.

Captain David R. Landon (FWS-SDG-3452.1)

Conservation Measures

The following measures have been incorporated into the project description by the Navy to avoid and minimize potential effects to the least tern and the snowy plover.

1. All snowy plover nests will be marked with blue flexi-stakes or cones and a buffer of 30 meters will be placed around each nest with the exception of the larger protected areas including Green 1, Blue 2, Orange 1, and Orange 2. No military training operations will be permitted to occur within this delineated buffer or protected areas. Once chicks hatch, markers will be removed within seven days.

2. A mini-exclosure with the design specifications described by Fancher et al. (2002) will be deployed over all snowy plover nests made on the Pacific Ocean beach lanes of NAB. The mini-exclosure will be removed within seven days or when it is biologically practical and minimizes impact to the nesting snowy plovers.

3. Predator control of mammalian and avian predators of the least tern and snowy plover will be performed by Wildlife Services on the Pacific ocean beach of NASNI, at least tern nesting colony known as the "MAT" site on NASNI, North and South Delta Beach located adjacent to San Diego Bay on NAB, and on the Pacific Ocean beach of NRRF.

4. NAB beach training lanes Green 1, Blue 2, Orange 1, and Orange 2 will be used as protected nesting habitat for the least tern and snowy plover. The perimeter of these areas will be delineated with blue flexi-stakes or cones and no military training operations will be permitted to occur within these delineated areas.

5. The nesting substrate of the least tern and snowy plover on South Delta Beach, NAB will be enhanced by the placement of new sand in the amount of 4,560 cubic yards extracted from the Pacific Ocean beach and transported to this nesting colony site. The sand was delivered by March 5, 2003, and spread on grids B13 to G14 of South Delta Beach.

6. Predator control to manage southern fire ants, field ants, Argentine ants, and pyramid ants found on North and South Delta Beach, NAB will be implemented prior to and during the snowy plover and least tern nesting season.

7. Thirty-six telephone posts ranging in height from approximately 2 to 4 feet located at the southern end of South Delta Beach will be removed and transported outside the boundaries of the nesting colony site in an effort to eliminate potential perch sites for avian predators of the least tern and snowy plover. This effort was completed by February 10, 2003.

8. Least tern and snowy plover nests found within beach lane Red 2 that are within 10 meters of Green 1 will be relocated to this latter protected nesting area. Least tern and snowy plover nests found within beach lanes Green 2 and Blue 1 that are within 10

meters of Green 1 or Blue 2 will be relocated to these respective protected nesting areas. Least tern and snowy plover nests with eggs found in the Alpha Area will be collected by biological monitors for the Navy for captive rearing at SeaWorld, San Diego or relocated to Green 1.

9. Within beach lanes Green 2, Blue 1, and the beach corridor identified as Alpha Area, the first 50 least tern eggs found in these areas that can not be relocated will be collected for captive rearing purposes and turned over to SeaWorld, San Diego for hatching and rearing. Upon reaching the fledgling stage and if the birds are in good health, the least terns will be released on U.S. Fish and Wildlife Service property depending on the current status and health of the nesting colony being considered, number of wild least tern adults and fledglings that these captive birds can be integrated with, etc. If the U.S. Fish and Wildlife Service property does not support wild least tern adults and fledglings that these captive birds can be integrated with, the least terns will be released on the NAB North or South Delta Beaches or another location with wild least tern adults and fledglings. Least tern eggs will not be collected after July 18, 2003, to ensure there is sufficient time for the young to fledge and be released with the wild population of least terns prior to migration.

10. Within active military training areas including beach lanes Red 1, Red 2, Green 2, and Blue 1 (e.g., after the collection of the first 50 least tern eggs in the latter two beach lanes) least nests will be marked with tongue depressors or small wooden stakes.

11. No kelp or other natural marine vegetation that collects on beach tidal areas and is commonly used by beach insects will be removed from the Pacific ocean beaches at NAB.

12. The beach crossing lanes will be positioned to avoid the largest number of current and historic nest sites. Lane alignments will be modified, if necessary and as appropriate, to reduce the number of nests requiring relocation. Beach crossing lanes will be marked with white metal stakes and green tape for their entire length.

13. Site preparation will be performed on least tern and snowy plover nesting colony sites located on Naval property including the "MAT"site on NASNI, and North and South Delta Beach on NAB. Site preparation includes grading or mowing to remove annual plant growth, inspection/replacement or reinstallation of chick barriers around the perimeter of the nesting colony, inspection/repair/replacement of nest site grid poles and placement of chick shelters throughout the nesting colony.

15. Biological monitoring of the least tern and the snowy plover during the breeding season will be performed by qualified experts at all nesting sites on NASNI, NAB, and NRRF. Monitoring at NAB ocean beach for least terns and snowy plovers would be three to five days a week (e.g., with three days a week from April 15 to April 30, five days a week from May 1 to July 21, and three days a week from July 22 to August 31). Monitoring at

NAB North and South Delta Beach for least terns and snowy plovers would be three to four days a week (e.g., three days a week from April 15 to April 30, four days a week from April 30 to July 31, and three days a week from July 31 to August 31). Monitoring at the NASNI "MAT" site for least terns would be three to four days a week (e.g. with three days a week from April 15 to April 30, four days a week from April 30 to July 31, and three days a week from July 31 to August 31). Monitoring at NASNI ocean beach for snowy plovers would be 2.25 days a week from March 1 to August 31. Monitoring at NRRF for snowy plovers would be 3 days a week from March 1 to August 31.

16. Banding of least terns and snowy plovers adults and chicks will be done in conjunction with monitoring of nests at NASNI, NAB, and NRRF. Due to the large number of nests that must be monitored, not all adults and chicks can be banded.

17. In 2002, the Navy performed additional beneficial measures at South Delta Beach for the purpose of improving the quality of the least tern and snowy plover nesting colony site that went beyond what was agreed to with the Service during informal consultation, including removal of a 900-meter long by 2 foot high sand berm, removal of 1.61 to 2.16 acres of ice plant from the southern and western shorelines of the site, grading approximately 4.3 acres of habitat south of a chain-link fence removed prior to the 2002 nesting season and installation of new gate and reconfiguration of an existing fence line for greater site security.

STATUS OF THE SPECIES/CRITICAL HABITAT

California least tern

The least tern historically nested along sandy beaches close to estuaries and embayments along the coast of California from San Francisco Bay to Baja California, Mexico. Human encroachment along California beaches for recreation, residential, and industrial development severely diminished the availability of suitable nesting habitat. This loss of nesting habitat in conjunction with increased loss of foraging areas, human disturbance, and predation at remaining breeding colonies resulted in a Federal designation of endangered status in 1970 (35 FR1604).

Upon its designation as endangered, statewide efforts to implement protection for least tern nesting and foraging areas has resulted in a breeding population increase from 623 pairs in 1969 to an estimated 4,700 pairs in 2001. The majority of the least tern population is concentrated in southern California within the Counties of Los Angeles, Orange, and San Diego.

The least tern is the smallest of our U.S. terns, measuring about 9 inches long with a wingspan of about 20 inches. Males and females look alike with a black cap, gray wings with black tips, orange legs, and black-tipped yellow bill. Immature birds have darker plumage and a dark bill with distinctive white heads and dark eye stripe.

Captain David R. Landon (FWS-SDG-3452.1)

Least terns typically arrive in California from Central and South America beginning in mid-April and complete their breeding cycle by the end of August. Sandy beaches close to estuaries and coastal embayments that have limited human disturbance have traditionally served as nesting sites for the least tern. In recent years, many non-beach sandy surfaces in coastal areas have been successfully utilized by least terns for nesting (Massey and Atwood 1979 -1985). The nest of the least tern is a simple scrape or depression in the sand that the birds sometime adorn with small fragments of shell or pebbles. One to 3 eggs are laid, usually 2, and incubated for 20-25 days with a mean time of about 21 days. This is followed by an approximate 3 week period of the adults tending the flightless but quite mobile chicks. Least tern nesting is characterized by two waves of nesting. Most of the initial nesting attempts are made by experienced breeders and are completed by mid-June. A second wave of nesting usually occurs from mid-June to early August which is comprised of re-nests after initial failures and second year birds nesting for the first time (Massey and Atwood 1981). Least terns exhibit a high degree of nest site fidelity from year to year (Atwood and Massey 1988). Factors which can affect colony site fidelity include reproductive failure and the physical attributes of the nest site such as the amount of vegetative encroachment.

Least terns feed exclusively on small fishes captured in shallow, nearshore waters, particularly at or near estuaries and river mouths (Massey 1974, Collins et al. 1979, Atwood and Minsky 1983, Atwood and Kelly 1984, Minsky 1984, Bailey 1984). After their eggs hatch, breeding adults catch and deliver small fish to the flightless young. The young begin to fly at about 20 days of age but continue to be fed and are taught how to feed by their parents for some time after fledgling. Reproductive success is, therefore, closely related to the availability of undisturbed nest sites and nearby waters with adequate supplies of appropriately sized fishes.

Conflicting uses of southern California beaches during the least tern nesting season have precluded the use of natural nesting sites. Because of the lack in availability of large expanses of beach, many colony sites have been restricted to small discrete areas often protected by fencing. Although this species is loosely colonial in nature, least terns have been artificially concentrated within these fenced areas, often adjacent to heavily used public beaches or on tiny man-made islands, since beach front property is at such a premium for human usage. The adults, eggs, and young are thus confined, rendering them susceptible to major problems such as predation and disturbance events with limited options to relocate. Hence, predator control constitutes one of the most crucial management strategies for reproductive success. Known problem predators of least tern adults, young, or eggs include the red fox, house cats and dogs, American kestrel, American crow, burrowing owl, loggerhead shrike, common raven, coyote, and others.

Episodic losses have also been attributed to cold, wet weather, extreme heat, dehydration and starvation, unusually high surf or tides, and human disturbance. Human disturbance is a primary problem at several colonies. Additionally, the "El Niño" warm sea current phenomenon can have deleterious long term effects on the entire least tern population. During the El Niño event of 1982-1983, diminished fish populations throughout the southern California bight caused a drastic reduction in least tern breeding success resulting in the lowest annual production of fledged young on record (Massey 1988, Massey et at. 1992). Subsequently, it took 5 years for the

population to recover from this event. El Niño conditions were also evident during the 1992 breeding season which also resulted in a much reduced statewide production of fledglings (Caffrey 1993).

Large fluctuations in the number of breeding pairs occurred for San Diego Bay as a whole over the period between 1978 to 2001. The number of pairs breeding at San Diego Bay nesting sites declined by 49 percent from a high of 291 pairs in 1979 to 148 pairs in 1982. This is in contrast to the statewide population for the same time period which exhibited a slight increase in the number of breeding pairs. Between 1983 to 1991 an erratic fluctuation of the San Diego Bay breeding population continued with a low of 107 breeding pairs in 1984 to a high of 178 pairs both in 1983 and 1990. Meanwhile, the statewide numbers declined during the period 1984 through 1987. The Bay-wide breeding population experienced a substantial increase from 141 pairs in 1991 to 251 pairs in 1992. Increases in the statewide breeding population of terns was evident by 1990 and has since continued to grow. However, the number of fledglings produced statewide during 1994 and 1995 decreased substantially and the implications of reduced recruitment into the breeding population during this period is uncertain. Parallel to the statewide trend, tern pairs nesting at San Diego Bay continue to increase. In 1996, the breeding population of terns in San Diego Bay was estimated at 430 pairs or 14 percent of the range wide population. In 2001, the breeding population of terns in San Diego Bay was estimated at 871 pairs or approximately 18.3 percent of the range wide population in California. Approximately 88 percent of the total number of breeding pairs that came to San Diego Bay nested at NAB and the NASNI "Mat" site [California Department of Fish and Game (CDFG 2002)]. In 2002, the breeding population in San Diego Bay was estimated at 709 pairs or approximately 19.8 percent of the range wide population in California. Approximately 85 percent total number of breeding pairs that came to San Diego Bay in 2002 nested at NAB and the NASNI "Mat" site (CDFG 2003).

Concurrent with erratic Bay-wide populations are the fluctuations in the number of breeding pairs associated with individual sites and the number of available sites which are occupied by nesting pairs. Declines at one nesting site sometimes are balanced by increases at another nearby site and are most likely a result of inter-colony movement. These shifts appear to be related to heavy predation or human disturbance event(s) which often times result in poor reproductive success.

In recent times, least terns have nested at 5 to 7 locations within San Diego Bay including NAB. The NAB population of least terns (541 breeding pairs in 2000; 664 breeding pairs in 2001; and 534 breeding pairs in 2002) (Patton 2002 and CDFG 2001-2002) is the second largest population in California. Camp Pendleton supports the largest population [1,029 breeding pairs in 2000; 992 breeding pairs in 2001; and 584 breeding pairs in 2002 (Patton 2002 and CDFG 2001-2002)] of least terns in California. Statewide population and fledgling production numbers for the least tern in 2002 is shown in Appendix A. Delta Beach was officially designated as a least tern nesting site in 1984 as compensation for the loss of nesting area in association with the construction of the LAMPS MK III project at NASNI. In 1987, the Service and the Navy signed a Memorandum of Understanding (MOU) to establish standards and conditions for Navy

in-water construction activities conducted in San Diego Bay to minimize and avoid effects to the least tern. The MOU between the Service and Navy was renewed in 1993. The Navy has requested extensions of the MOU for 1999 and 2000 which have been agreed to by the Service. In 2001, the Navy and the Service cooperatively worked in a joint effort to update the MOU. There was an agreement between the Service and the Navy that, while the MOU was being updated, the obligations of both parties would remain in effect. Under specifications of the MOU, the Navy intensified management of least tern colonies on Naval facilities including NAB. Since that time active management measures have included extensive biological monitoring, nest site preparation, and predator control.

Least terns have nested on the ocean front beach of NAB, and North and South Delta Beaches. Nesting by least terns along the ocean front beach of NAB was first recorded during recent times in 1994, when one nest was established within Beach Lane Green 2. This colony has continued to expand in numbers and distribution (Table 1). Management actions of South Delta Beach have been undertaken by the Navy in part to lure nesting least terns away from NAB ocean front beaches. These actions included enhancement of nesting substrate, use of herbicides to control non-native vegetation and control of predatory ant species at South Delta Beach. These management actions have resulted in an increase in least tern use of South Delta Beach (Table 2). However, in spite of these beneficial management actions at South Delta Beach, the least tern use of the ocean front beach of NAB has continued to significantly increase (Table 2).

Table 1. Number and Distribution of California Least Tern Nests within the Military Boat Training Lanes from 1993 to 2002 at NAB Ocean Beaches. Monitoring Data Collected by Biologists Under Contract with the Navy.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Yellow 1	0	0	0	0	0	0	0	0	0	0
Yellow 2	0	0	0	0	0	0	0	0	0	0
Red 1	0	0	0	0	0	1	0	0	0	0
Red 2	0	0	0	8	6	18	28	19	32	30
Green 1	0	0	13	21	27	68	101	81	101	116
Green 2	0	1	18	54	46	48	58	54	75	44*
Blue 1	0	0	0	1	0	0	6	6	7	8*
Blue 2	0	0	0	0	11	41	57	101	126	108
Orange 1	0	0	0	0	1	6	15	36	69	57
Orange 2	0	0	0	0	0	2	13	33	52	36

* 52 Least tern nests with 56 eggs were found in Green 2 and Blue 1. Fifty eggs from 48 of the 52 nests were collected and taken to Project Wildlife for captive rearing. Four eggs from two nests were relocated (Copper 2003, personal communication).

Table 2. Count of California Least Tern Nests at All Locations Utilized at NAB and NASNI. Data Collected by Biologists Under Contract with the Navy.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
NAB Ocean beaches	0	1	31	84	91	182	278	330	462	401
Delta Beach South	8	18	1	21	25	80	80	71	81	84
Delta Beach North	127	210	177	224	349	337	344	229	271	257
NASNI "Mat" Site	52	51	60	53	27	77	102	133	113	83
TOTAL	187	280	269	382	492	676	804	763	927	825

In recent historical past, least terns have not used the ocean beaches of NASNI and NRRF for nesting. However they have used the jetty and beach at Zuniga Point NASNI as a roost site (Copper 2003, pers. comm.).

In November 2002, CDFG held a post-breeding season meeting and provided as information a table that summarized estimated number of least tern breeding pairs, number of nests, estimated number of fledglings, and fledgling per pair ratio (Appendix A). In 2002, the number of least terns in California was estimated at 3569 breeding pairs [minimum pairs (3511) and maximum pairs (3626) for the State]. These breeding pairs had 4,093 nests and produced an estimated 692 fledglings [minimum fledglings produced (442) and maximum fledglings produced (941)]. Given the high number of number of adult breeding least terns in California, the number of fledglings produced per adult breeding pair was least tern nesting sites at NAB (i.e., North Delta Beach, South Delta Beach extremely low 0.18 (e.g., 692 average number of fledglings divided by 3569 average number of breeding pairs). The estimated minimum and maximum number of least tern fledglings produced per adult breeding pair at all combined NAB nesting sites was between 0.09 and 0.16 The number of least tern fledglings produced per adult breeding pair increased to between 0.15 and 0.22, if Project Wildlife's 31 captive reared fledglings (e.g., successfully released in 2002) are included in the total number of fledglings produced. With the captive breeding program, the fledgling per adult breeding pair at NAB in 2002 was 0.185 which was equal to or slightly higher than the statewide average. In 2002 at NASNI the number of least tern fledglings produced per adult breeding pair was 0.21, which was a slight improvement over the statewide average.

For the past four out of five years (e.g., 1998 to 2002) the number of least tern fledglings produced per adult breeding pair for the range wide California population and the combined San Diego Naval bases, NASNI and NAB has indicated a declining tern population. Fancher (1992) determined that if the fledgling to pair ratio was near 0.7, the breeding population two years later was not greatly different from the preceding year. However, if the ratio fell below about 0.7, the breeding population declines. Out of the past five years, only in 1998 was the fledgling to pair

ratio greater than 0.7. In 1998, NASNI and NAB combined had a fledgling to pair ratio 0.93 compared to the statewide average of 0.85.

Western snowy plover

The Pacific coast population of the snowy plover was listed as a threatened species on March 5, 1993 (58 FR 12864). The proposal to designate snowy plover critical habitat was published on March 2, 1995 (60 FR 11768). The final rule designating critical habitat was published on December 7, 1999 (64 FR 68508) and included 28 areas totaling about 18,000 acres and 180 miles of coastline. Of the 28 critical habitat areas, two are designated in Washington, seven in Oregon, and 19 in California. Critical habitat for the snowy plover was designated on NAB ocean beaches on January 6, 2000 (Figure 3).

The primary constituent elements of snowy plover critical habitat are those habitat components that are essential for the primary biological needs of foraging, nesting, rearing of young, roosting, and dispersal, or the capacity to develop those habitat components. The primary constituent elements are found in areas that support or have the potential to support intertidal beaches (between mean low water and mean high tide), associated dune systems, and river estuaries. Important components of the beach/dune/estuarine ecosystem include surf-cast kelp, sparsely vegetated foredunes, interdunal flats, spits, washover areas, blowouts, intertidal flats, salt flats, flat rocky outcrops, and gravel bars. Several of these components (sparse vegetation, salt flats) are mimicked in artificial habitat types used less commonly by snowy plovers (i.e., dredge spoil sites and salt ponds and adjoining levees)(64 FR 68508). The *Western Snowy Plover, Pacific Coast Population, Draft Recovery Plan* includes recommendations for snowy plover management measures for all known breeding and wintering locations. These locations have been divided into six recovery units. The designated snowy plover critical habitat on the NAB and NRRF ocean beaches is within recovery unit 6, which includes Los Angeles, Orange, and San Diego Counties. Designation of recovery units assists in identifying priority areas for conservation planning across the snowy plover's breeding and wintering range (Service 2001).

Factors that resulted in the Service's decision to list this species included: poor reproductive success resulting from human disturbances, predation, and inclement weather. These factors combined with permanent or long-term loss of nesting habitat to urban development and the encroachment of introduced beach grass, led to the decline in active nesting colonies as well as an overall decline in the breeding and wintering population of the snowy plover along the Pacific coast of the United States.

The breeding range of the snowy plover extends along coastal beaches from the southern portion of Washington State to southern Baja California, Mexico. Larger concentrations of breeding birds occur in the south rather than the north, suggesting that the center of the plovers' coastal distribution lies closer to the southern boundary of California (Page and Stenzel 1981). Prior to 1970, snowy plovers bred at 53 locations along coastal California (Page and Stenzel 1981). Presently, breeding occurs at only 20 locations representing a 62 percent decline in breeding sites. The greatest losses of habitat have occurred in southern California, where breeding snowy plovers

Figure 3. Designated critical habitat for the western snowy plover on the Silver Strand.

have vanished from parts of San Diego, Ventura, and Santa Barbara counties, most of Orange County, and all of Los Angeles County. In all of these areas, the plovers' absence can be correlated with industrial or residential development and/or heavy recreational use of former beach nesting areas (Page and Stenzel 1981).

In addition to the loss of nesting habitat, the breeding population of the snowy plovers in California, Oregon, and Washington has experienced a 17 percent decline between 1977 and 1989 (Page et al. 1991). The breeding population in California has declined from an estimated 1,565 adults in 1980 (Page and Stenzel 1981) to 1,386 adults in 1989, with a 55 percent decline occurring in north San Diego County and a 41 percent decline at San Diego Bay (Page et al. 1991). Follow-up statewide breeding season snowy plover surveys have been tallied by Point Reyes Bird Observatory in 1991 and 2000, with 1,371 and 976 adults counted during each of those respective years (Page 2002). The 2000 statewide count, however, represents an approximate 38 percent decline in adult snowy plover numbers recorded in 1980.

Snowy plovers breed in loose colonies with the number of adults at coastal breeding areas ranging from 2 to 318 (Page and Stenzel 1981). Sand spits, dune backed beaches, sparsely to unvegetated beach strands, open areas around estuaries, and beaches at river mouths are the preferred coastal nesting areas of the snowy plover (Page and Stenzel 1981, Wilson 1980, Powell et al. 1997). Other areas utilized by nesting snowy plovers include dredge spoil fill, dry salt evaporation ponds, and salt pond levees (Widrig 1980, Wilson 1980, Page and Stenzel 1981). Nest sites typically occur in flat, open areas with sandy or saline substrates with little or no vegetation (Widrig 1980, Wilson 1980, Page and Stenzel 1981, Welchell and Keane 1998, Pancher 1998). Although the majority of snowy plovers are site faithful, returning to the same breeding location in subsequent breeding seasons, some dispersal occurs (Warriner et al. 1986, Stenzel et al. 1994). Snowy plovers are sometimes found nesting in similar habitats as the least tern, such as occurs at Batiquitos Lagoon (Welchell and Keane 1998) and Camp Pendleton (Powell et al. 1996).

The breeding season of the snowy plover typically extends from March 1 through September 15. Egg laying has been documented as early as February 19th (Copper 2002, pers. comm.), but most often begins in mid-March and continues through late-July. Generally, 3 eggs are laid in a nest which consists of a shallow depression scraped in sandy or saline substrates. Incubation does not begin until the full clutch is laid and continues for 27-33 days with an average of 27 days before eggs are hatched (Warriner et al. 1986). Both sexes incubate the eggs. Broods rarely remain within the nesting territory (Warriner et al. 1986). Birds are able to fly within approximately 31 days of hatching. Snowy plovers will re-nest after loss of a clutch or brood (Wilson 1980, Warriner et al. 1986). Double brooding and polygamy have been observed in snowy plovers along coastal California (Warriner et al. 1986). Polygamous, snowy plover females may abandon chicks as young as 6 days old to find another mate. This leaves the male as the only adult to care for the brood (Warriner et al. 1986). Males attend their young for 29-47 days (Warriner et al. 1986). Re-nesting may occur within the initial colony or snowy plovers may move to another nesting site (Warriner et al. 1986, Powell and Collier 1994, Powell et al. 1997).

Captain David R. Landon (FWS-SDG-3452.1)

Snowy plover adults and young forage on invertebrates along intertidal areas, along beaches in wet sand and surf cast kelp, in foredune areas of dry sand above the high tide, on salt pans, and along the edges of salt marshes and salt ponds. Page et al. (1981) observed snowy plovers moving between salt pans, tidal flats, and beaches indicating these areas function together in providing habitat for the species.

Human disturbances which have a detrimental effect to nesting snowy plovers include unintentional disturbance and destruction of eggs and chicks, off-road vehicle use, horse-back riding, and beach raking. Intensive beach use by humans has resulted in abandonment of nesting sites, and reductions in nesting density and nesting success.

Human disturbance can interfere with normal snowy plover behavior. Disturbances to incubating adults can leave nests exposed to extreme temperatures resulting in non-viable eggs or blowing sand which buries the eggs. Snowy plover chicks which are separated from their attending adult as a result of human disturbances or predators, may become more susceptible to hypothermia since young chicks are unable to thermoregulate. It has been shown that increased human disturbance forces piping plover chicks (Charadrius melodius), an East coast species with habitat requirements very similar to the snowy plover, to expend more energy avoiding disturbances and less time foraging (Fleming et al. 1988). Frequently disturbed piping plover chicks fed less often and at a reduced rate with fewer chicks surviving to 17 days in areas heavily disturbed by humans (Fleming et al. 1988). However, there are levels of disturbance that have been documented to occur within the NAB training areas that appear not to have significantly affected snowy plover nesting efforts. In 2001, five snowy plover nests were established in beach area Red 1. The nests were established on or about May 6, 18, and 23, June 12, and July 3, 2001. In spite of training occurring almost daily in beach lane Red 1 throughout the nesting season, all five nests successfully hatched three eggs each (Copper 2002, pers. comm.). As typical with other large snowy plover nesting colonies, the fate of the fledglings was not determined.

Areas which receive significant off-road vehicle activity support lower densities of plover nests (Page and Stenzel 1981). Powell and Collier (1994) reported a shift in beach usage by snowy plovers from areas of heavy vehicular traffic to more protected sites. Direct mortality to snowy plovers as a result of vehicular activity on beaches has been documented (Persons 1994, Copper 1997). Research has shown a decrease in piping plover chick survivorship with as little as 10 vehicular passes per day (Melvin et al. 1994). Snowy plovers, especially the flightless young, are particularly vulnerable to being run over or trampled since crouching in depressions, such as footprints and tire tracks, appears to be a behavioral characteristic (James et al. 1992).

NAB Coronado is a key nesting area within San Diego County for the snowy plover. In 1996, a total of 179 snowy plover nests were found at 10 sites within San Diego County with approximately 90 percent of the nests occurring at four locations, including Marine Corps Base Camp Pendleton (81), Batiquitos Lagoon (39), NAB Coronado (26), and Tijuana Slough National Wildlife Refuge (16). At NAB Coronado 23 of the 26 nests were constructed on the ocean front beach (Powell et al. 1996). In 1998, the last comprehensive San Diego County-wide survey of snowy plover nesting sites was made by Powell et al. (1998). This survey recorded 156 snowy

plover nests at nine sites within the County, with approximately 90 percent of the nests occurring at same four sites that were dominate in 1996. These sites, along with the total number of nests found at each location, included Marine Corps Base Camp Pendleton (68), NAB Coronado (34), Batiquitos Lagoon (26), and Tijuana Slough National Wildlife Refuge (12).

Elizabeth Copper, a principal biological monitor for the Navy, compiled a table of snowy plover nest numbers and estimated fledglings in San Diego County for 2002, including Marine Corps Base Camp Pendleton (Appendix B). In 2002, there was a total of 323 snowy plover nests in San Diego County with 99 of those nests being within the project area [e.g., NASNI ocean beach (26), NAB-North Delta Beach (1), NAB-South Delta Beach (2), NAB ocean beach (57), and NRRF ocean beach (13)]. This snowy plover nesting effort produced a total estimate of 36 fledglings for NASNI, NAB, and NRRF. Counts and distributions of snowy plover nests by individual ocean beach lanes at NAB, between 1993 and 2002, is shown in Table 3. Total snowy plover nests at NANSI, NAB, and NRRF, between 1992 and 2002, are provided in Table 4.

Table 3. Number and Distribution of Western Snowy Plovers within the Military Boat Training Lanes from 1993 to 2002 at NAB ocean beaches. Nest Counts were made by Biologists Under Contract with the Navy.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Yellow 1	0	0	0	0	0	0	0	0	0	0
Yellow 2	0	0	0	0	0	0	0	0	0	0
Red 1	0	0	2	1	5	1	1	4	5	7
Red 2	0	1	2	3	5	2	3	3	1	6
Green 1	1	5	4	4	6	4	4	4	4	5
Green 2	2	3	4	5	4	4	3	3	1	2
Blue 1	0	0	1	3	2	1	1	4	2	5
Blue 2	2	0	2	4	6	5	8	7	8	14
Orange 1	0	0	0	3	7	5	2	6	7	10
Orange 2	0	1	1	1	2	5	3	6	6	8

Table 4. Count of Western Snowy Plover Nests at NAB, NRRF, and NASNI. Data Collected by Biologists Under Contract with the Navy.

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
NAB Ocean Beach	3	2	10	16	24	37	27	25	37	34	57
Delta Beach South	2	1	0	1	1	5	7	3	5	0	2
Delta Beach North	7	4	2	0	2	0	0	2	2	0	1
NRRF					2	1	0	0	1	2	13
NASNI Ocean Beach									4	13	26
TOTAL	12	7	12	17	29	43	34	30	49	49	99

In 2002, Gary Page of Point Reyes Bird Observatory coordinated a breeding season survey of adult snowy plovers along the entire California coast in which 45 beach areas were inventoried and a total of 1,387 individuals were counted (Appendix C). Only 12 areas of the coast had adult snowy plover counts that exceeded 10 individuals. These areas included Clam Beach (12) and Eel River gravel bars (26) Humboldt County; Point Reyes Beach (25) Marin County; San Francisco Bay (78), Pajaro Dunes (15) Santa Cruz County, Bolsa Chica oil fields (38) Orange County; and White Beach/French Creek/Cockleburr Beach (26), Santa Margarita River mouth (41), Batiquitos Lagoon (13), Zuniga Point NASNI (13), Silver Strand Beach including NAB (38), and Tijuana River mouth (16) San Diego County. These 12 areas comprised approximately 25 percent of all the adult snowy plovers counted statewide. San Diego County had a total count of 157 adult snowy plovers that comprised approximately 11.3 percent of the statewide total count.

In the 2000 breeding season statewide inventory in which 43 beach areas were surveyed, 976 adult snowy plovers were counted (Appendix C). The survey found that only 10 areas of the coast had 10 or more adult snowy plovers with four sites located in San Diego County, including White Beach/French Creek/Cockleburr Beach (13), Santa Margarita River mouth (42), Silver Strand bay shore (10), and Silver Strand Beach that included NAB (54). The total count of adult snowy plovers at all sites surveyed in San Diego County was 144 individuals. The San Diego County count comprised approximately 14.8 percent of the State-wide total count. In comparing adult snowy plover breeding counts in 2000 and 2002, there was a reduction in 16 adult snowy plovers in 2002 at Silver Strand Beach, including NAB. However, this information has to be evaluated in context with the respective number of snowy plover nests for 2000 and 2002, which increased from 37 to 57 nests. The State-wide estimates are point counts that can be highly influenced by

weather conditions, tidal cycles, accessibility of the site, and the number and experience of the people conducting the count. However, the statewide counts are important to evaluating populations and subpopulations of adult snowy plovers over time.

A summary of the 2002 snowy plover breeding season in San Diego County shows that biological monitors estimated there was a total of 180 snowy plover pairs that produced an estimated 159 fledglings (Appendix B). The estimated snowy plover breeding numbers at NASNI, NAB, and NRRF were 12, 24, and 5 adult pairs respectively, which produced an estimated 15, 18, and 3 fledglings respectively. Thus the fledgling per adult pair ratio at NASNI, NAB, and NRRF for 2002 was 1.3, 0.75, and 0.60 (Appendix B). A population viability analysis for the Pacific coast snowy plover suggests that reproductive success between 1.2 and 1.3 fledglings per male per year, with adult survival of 76 percent and juvenile survival of 50 percent, provides a 57 to 82 percent probability of reaching a population of 3,000 snowy plovers within 25 years (Service 2001).

The goal to achieve the long-term survival and recovery of the Pacific coast snowy plover population, as identified in the *Western Snowy Plover, Pacific Coast Population, Draft Recovery Plan*, includes three criteria: (a) maintain for 10 years an average of 3,000 breeding adults distributed among six recovery units (e.g., Recovery Unit 1 Washington and Oregon, 250 breeding adults; and in California, Recovery Unit 2 Del Norte to Mendocino Counties, California 150 breeding adults; Recovery Unit 3 San Francisco Bay, California 500 breeding adults, Sonoma to Monterey Counties, California 400 breeding adults, San Luis Obispo to Ventura Counties, California 1,200 breeding adults, and Los Angeles to San Diego Counties, California 500 breeding adults); (b) maintain a 5-year productivity of at least one fledged chick per male in each recovery unit in the last 5 years prior to delisting; (c) establish participation plans among cooperating agencies, landowners, and conservation organizations to assure protection and management of breeding, wintering, and migration areas listed in "Appendix B: Information on Snowy Plover Breeding and Wintering Locations" to maintain the subpopulation sizes and average productivity specified in criteria "a" and "b" above (Service 2001).

ENVIRONMENTAL BASELINE

Regulations implementing the Endangered Species Act (50 CFR § 402.02) defines the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions that are contemporaneous with the consultation in progress.

The least tern and snowy plover use of the ocean beach where military training operations are planned for NAB, NRRF, and NASNI are discussed below along with projects or planning efforts associated with San Diego Bay that affect these species. The presence of least terns and/or snowy plovers on Navy facilities are addressed first.

Captain David R. Landon (FWS-SDG-3452.1)

The least tern and snowy plover have been documented for a number of years utilizing the ocean beach at NAB for nesting. An analysis of least tern and snowy plover nesting use within beach lanes Red 1, Red 2, Green 2, Blue 1, and Alpha Area is summarized below.

Between 1993 and 2002, only one least tern nest, in 1998, was found in Red 1. Least terns were first documented to use Red 2 in 1996 when eight nests were discovered. Since 1996, least tern nests within Red 2 have increased to 33 nests in 2001 and 30 and 28 nests in 2002 and 1999, respectively. A single least tern nest was first discovered within beach lane Green 2 in 1994 and Blue 1 in 1996. In 2001, least tern monitors documented the presence of 75 and 7 least tern nests on Green 2 and Blue 1, respectively. In 2002, the Navy actively raked these two beach lanes a maximum of three times a day (e.g., HUMVEE pulling a beach rake) and collected least terns eggs laid within these beach lanes before each daily raking event. In spite of these methods to actively discourage least tern nesting, 44 nests were established in Green 2, eight nests in Blue 1, with a total of 56 least tern eggs. Two least tern nests, each with two eggs were relocated from the active training beach lane of Green 2 into the non-training area of Green 1. The remaining 50 eggs from 48 nests were collected by biological monitors and taken to Project Wildlife for captive rearing. A single egg was discovered by biological monitors in beach lane Green 2 and the egg was found to have a hole in it. The cause of the egg damage was unknown, but it was believed that the hole may have been caused by a bird poking a hole in the egg or the eggshell being damaged from raking activities (Copper 2003).

The fate of the 50 least tern eggs collected in 2002 and incubated and reared by Project Wildlife is described below. Of the 50 lest tern eggs taken to Project Wildlife, 43 of the eggs hatched with 32 of the young chicks surviving and making to the fledgling stage. These captive reared fledglings were released on Delta Beach, NAB in 2002, prior to the onset of migration, with the expectation that social interaction between these captive and wild reared birds would increase the likelihood of survival of the captive reared birds. Fifteen additional young least terns reared by Project Wildlife were released at Delta Beach, including three individuals raised from other collected eggs and 12 from chicks taken into captive rearing due to their poor physical condition (e.g., typically underweight) and/or abnormal behavior. All of the captive reared birds released at Delta Beach were banded with a numbered blue anodized band that was attached to the left leg along with a Service band that was secured to the right leg. None of the captive birds released at Delta Beach were seen after the day of release with two exceptions. One least tern was found injured at NASNI having flown into a restroom and the other released bird was found dead at the Salt Works, which is part of South San Diego Bay National Wildlife Refuge (Copper 2003).

In 2002, biological monitors relocated three least tern nests on the ocean beaches of NAB. Two nests were relocated from the active training beach lane Green 2 to the protected beach lane of Green 1 and one nest was relocated from the beach crossing lane located between beach lanes Blue 2 and Orange 1. One of the relocated nests with two eggs was preyed upon by a Virginia opossum (*Didelphis virginiana*). The second nest with two eggs that was relocated from Green 2 was successful in that both eggs hatched and the chicks were banded. The eggs from the eight nests established in Blue 1, which was an active training lane, were collected by biological monitors and turned over to Project Wildlife for captive rearing. The least tern nest with two eggs

that was relocated from the beach crossing lane established between Blue 2 and Orange 1 was successfully moved. Both eggs from this nest hatched after being relocated (Copper 2003).

In 2001 and 2002, five and seven snowy plover nests, respectively, were constructed in Red 1 and one and six snowy plover nests, respectively, were constructed in Red 2. In 2001, a total of three snowy plover nests were constructed in beach lanes Green 2 (one nest) and Blue 1 (two nests). In 2002, snowy plover nests in these latter beach lanes had increased to a total of seven (i.e., two nests in Green 2 and five nests in Blue 1). The two nests established in beach lane Green 2 had different fates. One nest with a single egg was determined to be abandoned and the egg was taken to Project Wildlife. The second nest had two eggs that hatched, but the chicks disappeared after several days and it was feared that they may have been killed by the raking activities, however, their ultimate survival is unknown. The five nests were established in four scrapes made by snowy plovers in Blue 1. Each of these nests had three eggs that hatched. Fate of the chicks is unknown with the exception of a chick that was found dead of unknown causes (Copper, pers. comm. 2003).

In 2002, as a conservation measure, the Navy prepared 15 additional acres on South Delta Beach for snowy plover and least tern habitat. The northwestern section of this newly prepared area supported 17 least tern and two snowy plover nests. Four of the 17 tern nests were abandoned and 13 of the nests hatched young. One plover nest in the new area hatched three young. There was no nesting by least terns or snowy plovers at the southern end of the site. No plover foraging was observed along the southern shoreline of South Delta Beach (Copper, pers. comm. 2003).

Snowy plover nesting also occurs on the ocean beach of NASNI and NRRF. Nesting snowy plovers were first documented at NASNI in 1979 by Elizabeth Copper (Unitt 1984). In 2002, 26 nests were documented by biological monitors along the NASNI ocean beach. Some military training was conducted at NASNI beaches in 2002, however, the number of training events and the extent of the beach utilized for training has not been documented by the Navy.

Snowy plovers pairs were reported by L. E. Stenzel and S. C. Peaslee on the Silver Strand in May 1978 as part of an extensive study of the distribution and ecology of the species through California (Page and Stenzel 1981). In recent years snowy plover nesting has been documented at NRRF in 1996, 1997, 2000, 2001, and 2002. In 2002, 13 snowy plover nests were found on the ocean beach of this facility. Some military training was conducted in 2002. The southern beach front area of NRRF is also utilized by youth recreational activities sponsored by YMCA Camp Surf (e.g., aquatic skills, arts, crafts, outdoor education). This facility occupies 45 acres of land on the southwestern corner of NRRF and is leased from the Navy under a long term agreement that expires in 2048. Camp Surf currently serves 6,000 to 7,000 youth each year [Integrated Natural Resource Plan (INRMP)], Naval Base Coronado 2002). Currently the biological monitors use stakes and string to fence a small portion of the beach dunes at NRRF where there are active snowy plover nests. There is one sign in the beach dune area with the following information: "Endangered and Threatened Species Nesting Occurs on these Beaches from 15 March to 15 September Each Year / Individuals Disturbing Birds, Nests and/or Eggs are Subject to Fines and Imprisonment under Provisions of the Endangered Species Act of 1973."

Of the 13 snowy plover nests found at NRRF in 2002, only 5 nests survived to hatch young. Copper (pers. comm. (2002) reported that of the 36 eggs laid, 22 were lost to human disturbance/predators, 13 eggs hatched and one egg was incubated to term but failed to hatch. It was noted by a biological monitor that on April 25, 2002, four of five active snowy plover nests were found empty (e.g., eggs missing). While predation may have been the cause of the missing eggs, there had been persistent human activity in the immediate area of the nests including evidence of a person approaching posted snowy plover nests including going inside areas that had been marked off to protect nesting habitat. On May 20, 2002, four separate nests were found empty with human tracks near each of the nests. All evidence of human disturbance to snowy plover nests appeared to be from non-military personnel based on the shoe prints left in the sand. Tierra Environmental Services (Tierra), who also conducted biological monitoring of the beach for snowy plovers in 2002, documented the presence of people on two separate occasions within areas that had been posted to protect snowy plover nests. One incident involved a man throwing a ball into a designated nesting area for his dog to retrieve (Tierra 2002).

Public use of NRRF ocean beach appears to be unrestricted and largely unregulated based on an April 7, 2003, site visit to the beach area adjacent to YMCA Camp Surf by Martin Kenney of the Service. In approximately 45 minutes Mr. Kenney was on the beach, he observed six people walking on the beach, seven dogs off-leash accompanied by six persons (e.g., one lady had two dogs), three joggers, and a small boy with a man flying a kite accompanied by one of the unleashed dogs noted above. One of the joggers was running north through the back dunes that parallel the Camp Surf fence line and headed straight for an area utilized by snowy plovers for nesting. Mr. Kenney stopped the jogger using the dune area and requested that he jog on the hard packed sand portion of the beach. The jogger complied with Mr. Kenney's request. It was noted that the back dune areas adjacent to Camp Surf had trash that had appeared to have been left by people using the dunes as a party area.

Significant project planning was implemented during the past two years with the formulation of INRMP's on San Diego Bay and Naval facilities adjacent to the Bay. The Navy completed an INRMP for San Diego Bay in September 2000. During preparation of the INRMP, the Navy received technical advise and direction from a Technical Oversight Committee, a Science Advisory and Review Team, and a Naval Installations Oversight Committee. This document provided up-to-date information on the biological resources of San Diego Bay and future management strategies that could be implemented by the Navy and the San Diego Unified Port District, the two major managers and users of the bay. One of the goals addressed by the State and Federal resource agencies, who were members of the Technical Oversight Committee, was for the Navy and the San Diego Unified Port District to seek opportunities to create intertidal and subtidal habitats within San Diego Bay, given that 84 percent and 42 percent of the historical acreage of intertidal (+2 feet to -2 feet Mean Lower Low Water (MLLW) and shallow subtidal habitat (-2.2 feet to -12 feet MLLW), respectively, have been lost to past dredge and fill activities (U.S. Navy and San Diego Unified Port District 2000). The opportunity for creation of new intertidal and shallow subtidal habitat came with the Navy's dredging of a berthing facility for a NIMITZ-class aircraft carrier (CVN) at Naval Air Station North Island (USN P-700A). The project resulted in the dredging of approximately 534,072 cubic yards of sediments that needed an

area for disposal. The Navy decided to dispose the majority of this material in San Diego Bay waters that were -12 to -15 feet MLLW immediately adjacent to the NAB Coronado. The disposal operation, which occurred between 2000 and 2002, resulted in the creation of an island surrounded by existing eelgrass. This island is known as the CVN Enhancement Site and is comprised of 6 acres of intertidal habitat and approximately 15 acres of shallow subtidal habitat. The CVN Enhancement Site with its shallow water bathymetry was designed to provide productive foraging habitat for shorebirds, wading birds, and colonial seabirds, such as the least tern.

In May 2002, the Navy released the final INRMP for Naval Base Coronado (NBC). The Sikes Act Improvement Act ([16 U.S.C. 670 (1) et seq.)] of 1997 required the Department of Defense to prepare INRMP's. The NBC INRMP addressed the management of six separate installations under the administration of NBC including NASNI, NAB, NRRF, Naval Outlying Field Imperial Beach (NOLF IB), La Posta Mountain Warfare Training Center, and Survival Evasion Resistance and Escape Training School. NASNI, NAB, and NRRF are key installations that support nesting populations of least terns and snowy plovers and are addressed in this biological opinion. The Service was a member of the 2001 NBC INRMP Working Group that identified issues and strategies for managing the natural resources found on NBC, including measures to avoid and minimize the take federally listed species, such the least tern and snowy plover, in their management of the installations.

In addition, during 2001 the Service worked with the Navy on the finalization of two other INRMP's that had military installations adjacent to San Diego Bay. These INRMP's, which were released by the Navy in 2002, included the Naval Base Point Loma (July 2002), and Naval Base San Diego (August 2002). Naval Base Point Loma INRMP addressed natural resources at Naval Submarine Base, San Diego (SUBASE), Space and Naval Warfare Systems Center San Diego (SSC), Fleet Combat Training Center (FCTCPAC), Fleet Anti-Submarine Warfare Training Center, Pacific (ASW), Fleet Intelligence Training Center, Pacific (FITCPAC), and Space and Naval Warfare Systems Command (SPAWAR) Headquarters. Naval installations, including the SUBASE, SSC, and FCTCPAC, are located on Point Loma, a prominent land form that delineates the northern edge of the mouth of San Diego Bay. Installations ASW and FITCPAC are located adjacent to San Diego Bay near Harbor Island. The Naval Base San Diego INRMP addressed natural resources at the Naval Station San Diego, Mission Gorge Recreation, Facility and Broadway Complex. Naval Station San Diego and Naval Base Point Loma are major military installation adjacent to San Diego Bay. The Navy's dredging and other in-water activities are reviewed by the Service for potential effects to the least tern foraging success.

Military installations adjacent to San Diego Bay, such as SUBASE, NAB, and Naval Station San Diego (NAVSTA), need to perform maintenance and new construction of facilities that routinely require in-water construction activities. In an effort to address in-water construction activities that could affect the success of least tern foraging, a Memorandum of Understanding (MOU) between the Service and the Navy was developed in October 1987 that established standards and conditions for in-water construction projects that would minimize adverse effects to this species. The MOU defines geographical areas and physical conditions under which in-water Naval

construction activities may occur in San Diego Bay without the need to conduct formal section 7 consultation. The MOU was renewed by the Navy and the Service in 1993. The Navy and Service agreed to extensions of the MOU for 1999 and 2000. The MOU is currently being updated and revised by the Service and the Navy in a joint cooperative effort. This MOU was referenced in the text and incorporated as an appendix in each INRMP that had military installations adjacent to San Diego Bay.

Major Navy construction activities on-going within San Diego Bay include a replacement pier and dredging at the Naval Station San Diego. The project includes the demolition of existing piers 10 and 11, construction of a single-deck pile supported replacement pier (120 feet wide X 1,500 feet long), and dredging 763,545 cubic yards of bay sediments, of which 47,966 cubic yards have been determined to be "unsuitable" for ocean disposal due to contaminant levels. The Navy anticipated that project construction may extend for 24 to 30 months in 2002 and 2003. This specific project was addressed in the Navy's draft and final Environmental Impact Statement (EIS) Replacement Pier and Dredging Naval Station San Diego, California, dated October 2000 and June 2001, respectively. This project incorporated measures to avoid effects to the least tern including: (a) the use of silt curtains during dredging and placement and removal of pier pilings to minimize the spread of surface turbidity that could hinder the least tern ability to visually sight potential prey items within the project area; (b) the use of booms to contain surface debris associated with the demolition of piers 10 and 11; (c) a commitment by Navy personnel to schedule pile driving operations to the maximum extent practicable during the non-breeding season of the least tern (the new pier would require the installation of 800 piles and would last for 24 months); (d) the creation of two additional acres of intertidal habitat at the Navy's CVN Enhancement Site in San Diego Bay adjacent to the Naval Amphibious Base Coronado (for a total of 8 acres of intertidal habitat at the CVN Enhancement Site); and (e) the placement of fish attractant structures at the northern, southern and western portions of the CVN Enhancement Site. In 2002, two pilings that were removed during the demolition of pier 10 were cleaned and broken into small sections for use as fish attractant structures at specific locations around the perimeter of the CVN Enhancement Site. In January 2003, these piling sections were barged to and laid in place at the CVN Enhancement Site. In addition, approximately 150 pilings from piers10 and11 were used at the site of the "International Reef." This artificial reef structure is one of many that have been constructed along the southern California coast as habitat enhancement features for marine fish. The reef is being constructed in nearshore Pacific Ocean waters off of the City of Imperial Beach. The construction of the pier replacement project at the Naval Station is approximately 80 percent completed.

Other on-going military construction projects occurring in San Diego Bay include the Force Protection Barrier Systems being employed around the perimeter of the docks at SUBASE, the carrier berthing area at NASNI, and NAVSTA. This barrier system will be a floating structure held in place with anchors that are employed around the perimeter of docks and berthing areas at each of these Navy facilities. The Southwest Division, Naval Facilities Engineering Command and the Service coordinated on the placement of these structures to avoid project impacts to eelgrass beds and least terns (e.g., timing of project construction during the non-nesting season of the least tern). The Navy reconditioned Pier 4 at the NAVSTA by pouring a new concrete deck. No in-water construction activity is associated with latter project.

Captain David R. Landon (FWS-SDG-3452.1)

The Navy held a meeting on November 19, 2002, to discuss future military construction projects and military training operations to employ within San Diego Bay and the Pacific Ocean. Significant proposed actions that may affect least terns and snowy plovers include: (a) the Navy planned release of a draft EIS in November 2003, for the "Current and Future Training Operations and Maintenance at the Beaches of NAB and NRRF"; and (b) the proposed release of an Environmental Assessment (EA) for the "Naval Lodge Complex Expansion, NASNI" that is immediately adjacent to the Pacific Ocean beach occupied by nesting snowy plovers.

The San Diego Unified Port District is implementing another major construction project in San Diego Bay. The project involves the extension of the west-facing wharf at the National City Terminal, with the installation of 325 piles approximately 1,025 feet to the south and 220 feet to the west from the existing shoreline to match the existing wharf configuration at Berths 24-3 and 24-4, and the removal of 217,500 cubic yards of sediment associated with deeping a portion of Berth 24-1, maintenance dredging of Berths 24-2 through 24-4, and dredging at the new wharf known as Berth 24-5. This project incorporated measures to avoid effects to the least tern, including: (a) the use of a vibratory hammer to significantly reduce the noise generated during pile driving; (b) the replacement of mercury vapor flood lamps with high pressure sodium lamps on 30-foot high poles (light poles 40-49) on National City Terminal that are closest light sources to the D Street Fill, which is utilized by the least tern and snowy plover for nesting; and (c) appropriate sand material excavated from the intertidal/shallow subtidal habitat being created on D Street Fill will be placed on-site and tracked to the Chula Vista Wildlife Reserve to enhance nesting substrate for the least tern and snowy plover. Wharf construction was initiated in 2002 and was continuing in 2003. Project impacts to intertidal and shallow subtidal habitats are proposed to be offset with a wetland restoration project on Port owned land on D Street Fill. The final design for the restoration proposal was prepared in 2003 by Merkle and Associates and submitted to the U.S. Army Corps of Engineers for approval.

In June 2000, the Service initiated the process of developing a Comprehensive Conservation Plan (CCP) for the Sweetwater Marsh National Wildlife Refuge (Sweetwater Refuge) and the South San Diego Unit of the San Diego National Wildlife Refuge (SSDB Refuge Unit). Both the Sweetwater Refuge and the SSDB Refuge Unit are located in south San Diego Bay. The Sweetwater Refuge includes approximately 316 acres of salt marsh and upland habitat, while the acquisition boundary for the SSDB Refuge Unit encompasses approximately 3,500 acres of open bay water, salt ponds (formerly Western Salt property and salt ponds leased by Western Salt from the State of California), wetlands, and uplands (primarily former agricultural lands within the floodplain of the Otay River and Nestor Creek). The purpose of the CCP is to provide a clear statement of the desired future conditions for the Sweetwater Refuge and SSDB Refuge Unit through the development of a 15-year management plan. This management plan will include proposals for the management and conservation of fish, wildlife, and plant resources, while also describing opportunities for compatible wildlife dependent recreation. A variety of habitat management actions will be addressed in the CCP, including a proposal to enhance or restore habitat to support threatened and endangered species, including the least tern, snowy plover, and light-footed clapper rail. The Service received public input through a series of workshops. Based on the input received to date, the Service is preparing a draft CCP that will include a range of

management alternatives pursuant to the National Environmental Policy Act. The draft CCP/EIS is expected to be released for public review in summer 2003.

EFFECTS OF THE ACTION

Effects to least terns and snowy plovers are combined in this analysis because of the similarities of beach habitat occupied by these species and expected impacts by the proposed action. These effects are addressed below.

California least tern

The Navy has proposed a major change in the management strategy for the least tern at NAB in 2003. In 2002, least terns were discouraged from utilizing beach lanes Green 2 and Blue 1 by active raking of these beach lanes two or a maximum three times a day and having biological monitors collect for captive rearing purposes up to 75 least tern eggs (e.g., Service amended Biological Opinion 1-6-02-F-2645.1 in a letter dated July 29, 2002, from the initial collection of 50 to a total of 75 least tern eggs). In 2003, active discouragement of least tern nesting would be implemented by the Navy on beach lanes Red 1, Red 2, Green 2, and Blue 1 to ensure an available ocean front beach area for military training throughout the least tern and snowy plover breeding seasons. To discourage least tern nesting in Green 2 and Blue 1, the Navy would have biological monitors collect up to 50 least tern eggs and conduct active military training exercises in these beach lanes. The Navy also would also discourage least tern nesting in beach lanes Red 1 and Red 2 by conducting military training operations in this area of the beach. No collection of least tern eggs would occur in beach lanes Red 1 and Red 2. In Red 1, Red 2, Green 2, and Blue 1 the least tern nests would be marked but they would not be buffered from training exercises. In addition to the four beach lanes referenced above, the Navy would establish Alpha Area, a military troop and vehicle corridor that parallels the oceanfront and extends from beach lane Red 1 to Blue 1. The loss of these four ocean beach lanes would result in the elimination of 58.57 acres of nesting habitat for the least tern and 6.03 acres of nesting habitat for the least tern and snowy plover with the incorporation of the Alpha Area (Conkle 2003b).

Since breeding least terns often re-nest at the same sites year after year (Atwood et al. 1988) and the combined total number of nests that occurred in beach lanes Red 1, Red 2, Green 2, and Blue 1 has been relatively large (115 nests in 2001 and 82 nests in 2002), we anticipate that some least terns will lay eggs in these four beach lanes in spite of the harassment resulting from military training operations and collection of egg(s) from individual tern nests. To minimize impacts to the least tern in areas proposed for active training, the Navy has committed to implement three measures into their training operations that include: (a) relocating least tern nests from active training areas to protected areas; (b) collecting up to 50 least tern eggs for captive rearing purposes; and (c) marking nests with wooden stakes or tongue depressors in areas scheduled for active military training. These minimization measures are discussed below.

The Navy would relocate any least tern nest with eggs found within beach lane Red 2 that are within 10 meters of beach lane Green 1, a fully protected area. In addition any least tern nests

with eggs found within 10 meters from the northern edge of beach lane Green 2 and the southern edge of beach lane Blue 1 would be relocated to an adjacent beach lane that is protected as nesting habitat. Least tern nests with eggs found within Alpha Area would be relocated to Green 1, east of Alpha Area, and up to 50 eggs would be collected for captive rearing at SeaWorld, San Diego. The Navy proposes to relocate 28 least tern nests associated with military training operations that would occur in 2003 at NASNI, NAB, and NRRF (Department of the Navy 2003).

At active military training beach lanes Red 1 and Red 2, where least tern nests can not be relocated, each nest would be marked with a wooden stake or tongue depressor. The use of tongue depressors to mark nests would be implemented at active military beach lanes Green 2 and Blue 1 once it has been determined that no least tern nests can be relocated to protected areas and 50 least tern eggs have been collected. Military troops scheduled to conduct training operations on Red 1, Red 2, Green 2, and Blue 1 would be advised that the wooden stakes or tongue depressors mark the location of a nearby least tern nest and that they should exercise care in avoiding stepping on eggs or chicks if they are seen in these areas. The effectiveness of this technique as a means to minimize impacts to nesting terns is unknown, as it has not been tried before in an area used for military training operations. It is expected, however, that military training would be concentrated in a relatively small area and that many of the wooden stakes or tongue depressors would be easily knocked over and buried. Given the cryptic coloration of least tern eggs and chicks, it is anticipated that a number least tern eggs and chicks would be killed or injured by military vehicles and equipment running over them or by military troops stepping on them. Estimates of the number of eggs and chicks that are likely to be taken are provided below under the Incidental Take section.

In 2003, the Navy proposes that any least tern eggs discovered by the biological monitors in beach lanes Green 2 and Blue 1 would be collected on a daily basis up until July 18, 2003. The Navy has proposed that the first 50 least tern eggs collected would be turned over to SeaWorld, San Diego, for captive rearing purposes. Captive rearing would include the incubation and hatching of eggs collected and the raising of young chicks until they fledge. The chicks raised in captivity would be banded with a metal band from the Service and a band combination indicating that it is a captive raised bird. Once the young least terns have fledged and are determined to be healthy and able to fly, they would be returned to San Diego Bay and released with wild sub-populations of least terns at NAB (e.g., North or South Delta Beach), Sweetwater Marsh National Wildlife Refuge (e.g., "D" Street Fill), or South San Diego National Wildlife Refuge. The Navy preference will be to release least terns on U.S. Fish and Wildlife Service property. If the U.S. Fish and Wildlife Service property does not support wild least tern adults and fledglings that these captive birds can be integrated with, the terns will be released on the NAB North or South Delta Beaches or another location with wild least tern adults and fledglings.

Full protection of least tern and snowy plover nests from military training operations at NAB will be provided in beach lanes Green 1, Blue 2, Orange 1, and Orange 2. These four beach lanes comprise 55.15 acres of nesting habitat for both species (Conkle 2003b).

Western snowy plover

The nests of snowy plovers within Red 1, Red 2, Green 2, and Blue 1 that, which are subjected to military training, would be protected by establishing a 30-meter buffer around each nest. The military training operations in 2003 would occur on 58.57 acres of the ocean beach at NAB.

Snowy plover nesting also occurs on the ocean beaches of NASNI and NRRF. The entire ocean front beach of NASNI (66.9 acres) would be subject to military training operations. Critical habitat for the snowy plover was designated on NRRF ocean beach on January 6, 2000. The entire ocean front beach at NRRF would be subject to military training operations (49.67 acres) and recreational youth activities associated with YMCA Camp Surf.

Military training operations conducted at NAB, NASNI, and NRRF would affect snowy plovers that nest and forage on the Pacific ocean beach at all three of these Naval facilities. The Navy is requesting permission to relocate eight snowy plover nests associated with military training operations that would occur in 2003 at NASNI, NAB, and NRRF (Department of the Navy 2003).

Based on 2002 nest numbers in Red 1, Red 2, Green 2, and Blue 1, we anticipate that a minimum of 20 snowy plover nests would be within beach lanes designated for military training at NAB. With military training only occurring on two ocean beach lanes of NAB in 2002 (i.e., Green 2 and Blue 1), overall snowy plover nesting was good, with the fledgling to breeding pair ratio being 0.86 based on an estimated 18 fledglings and 21 breeding pairs (Appendix B). We expect that the fledgling to breeding pair ratio in 2003 may be lower, based on the fact that 50 percent of the ocean beach used by snowy plovers (i.e., 4 out of 8 boat lanes historically occupied by snowy plovers) would be subjected to military training operations.

The number of snowy plover nests at NASNI increased from 13 nests in 2001 to 26 nests in 2002. These 26 nests were estimated to be established by 12 breeding pairs that produced an estimated 15 fledglings for a fledgling to breeding pair ratio of 1.25 (Appendix B). All of the NASNI beach area where the 26 nests were established in 2002 would be subject to military training operations in 2003. If military training operations are similar to what was conducted in 2002, approximately the same number of adult snowy plover pairs utilize NASNI beaches for breeding, and predation levels remain similar to what was experienced last year, we believe the fledgling per breeding pair ratio should be similar to what was achieved in 2002.

Increases in snowy plover nest numbers also occurred at NRRF during this same time period. At the NRRF beach there were, expanding from 2 nests in 2001 andto 13 nests in 2002. Eleven of the 13 snowy plover nests in 2002 occurred within beach training lanes at NRRF. Of those, only five nests survived to hatch young. Of the 36 eggs laid at NRRF, 22 were lost to human disturbance or predators, 13 hatched, and one egg was incubated to term but failed to hatch. Copper (pers. comm. 2002) noted that on April 25, 2002, four of five active snowy plover nests were found empty (e.g., eggs missing). While predation may have been the cause of some of the missing eggs, there had been persistent human activity in the immediate area of the nests, including evidence of a person entering posted areas and approaching snowy plover nests that

have been individually marked. On May 20, 2002, four separate nests were found empty with human tracks near each of the nests. All evidence of human disturbance to snowy plover nests appeared to be from non-military personnel based on the shoe prints left in the sand. In addition, Tierra Environmental Services, who also conducted biological monitoring of the City of Imperial Beach northern beach areas for snowy plovers in 2002, documented the presence of people on two separate occasions within areas that had been posted to protect snowy plover nests. Of the five nests that produced young snowy plovers, it was estimated by Copper (2003) that three birds became fledglings. Based on the estimated five breeding pairs of snowy plovers at NRRF, the fledgling per breeding pair ratio was 0.60. We believe this ratio can be improved in 2003, if snowy plovers nests are not individually marked.

Based on snowy plover nest numbers in 2002 at NAB, NASNI, and NRRF and where military training is proposed for 2003, we anticipate that approximately 44 snowy plover nests would be initiated in active training areas.

At NAB, NASNI, and NRRF, all snowy plover nests discovered by the biological monitors would be marked (with cones and/or stakes) and a buffer of 30 meters would be established around each nest. The only exception to marking of individual snowy plover nests would occur at the protected beach lanes at NAB, Green 1, Blue 2, Orange 1, and Orange 2, where the perimeters of these beach lanes would be marked with blue stakes or cones. In addition to marking nests, snowy plover eggs would be protected at NAB ocean beach by the placement of Service designed mini-exclosures over each nest. These mini-exclosures would be utilized by the Navy in-lieu of providing predator management by Wildlife Services. Though mini-exclosures would not employed at North and South Delta Beach, NAB, NASNI, or NRRF, predator management would be provided in these latter areas.

The training operations may affect snowy plover nesting on South Delta Beach where a single beach crossing lane would be constructed through the least tern and snowy plover nesting colony. If snowy plover nests are successfully established in beach lanes Red 1, Red 2, Green 2 and Blue 1, we anticipate that snowy plover chicks may be killed during military training operations. Snowy plover adults and chicks have been observed using tire tracks and human footprints for loafing at Marine Corps Base Camp Pendleton and NAB (Powell and Collier 1994). This behavior increases their chances of being run over by vehicles or stepped on by troops, particularly when training operations are being conducted in a confined area. A defense mechanism of snowy plover chicks, particularly flightless young, is to remain immobile and therefore are, which renders them vulnerable to being run over or stepped upon by military troops and vehicles.

To minimize the loss of least tern and snowy plover nesting habitat in beach lanes Red 1, Red 2, Green 2 and Blue 1, the Navy has attempted to improve improved nesting substrate on the bay side nesting colonies by transporting, placing and spreading 4,560 cubic yards of ocean beach sand at South Delta Beach. In addition to the above referenced work, site preparation at South Delta Beach in 2002 exceeded what was agreed to during informal consultation between the Service and the Navy. Informal consultation established an agreement to prepare 15 acres of

suitable nesting habitat at South Delta Beach above the traditional 24 acres of nesting habitat that has been annually graded on South Delta Beach for least terns and snowy plovers. During grading of the 15 acres at the southern end of South Delta Beach, it became apparent that there were physical features still remaining at this site that were limiting ultimate value of this area as a nesting colony. The Navy agreed to further modify the site by removal of a 900-meter long by 2-foot high sand berm, removal of 1.61 to 2.16 acres of ice plant from the southern and western shorelines of the site, and improvement of 4.3 acres of potential least tern and snowy plover habitat through grading activities on lands south of a former fence that was removed in 2002. An additional site improvement made by the Navy in 2003 at the southern end of South Delta Beach included the removal of 36 telephone posts that ranged in height from two to four feet. These posts were potential perch sites for avian predators of the least tern and snowy plover. This nesting site enhancement of South Delta Beach is designed to increase the overall acreage and quality of suitable habitat that can be utilized by nesting least terns and snowy plovers. We anticipate that these improvements may, over the next 3 to 5 years, offset the loss of nesting opportunities for least terns on beach lanes Red 1, Red 2, Green 2 and Blue 1. However, losses of snowy plover nesting productivity on the Pacific ocean beach would be difficult to offset on South Delta Beach, given that between 1992 and 2002, the maximum number of snowy plover nests established on North and South Delta Beach in any one year was nine in 1992.

The commitment by the Navy to protect all least tern nests in beach lanes Green 1, Blue 2, and Orange 1 and 2 would minimize mortalities to least tern fledglings, chicks, and eggs. The use of a 30-meter buffer around all snowy plover nests is an important measure in minimizing the loss of eggs. However, assuming that the number least terns and snowy plover nests in 2003 would be similar to nest numbers documented in 2002 at Red 1, Red 2, Green 2, and Blue 1 (e.g., 82 least tern nests and 20 snowy plover nests), large numbers of eggs and chicks of both species would be subject to trampling and crushing by vehicles, equipment, and military troops. In addition these training activities would be likely to disrupt incubating or brooding adult birds and may result in the exposure of eggs and/or chicks to weather extremes, blowing sand (can bury eggs), and predators. Prolonged periods of human disturbance may also result in adult least terns or snowy plovers abandoning their eggs and/or chicks.

Evidence of harm from military training exercises to least terns and snowy plovers was documented in 2000. On July 17, 2000, a dead snowy plover chick was found in a vehicle tire track at Beach Lane Orange 2. It was believed to have been, probably run over by a military vehicle. In addition to vehicle tire tracks, multiple footprints were found, indicating a group of individuals had run through this area. On July 21, 2000, two least tern nests were found within the Orange training beach that had multiple footprints in and around the nests and vehicle tracks alongside the footprints. One least tern nest in the boundary between Beach Lanes Orange 1 and Orange 2 had been stepped on and a single egg was found broken. A second least tern nest located in Orange 2 was documented by biological monitors prior to a training event to have one egg and one chick. After the training event occurred, the egg in this nest was found damaged, however, the chick was found alive. On August 2, 2000, a group of military individuals running with rubber boats, closely followed by three military vehicles left the hard pack wave-washed portion of the sand beach where they were authorized to jog and entered into an area of Orange

Beach that contained approximately 12 least tern nests. This group ran in and out of this nesting area for approximately 45 minutes, apparently unaware of the presence of least tern nests. They departed when confronted by a biological monitor. The military group that participated in this event had not sought authorization from the Naval training scheduler who is responsible for coordinating and authorizing training events on a daily basis for the specific beach lane. Subsequent inspection of Orange Beach by biological monitors the day after the event revealed no loss of least tern chicks or eggs.

Based on the above series of events, the Navy informally consulted with the Service prior to the 2001 least tern and snowy plover nesting season to establish five beach crossing lanes (running east-west) along the boundary of the Yellow, Red, Green, Blue, and Orange beach lanes that would provide a clear, designated pathway for the movement of troops, vehicles, and equipment being sent between Highway 75 and the Pacific Ocean. The incidents of take from military training during the 2001 breeding season decreased dramatically. The biological monitors for the Navy documented on May 23, 2001, that two nests in beach lane Blue 2 and one nest in beach lane Orange 1 had been vandalized from what appeared to be recreational beach users. These nests had footprints around them that appeared to have been made by two adult individuals. All the nests were found to be missing their eggs. One egg from a nest in Blue 2 was found buried and replaced in a scrape made by adult least terns. Biological monitors concluded that this take incident was a result of recreational beach users crossing onto Navy beaches from the nearby Silver Strand State Beach. Based on the results of monitoring efforts for 2002, it appears that the combination of individual nest marking or establishing protected areas for nesting and the employment of beach crossing lanes has been beneficial in reducing the take of least tern and snowy plover nests.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future non-federal (State, tribal, local, or private actions) activities 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 consultation pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended. We anticipate that non-Federal actions, such as the prevalence of contaminants in San Diego Bay waters associated with certain marine activities (e.g., marinas and shipyards), the continued development of nearshore ocean and bay waters for commercial and recreational purposes, and the disturbance of nesting areas by humans and feral mammals, are expected to cumulatively contribute to adverse effects to the least tern and snowy plover.

CONCLUSION

After reviewing the current status of the least tern and the snowy plover, environmental baseline for the action area, effects of the project, and cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of these species and is not likely to adversely modify critical habitat for the snowy plover. Critical habitat

for the least tern has not been designated; therefore, none would be affected. We draw these conclusions for the following reasons:

1. The reduction in habitat value to 58.57 acres of ocean front least tern and snowy plover nesting habitat in beach lanes Red 1, Red 2, Green 2 and Blue 1 at NAB, 6.03 acres of ocean front least tern and snowy plover habitat with incorporation of Alpha Area at NAB, 49.67 acres of ocean front snowy plover nesting habitat in beach lanes White 1, White 2, Purple 1, and Purple 2 at NRRF, and 66.9 acres at NASNI is being offset in a manner that includes the following measures: (a) the relocation of any least tern nests within 10 meters of the outer edge of designated military training beach lanes Red 2, Green 2, Blue 1, and Alpha Area to protected ocean front nesting areas, such as Green1; (b) the grading and site preparation of South Delta Beach, including the removal of a 900-meter long by 2-foot high sand berm, removal of 1.61 to 2.16 acres of ice plant from the southern and western shorelines of the site, re-contouring of 4.3 acres of site following the removal of the southern chain link fence in 2002; (c) the removal of 36 telephone posts at the southern end of South Delta Beach that provided a perch site for potential avian predators (e.g., American kestrel and loggerhead shrikes) of snowy plover and least tern chicks; (d) the enhancement of least tern and snowy plover nesting substrate by the placement of 4,560 cubic yards of beach sand on South Delta Beach; (e) the use of mini-exclosures on all snowy plover nests with eggs established on NAB ocean beach; and (f) control of ants that can prey upon eggs and chicks of snowy plovers and least terns. The long-term goal of items "b", "c", and "d" would be to provide suitable nesting habitat for least terns and snowy plovers displaced from the ocean front beach area of NAB Coronado by military training operations.

2. All snowy plover nests established in beach lanes Red 1, Red 2, Green 2 and Blue 1 that have been designated for military training would be marked with a blue stake and a 30-meter buffer protected area would be established around each nest. This technique has proven relatively successful in the past in minimizing adverse effects to the plover.

3. All least tern nests established in beach lanes Red 1, Red 2, Green 2, and Blue 1 would be marked with wooden stakes or tongue depressors in effort to provide a visual cue to military troops concerning the presence of a nest. Though these markers may be relatively inconspicuous, they likely will provide some measure of protection. Losses in productively on the ocean beaches would be partially offset by nest site management at North and South Delta Beach.

4. The perimeter of protected snowy plover and least tern nesting areas that include beach lanes Green 1, Blue 2, Orange 1, and Orange 2 would be marked with blue flexi-stakes or cones that indicate the presence of a nesting area and the need for military troops and operators to avoid these marked areas. These markers should prove successful in directing troop movements.

5. The Navy would ensure that military training operations does not result in the systematic or large-scale intentional removal any kelp or other natural marine vegetation. The wrackline of these wave-deposited plants and associated invertebrates is an important food resource for snowy plovers.

6. The Navy would implement predator management activities to enhance the reproductive success of all NAB least tern and snowy plover nesting sites including North Delta Beach, South Delta Beach, NRRF, and NASNI ocean beaches and "Mat" site. However, the lack of predator control proposed on the ocean beach at NAB probably would result in reduced productivity for least terns and snowy plovers compared to previous years.

7. The Navy would prepare least tern and snowy plover nesting colony sites that include the "MAT" site on NASNI, and North and South Delta Beach on NAB, thereby promoting successful nesting at these established sites.

8. The Navy would employ biological monitors to document least tern and snowy plover nest locations, breeding numbers, reproductive success, and predator problems at NAB, NRRF, and NASNI, which would maximize nest site productivity. Nest site productivity will be further enhanced by use of predator control personnel at NAB (e.g., with the exception of the ocean beach), NRRF, and NASNI.

9. The Navy would construct two beach crossing lanes (e.g., a 50-foot lane between Blue 2 and Orange 1 and 100-foot lane between Orange 2 and the State Beach) to designate a pathway for the movement of troops, vehicles, and equipment from Highway 75 to the Pacific Ocean, thereby minimizing the potential for take associated with such activities. A separate 50-foot wide beach crossing lane would be established on South Delta Beach to provide a designated pathway for military operations proposed in San Diego Bay. These beach crossing lanes would be positioned to avoid the largest number of current and historic nest sites.

10. Military training operations proposed on NASNI, NAB, and NRRF would not eliminate sand substrate and kelp wrack on beaches, which are constituent elements of designated critical habitat for the snowy plover. Though the proposed training would adversely affect the capability of to support snowy plover nesting in 2003, the Navy has modified their operations to promote successful nesting by establishing buffers and employing mini-exclosures around all snowy plover nests on the ocean beach at NAB. Buffers around snowy plover nests are also utilized at NASNI. The marking of snowy plover nests at NRRF is limited in scope due to the past vandalism of nests.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations issued pursuant to section 4(d) of the Act prohibit take of endangered and threatened species without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing potential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral 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, the carrying out of

an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2) of the Act, such incidental take is not considered to be a prohibited taking under the Act, provided that such taking is in compliance with this incidental take statement.

The measures described below are nondiscretionary and must be undertaken by the Navy so they become binding conditions of any permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity covered by this incidental take statement. If the Navy (1) fails to adhere to the terms and conditions, (2) fails to require the enforceable terms that are added to the permit, and/or (3) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impacts of incidental take, the Navy must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

Amount or Extent of Take Anticipated

California least tern: Impacts to least terns will occur at NAB within beach lanes Red 1, Red 2, Green 2 and Blue 1, which in 2002 had 0, 30, 44, and 8 nests, respectively, for a combined total of 82 nests. Based on one breeding adult pair per nest, we anticipate that take in the form of harassment may occur to 164 adult least terns from military training operations. Furthermore, since least terns typically lay two eggs per nest, potential take in the form of harm may approximate 164 least tern eggs/chicks. However, relying on 2002 least tern numbers does not account for the active raking the Navy did in beach lanes Green 2 and Blue 1 a minimum of twice a day to discourage least terns from nesting in area of the beach. In 2001, when no raking was conducted, the least tern established 0, 33, 75, and 7 nests within beach lanes Red 1, Red 2, Green 2 and Blue 1, respectively, for a combined total of 115 nests. Based on two eggs per nest, there is a remote potential that take in the form of harm may occur to 230 least tern eggs/chicks. With 115 nests and one breeding pair per nest, we anticipate take in the form of harassment may occur to 230 adult breeding birds from military training. However, these two scenarios do not account for the Navy commitment to have their biological monitors pick up for captive rearing the first 50 least tern eggs laid in beach lanes Green 2, Blue 1, and Alpha Area, and the individual marking of nests with wooden stakes or tongue depressors all new nests established after the first 50 eggs are collected to minimize take associated with military training. As a result of the collection of 50 eggs, we anticipate that at most about 180 eggs would be taken (e.g., 230 eggs - 50 eggs collected = 180 eggs). We expect that the individual marking of nests with wooden stakes or tongue depressors will help minimize the take of the remaining 180 eggs/chicks. While recognizing that wooden stakes and tongue depressors are small and may not be easily seen by military troops, particularly with any training operations conducted at night, and that some tongue depressors will become buried in the sand, we are assuming that at most, perhaps up to 75 percent of the eggs/chicks, will be harmed. Utilizing this assumption, it would be expected that 135 eggs/chicks, would be subject to harm and 45 eggs/chicks could avoid harm in spite of being in an active training area (e.g., 180 eggs/chicks x 0.25 percent avoiding harm = 45 eggs/chicks not subject to take, and 180 eggs/chicks - 45 eggs/chicks surviving = 135 eggs/chicks subject to harm).

The only other nesting area that would be subject to harm and harassment is South Delta Beach, where a 50-foot beach crossing lane will run through an where least terns could potentially nest. Any nests established in this beach crossing lane would be relocated; we therefore anticipate that there will be no take in the form of harm. However, there are likely to be least tern breeding pairs with nests adjacent to the beach lane, which would be vulnerable to harassment by military troops and vehicles. The closest portion of South Delta Beach to the road is a 15-acre section that was graded and prepared in 2002 in accordance with Biological Opinion 1-6-02-F-2645.1. Since all of the 17 least tern nests in this portion of South Delta Beach were concentrated in the northwestern portion of this 15-acre parcel, we assume that only a few, perhaps three adult least tern breeding pairs (e.g., 6 adult least terns), may be subject to take in the form of harassment at this location.

Copper (2003) documented the relocation of three least tern nests in 2002 within two active military areas (beach lanes Green 2 and Blue 1). In 2003, the Navy is designating two additional beach lanes for active military training (Red 1 and Red 2) and Alpha Area that parallels the wave washed portion of ocean beach. However, the overall number of beach crossing lanes has been reduced from four on the ocean and one on South Delta Beach in 2002, to two on the ocean and one on South Delta Beach in 2003. We again expect that nests may need to be relocated to a safer area within active military training areas, or to protected nesting areas adjacent to active military training areas and beach crossing lanes. We anticipate that eight least tern nests may need to be relocated at NAB ocean beach and/or South Delta Beach.

Based on the analysis above, we anticipate the following take in the form of harm or harassment:

1. Sixty-eight (68) least tern nests or one hundred and thirty-five (135) least tern eggs and/or chicks in the form of direct death, injury, or harassment associated with the proposed action of military training operations.

2. Two hundred and thirty-six (236) adult least terns in the form of harassment (e.g., 230 adult least terns on NAB ocean and 6 adult least terns on Delta Beach South) as a result of military training operations on beach lanes Red 1, Red 2, Green 2, Blue 1, Alpha Area, and use of crossing lane on South Delta Beach.

3. Fifty (50) least tern eggs to be collected on beach lanes Green 2, Blue 1, and Alpha Area. by Ms. Elizabeth Copper (a biologist under contract with the Navy) and biological monitors under her supervision (Appendix D), or biologists that have been approved and permitted by the Service. Navy personnel who will assist in the transportation of least tern eggs to SeaWorld, San Diego are identified in Appendix E. The 50 least tern eggs collected will be transferred and placed in the care of Wendy Turner, Curator of Birds; Laurie Burch and Lauren Dubois, Supervisors of Birds; and Stephanie Costelow, Assistant Curator of Birds; SeaWorld, San Diego, California. The purpose of SeaWorld, San Diego's care will be to incubate and hatch the eggs and raise the young birds in captivity until they are of sufficient size and health to be released at North Delta Beach, South Delta Beach, NAB; D Street Fill, Sweetwater Marsh National Wildlife Refuge; and/or South San Diego Bay National Wildlife Refuge. The Navy's preference will be to release least terns on U.S. Fish and

Wildlife Service property. If U.S. Fish and Wildlife Service property does not support wild least tern adults and fledglings that these captive birds can be integrated with, the least terns will be released on NAB North or South Delta Beaches or another location with wild least tern adults and fledglings. Released least terns will be banded and monitored in an attempt to determine the long-term success of captive rearing techniques associated with the least tern. Any least tern eggs collected that do not hatch or can not be incubated would be properly stored for future contaminate analysis.

4. Sixteen (16) least tern eggs to be relocated by Ms. Elizabeth Copper and the biological monitors specified in Appendix D or biologists that have been approved and permitted by the Service if the eggs are found within beach lanes Red 1, Red 2, Green 2, Blue 1, Alpha Area, designated beach crossing lanes, or anywhere within the designated military training areas of NASNI and NRRF.

Western snowy plover: In 2002, the ocean beach at NASNI, NAB, and NRRF had 26, 57, and 13 western snowy plover nests, respectively, for a combined total of 96 nests. Fifty-seven of the 96 nests established in 2002 will lie within designated active training areas for 2003 (i.e., 20 nests at NAB + 26 nests at NASNI + 11 nests at NRRF). We assume that 50 percent of the snowy plover breeding pairs at NASNI, NAB, and NRRF may be subject to take in the form of harassment associated with training operations [e.g., 20 nests x a breeding pair x 50 percent = 10 breeding pairs or 20 adult birds). Since the Navy, as a conservation measure, will mark all nests in active beach training areas with blue flexi-stakes, take in the form of harm should largely be avoided. In 2002, Copper (2002) documented human take of 13 snowy plover nests, with two nests at NASNI, three nests at NAB, and eight nests at NRRF. Biological monitors believed the eight nests at NRRF were primary destroyed through vandalism, however, there is possibly that some of the missing eggs were taken by avian and/or mammalian predators. Based on 2002 nest numbers, it is anticipated that five snowy plover nests may be harmed. Since snowy plovers typically have a three egg nest, 15 eggs/chicks may be harmed.

Copper (2003) did not document any relocation of snowy plover nests in 2002. However, it should be expected that if nest numbers in 2003 are similar to those in 2002, there may be a need to relocate nests to a safer area within active military training areas or to protected nesting areas adjacent to active military training areas. We anticipate that up to combined total of 6 nests may need to be relocated from NASNI, NAB, and NRRF.

Based on the analysis above, we anticipate that the following take in the form of harm or harassment:

1. Five nests (5) or fifteen (15) snowy plover eggs and/or chicks in the form of death, injury, or harassment associated with the proposed Naval training operations including activities associated with biological monitoring.

2. Twenty (20) adult snowy plovers in the form of harassment as a result of ongoing military training activities.

3. The relocation of six (6) nests or eighteen (18) snowy plover eggs by Ms. Elizabeth Copper and the biological monitors specified in Appendix D or biologists approved and permitted by the Service if the eggs are found within beach lanes Red 1, Red 2, Green 2, Blue 1, Alpha Area, the footprint of any of the two beach crossing lanes located on the ocean front of NAB or the one beach crossing lane located at South Delta Beach.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the impact of incidental take anticipated in this biological opinion on least tern and snowy plover.

1. Unavoidable project impacts will be offset by the implementation of the Conservation Measures, subject to modifications described below, to increase the measures' effectiveness in avoiding and minimizing take.

2. Protection will be provided to least tern and snowy plover nests at NASNI and NAB and snowy plover nests at NRRF to the maximum extent practical.

3. Management and protection will be provided at the NASNI, NAB, and NRRF least tern and snowy plover nesting colonies.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Endangered Species Act, the Navy must ensure that their military personnel, including all agents and contractors anticipated herein, comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline the required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure one, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

   The Navy shall implement the Conservation Measures, proposed in the "Description of the Proposed Action" above, subject to the following modifications:

   - Conservation Measure 1: at NRRF modify the method of marking snowy plover nests or avoid marking of individual snowy plover nests altogether, due to the likely presence of vandals that appear to be attracted to marked nests.

   - Conservation Measure 2: modify the mini-exclosure protocol at NAB ocean beach to require placement on any snowy plover nest that has one egg or more, and removal a minimum of seven days after all eggs from the nest have hatched.

- Conservation Measure 6: in addition to NAB, the Navy shall have the biological monitors for the the NASNI "MAT" site, and the ocean beach areas of NASNI and NRRF, determine if predatory ants are a problem to least terns and snowy plovers at these nesting locations. If it is determined that predation to chicks or eggs from ants is occurring, the Navy and Service shall meet to discuss potential remedies.

- Conservation Measure 8: modify the relocation protocol for least tern and snowy plover egg(s) found within Alpha Area, and the notification of the Service concerning the relocation of any nest, by including Blue 2 and the area east of Alpha Area (e.g., in addition to Green 1) as areas that shall be considered potential relocation areas for least tern and snowy plover nests with egg(s) found in Alpha Area. In addition, all least tern nests relocated from beach lanes Red 2, Green 2 and Blue 1 shall be reported to the Carlsbad Fish and Wildlife Office. The relocation effort shall be documented as part of the weekly report submitted to our office. The report shall include the following information: (a) date the nest was moved; (b) number of eggs moved; (c) location of the moved nest; and (d) distance the nest was moved. Weekly reports shall be e-mailed to: Martin_Kenney@r1.fws.gov. In addition, this relocation effort and subsequent documentation shall be performed for all least tern and snowy plover nests found within the footprint of the beach crossing lanes.

- Conservation Measure 9: modify to ensure that two weeks prior to the release of any least tern fledglings that have been reared by SeaWorld, the Navy shall notify Martin Kenney at (760) 431-9440 extension 252 and Mendel Stewart, Complex Manager for Wildlife Refuges at (760) 431-9440 extension 344, so the Service and the Navy can discuss the location site(s) for all released birds.

- Conservation Measure 10: modify to ensure the markers used within active military training areas, including Red 1, Red 2, Green 2, and Blue 1 shall be agreed to by the Navy and Service.

- Conservation Measure 11: expand to require that no systematic or large-scale intentional removal of kelp, other marine vegetation, or small pieces of driftwood from the Pacific Ocean beaches at NAB, NASNI, or NRRF shall be permitted.

- Conservation Measure 13: expand to include site preparation of least tern and snowy plover nesting sites with Service-approved herbicide(s) to control annual plant growth.

2. To implement reasonable and prudent measure two, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

2.1 The Navy shall ensure that biological monitors look for and document the location of least tern or snowy plover nests and eggs prior to military training exercises commencing in

beach lanes Red 1, Red 2, Green 2, and Blue 1 at NAB, and the ocean beach of NASNI and NRRF. This monitoring effort shall be repeated once the military training event has concluded.

2.2 The Navy shall ensure effective communication and coordination between the biological monitors, Natural Resources Compliance Program Manager, and the Naval Beach Group 1 Scheduling Officer. The Natural Resources Compliance Program Manager shall instruct the military troops who schedule training operations that: (1) blue flexi-stakes or cones denote boundaries of nests or protected nesting areas for least terns and snowy plovers; (2) the presence of stakes within beach lanes Red 1, Red 2, Green 2, and Blue 1 mark the location of least tern nests; (3) movement of troops and vehicles at NAB are restricted to beach training lanes Red 1, Red 2, Green 2, Blue 1, Alpha Area, and the designated beach crossing lanes, and (4) take of least terns and snowy plovers at NASNI, NAB, and NRRF shall be avoided to the extent consistent with effective training.

2.3 A line of 3-foot tall blue markers approximately 10 to 15 feet apart shall be laid 35 feet landward from the mean high tide line to delineate the boundaries of the corridor that military troops, large vehicles, and heavy equipment can use when operating in the Alpha Area of the ocean training beach at NAB.

2.4 The ingress/egress road that parallels Highway 75 shall be signed every 500 feet to inform military troops of the need to avoid areas marked that designate nesting locations of snowy plovers or least terns on the beach.

3. To implement reasonable and prudent measure three, the Navy, including all of their agents and contractors, shall adhere to the following terms and conditions:

3.1 The Navy shall implement a comprehensive biological monitoring program that ensures the identification of least tern and snowy plover nesting locations and the overall number of adult breeding pairs and fledglings produced at the NAB nesting colonies, including North Delta Beach, South Delta Beach, and the ocean beach; NASNI "MAT" site and ocean beach; and NRRF. The Navy shall prepare reports for the Service at a minimum of twice a month. In addition, the monitoring effort shall be summarized in a written report that is submitted to the Service when a Final Report for 2003 least tern and snowy plover breeding season is received by the Navy. The biological monitors shall also include in their report: (a) an evaluation of the effectiveness of the 30-meter buffer surrounding each snowy plover nest and the wooden stakes or tongue depressors used to mark least tern nests; (b) when the first adult birds arrive, number and location of nests, number of individual nests, estimated number of fledglings produced, number of relocated nests, success of all relocation efforts, level of incidental take associated with training at NAB, NANSI, and NRRF, and when discernible the amount and type of predation events that occur; (c) an evaluation of the success of the 15-acre site that was graded and re-contoured in 2002 and the area enhanced by 4,560 cubic yards of sand to enhance nesting substrate in 2003 at South Delta Beach, along with other conservation measures being implemented by the

Navy; (d) number of captive bred fledglings and their band numbers that are released; (e) when possible, any observations of captive-reared fledglings in the wild, especially as relating to the condition and survival of these birds (e.g., data on: the interaction of fledglings with wild least terns, foraging behavior of captive birds compared to wild birds, mortality and cause of death of captive birds when it can be determined, and locations where captive-reared least terns are observed); and (f) the interactions of gull-billed terns and peregrine falcons with least tern and snowy plover nesting colonies.

3.2 The Navy shall color band any fledglings raised in captivity and shall release captive birds at U.S. Fish and Wildlife Service property if wild least tern adults and fledglings are present, or secondarily at North and South Delta Beaches, NAB. Bands shall be distinctively colored so that captive raised fledglings can be easily recognized among fledglings reared in the wild.

3.3 The Navy shall send written information to military personnel and their families in military housing adjacent to NAB ocean beaches advising them of the nesting season and the presence of least terns and snowy plovers. The Navy will also distribute educational materials at NAB and NASNI Morale, Welfare and Recreation facilities to inform users of the presence of least terns and snowy plovers, and how to avoid disturbing any nest.

The Service believes that no more than the anticipated incidental take for least terns and snowy plovers identified above will result as a result of the proposed action. The reasonable and prudent measures, with the implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Navy must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

In an effort to minimize disruption of training, the Service and Navy agreed to meet if 50 percent of the anticipated take to least terns is reached (i.e., 34 nests and 67.5 eggs and/or chicks rounded to 68 eggs and/or chicks in the form of direct death, injury, or harassment and 118 adults in the form of harassment), or 50 percent of the anticipated take to snowy plovers is reached (i.e., 2.5 nests rounded to 3 nests or 7.5 eggs and/or chicks rounded to 8 eggs and/or chicks in the form of direct death, injury, or harassment and 10 adults in the form of harassment).

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act 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.

Captain David R. Landon (FWS-SDG-3452.1)

1. During site preparation on North and South Delta Beach and prior to grading and the use of herbicides, the locations of two sensitive plants, coastal woolly-heads (Nemacaulis denudata) and Nuttall's lotus (Lotus nuttallianus), should be marked to ensure that potential impacts to these two rare species are minimized to the greatest extent practicable. During site preparation at NASNI, potential impacts to Nuttall's lotus also should be minimized.

2. To promote alternative tern and plover nesting habitat outside the beach lanes used for training and NRRF, the Navy should begin a program of ice plant eradication to restore natural dune plant communities.

REINITIATION NOTICE

This concludes formal consultation on the Military Training Operations on the Silver Strand Naval Facilities. 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 if exceeded; (2) new information reveals effects of the proposed 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 listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this biological opinion, please contact Martin Kenney of this office at (760) 431-9440 extension 252.

Sincerely,

Peter Sorensen
Acting Assistant Field Supervisor

LITERATURE CITED

Atwood, Jonathan L. and D.E. Minsky. 1983. Least tern foraging ecology at three major California breeding colonies. West. Birds 14(2):57-72.

Atwood, Jonathan L. and P.R. Kelly. 1984. Fish dropped on breeding colonies as indicators of least tern food habits. Wilson Bull. 96(1):34-47.

Atwood, Jonathan L. and B.W. Massey. 1988. Site fidelity of least terns in California. Condor 90(2):3 89-394.

Bailey, Stephen F. 1984. California Least Tern Foraging and Other Off-Colony Activities Around Alameda Naval Air Station during 1984. Unpublished report. Dept. of Ornithology and Mammalogy, California Academy of Sciences, Golden Gate Park, San Francisco, CA.

Caffrey, Carolee. 1993. California Least Tern Breeding Survey 1992 Season. A report to the Calif Dept. of Fish and Game. Final report PG 93-11, 35pp.

California Department of Fish and Game. 2001. California least tern breeding pairs and fledgling production-2001 Draft.

California Department of Fish and Game. 2002. California least tern breeding pairs and fledgling production-2002 Draft. Included as Appendix A of this Biological Opinion.

Collins, Charles, K. Bender and D. Rypka. 1979. Report on the Feeding and Nesting Habits of the California Least Tern in Santa Ana River Mouth Area, Orange County. Report to Corps of Engineers, Los Angeles District.

Conkle, Tamara. 2003a. Information provided to Fish and Wildlife Service in the form of electronic messages and telephone conversations during March and April 2003 in response to questions raised by the Service during preparation of the biological opinion on military training operations conducted at NASNI, NAB, and NRRF.

Conkle, Tamara. 2003b. Beach lanes at NAB and NRRF and the Ocean Beach at NASNI-- A determination of acres within the ten beach lanes at NAB, the four beach lanes at NRRF, and ocean beach at NASNI. Prepared by Tierra Data Systems, Escondido, CA for the U.S. Navy, Southwest Division, Naval Facilities Engineering Command, Natural Resources Team, San Diego, CA.

Copper, E. 1997. The status of the western snowy plover at Naval Amphibious Base, Coronado in 1995. A report for the U.S. Navy, Nay. Fac. Engr. Cmd. San Diego. Feb 1997. 30pp.

Copper, E. 1998. Unpublished information provided to the Service during informal consultation meetings with the Navy concerning military training on NAB ocean beaches.

Copper, E. 2002. Snowy plover summary-San Diego County. Table of snowy plover monitored breeding locations, nest numbers, estimated fledglings produced, estimated adult pairs (incomplete for all sites), and maximum active nest numbers (incomplete for all sites). Included as Appendix B of this Biological Opinion.

Copper, E. 2003. Submittal of report on work done in 2002 under Endangered Species Permit No. PRT-789254. Report summarizing the breeding season results of monitoring of California least terns and western snowy plovers at San Diego Navy sites in 2002 along with the egg-collecting data for 2002. Report submitted to U.S. Fish and Wildlife Service, Carlsbad, California.

Department of the Navy. 1998. Operations, Training and Maintenance Plan, Naval Amphibious Base, Coronado, California: An Implementation Plan to Balance Operations and Training with Natural Resource Protection Requirements. Jan 1998. 103 pp.

Department of the Navy and San Diego Unified Port District. 2000. San Diego Bay Integrated Natural Resources Management Plan.

Department of the Navy. 2002. Naval Base Point Loma Integrated Natural Resources Management Plan.

Department of the Navy. 2002. Naval Base Coronado Integrated Natural Resources Management Plan.

Department of the Navy. 2002. Naval Base San Diego Integrated Natural Resources Management Plan.

Department of the Navy. 2003. Information on military training operations conducted on the Silver Strand Training Complex and NASNI. included as part of the Navy's April 4, 2003, letter requesting section 7 consultation pursuant to the Endangered Species Act.

Fancher, J. M. 1992. Population Status and trends of the California least tern. Transactions of the western section of the Wildlife Society. 28:59-66.

Fancher, J. M. 1998. Western snowy plover nesting at Bolsa Chica, Orange County, California 1997. A report of the U.S. Fish and Wildlife Service, Carlsbad Office. Jan. 1998. 21 pp.

Fancher, J. M., L. Hays, P. Knapp 2002. Western snowy plover nesting at Bolsa Chica, Orange County, California. A report of the U.S. Fish and Wildlife Service, Carlsbad Office. Dec. 2002. 23 pp.

Fleming, S.P., R.D. Chiasson, P.C. Smith, P.J. Austin-Smith, and RP. Bancroft. 1988. Piping plover status in Nova Scotia related to its reproductive and behavioral responses to human disturbance. J. Field Ornithol. 59(4):321-330.

Captain David R. Landon (FWS-SDG-3452.1)

James, R., J. Tutton, and D. Stadtlander. 1992. A survey of the western snowy plover on Camp Pendleton San Diego County, California. Fish and Wildlife Service report for the Marine Corps Base Camp Pendleton, Natural Resources Office. 19pp.

Massey, Barbara W. 1974. Breeding biology of the California least tern. Proc. Linn. Soc. N.Y 72:1-24.

Massey, Barbara W. 1988. California Least Tern Field Study 1988 breeding season. A report to the California Dept. of Fish and Game. Final report FG 7660. 22pp.

Massey, Barbara W. and J. L. Atwood. 1979-1985. Application of Ecological Information to Habitat Management for the California Least Tern. Annual report nos. 1-7. U.S. Fish and Wildlife Service, Laguna Niguel, CA.

Massey, Barbara W. and J. L. Atwood 1981. Second-wave nesting of the California least tern: age composition and reproductive success. Auk 98:596-605.

Massey, Barbara W., D.W. Bradley, and J. L. Atwood, 1992. Demography of a California least tern colony including effects of the 1982-1983 El Niflo. Condor 94:976-983.

Melvin, S.C., A. Hecht, and C.R. Griffin. 1994. Piping plover mortalities caused by off-road vehicles on Atlantic coast beaches. Wildl. Soc. Bull. 22:409-414.

Minsky, Dennis. 1984. A Study of the Foraging Ecology of the California Least Tern at Camp Pendleton, Season of 1984. Unpublished Report. U.S. Navy, Navy Facilities Engineering . Command., San Bruno, CA. 31pp.

Page, G.W. and L.E. Stenzel (eds.). 1981 The breeding status of the snowy plover in California. Western Birds 12(1): 1-40.

Page, G.W., L.E. Stenzel, W.D. Shuford, and C.R. Bruce. 1991. Distribution and abundance of the snowy plover on its western North American breeding grounds. J. Field Ornithol. 62(2): 245-255.

Page, G.W. 2002. Year 2002 Breeding season snowy plover survey of California coast. Table includes statewide breeding snowy plover numbers for 1991, 1995 (incomplete count), 2000, and 2002. Included as Appendix C in this Biological Opinion.

Patton, Robert T. 2002. California least tern breeding survey, 2000 season. California Department of Fish and Game, Habitat Conservation Planning Branch, Species Conservation and Recovery Program Report, 2002-03. Sacramento, CA. 24pp. + app.

Powell, A., and C. Collier. 1994. The status of Western Snowy Plovers (Charadrius alexandrinus nivosus) in San Diego County, 1994. Report to the California Dept. of Fish and Game and U.S. Fish and Wildlife Serv. 23pp.

Powell, A., B. Peterson, J. Terp. 1996. The status of western snowy plovers (Charadrius alexandrinus nivosus) at Camp Pendleton, 1996. A report for the Marine Corps Base, Camp Pendleton. 32pp.

Powell, A., J. Terp, C. Collier and B. Peterson. 1997. The status of Western Snowy Plovers (Charadrius alexandrinus nivosus) in San Diego County, 1997. Report to the California Dept. of Fish and Game and U.S. Fish and Wildlife Serv. 34pp.

Powell, A., J. Terp, C. Collier and B. Peterson. 1998. The status of Western Snowy Plovers (Charadrius alexandrinus nivosus) in San Diego County, 1998. Report to the California Department of Fish and Game and U.S. Fish and Wildlife Serv. 29pp.

Tierra Environmental Services. 2002. Focus surveys for the western snowy plover and California least tern in the proposed street end project site. Report in a letter dated July 29, 2002, to Brian Mooney and Associates from Tierra Environmental Services. The report was incorporated as Appendix D of Draft Environmental Impact Report for the Palm and Carnation Avenues Street End Improvement Project prepared for the San Diego Unified Port District.

Unit, P. 1984. The birds of San Diego County. Memoir 13. San Diego Society of Natural History. 276pp.

U. S. Fish and Wildlife Service. 2001. Western Snowy Plover (Charadrius alexandrinus nivosus) Pacific Coast Population Draft Recovery Plan. Portland, Oregon. xix + 630 pp.

Warriner, J.S., J.C. Warnner, G.W. Page, and L.E. Stenzel. 1986. Mating system and reproductive success of a small population of polygamous snowy plovers. Wilson Bull. 98(1): 15-37.

Welchell, A. and K. Keane. 1998. Western snowy plover breeding survey for Batiquitos Lagoon, San Diego County, 1997 season. A report from Wetland Research Associates and Keane Biological Consulting for the Batiquitos Lagoon Enhancement Project. 17pp.

Widrig, R. 1980. Snowy Plovers at Leadbetter Point. Willapa National Wildlife Refuge. Fish and Wildlife Service, Ilwaco Washington.

Wilson, R.A. 1980. Snowy plover nesting ecology on the Oregon coast. MS Thesis, Oregon State Univ., Corvallis. 41pp.

Appendix A

California Least Tern Breeding Pairs and Fledgling Production - 2002 Draft

	Estimated Number of Breeding Pairs		Number of Nests	Estimated Number of Fledglings		Fledgling per Pair Ratio	
Colony Site	Minimum	Maximum		Minimum	Maximum	Minimum	Maximum
San Francisco Bay Area							
Pittsburg Power Plant	6	6	6	0	0	0.00	0.00
Albany - Central Ave. mitigation island	0	0	0	0	0	0.00	0.00
Alameda Point	287	287	326	104	372	0.36	1.30
San Luis Obispo/Santa Barbara Counties							
Oceano Dunes SVRA	22	22	22	10	10	0.45	0.45
Rancho Guadalupe Dunes County Park	2	3	3	2	2	1.00	0.67
Vandenberg AFB - Purisma Point	59	59	65	39	39	0.66	0.66
Ventura County							
Santa Clara River/McGrath State Beach - Totals	18	23	23	12	20	0.67	0.87
Santa Clara River North			*13*				
McGrath Lake			*10*				
Ormond Beach	50	50	50	34	34	0.68	0.68
NBVC Point Mugu - Totals	254	311	323	17	30	0.07	0.10
Ormond Beach East	*210*	*258*	*269*	*17*	*30*	*0.08*	*0.12*
Nesting Islands	*32*	*39*	*39*	*0*	*0*		
Eastern Arm	*12*	*14*	*15*	*0*	*0*		
Los Angeles/Orange Counties							
Venice Beach	2	2	2	0	0	0.00	0.00
LA Harbor - Pier 400	287	287	320	21	21	0.07	0.07
Seal Beach NWR - NASA Island	91	91	92	3	21	0.03	0.23
Bolsa Chica Ecological Reserve	4	4	4	0	0	0.00	0.00
Huntington State Beach	316	316	347	11	11	0.03	0.03
Upper Newport Bay Ecological Reserve	2	2	2	0	0	0.00	0.00
San Diego County							
Camp Pendelton - Totals	584	584	602	36	37	0.06	0.06
White Beach	*39*	*39*	*40*	*5*	*5*	0.13	0.13
Santa Margarita River - North Beach	*514*	*514*	*531*	*31*	*32*	0.06	0.06
Santa Margarita River - Saltflats	*16*	*16*	*16*	*0*	*0*	0.00	0.00
Santa Margarita River - Saltflats Island	*15*	*15*	*15*	*0*	*0*	0.00	0.00
Batiquitos Lagoon Ecological Reserve - Totals	203	205	226	52	52	0.26	0.25
W-1	*27*	*27*	*29*	*9*	*10*	0.33	0.37
W-2	*120*	*120*	*125*	*28*	*28*	0.23	0.23
E-1	*58*	*58*	*58*	*12*	*12*	0.21	0.21
E-2	*0*	*0*	*0*	*0*	*0*	0.00	0.00
E-3	*14*	*14*	*14*	*5*	*5*	0.36	0.36
San Elijo Lagoon Ecological Reserve - Saltpanne	1	1	1	0	0	0.00	0.00
Mission Bay							
FAA Island	192	192	210	5	15	0.03	0.08
North Fiesta Island	60	60	66	6	10	0.10	0.17
Mariner's Point	220	220	230	6	12	0.03	0.05
San Diego Bay							
Lindbergh Field	48	48	50	0	0	0.00	0.00
NAS North Island	71	71	83	15	15	0.21	0.21
NAB Coronado							
Delta Beach North	226	226	257	25	25	0.11	0.11
Delta Beach South	70	70	84	6	8	0.09	0.11
NAB Ocean	238	238	399	17	53	0.07	0.22
D Street Fill/Sweetwater Marsh NWR	23	23	24	8	8	0.35	0.35
Chula Vista Wildlife Reserve	3	4	4	2	2	0.67	0.50
South San Diego Bay NWR - Saltworks	26	32	39	2	2	0.08	0.06
Tijuana Estuary NERR - Totals	146	190	233	9	10	0.06	0.05
North of River	*42*	*50*	*61*	*6*	*7*	0.14	0.14
South of River	*104*	*140*	*172*	*3*	*3*	0.03	0.02
Total	**3511**	**3626**	**4093**	**442**	**809**	**0.13**	**0.22**

Appendix B

Snowy Plover Summary - San Diego County, 2002

Snowy Plover Breeding in San Diego County, 2002 *Monitored Breeding Locations*		*Nests*	*Est. Fledglings*	*Est. Pairs*	*Max. Active Nest No*	*Date*
Camp Pendleton				51		
	White Beach	24	26		14	
	Cocklebur	21	11		13	
	Salt Flats	25	5		7	
	Salt Flats Island	0	0		0	
	North Beach North	24	14		10	
	North Beach South	51	31		17	
Batiquitos Lagoon						
	W2	1	0	1		
	E1	23	17	8		
	E3	1	0	1		
San Elijo		1	0	1		
North Island		*26*	*15*	*12*	*12*	*6/22/02*
North Delta Beach		*1*	*0*	*1*	*1*	
South Delta Beach		*2*	*0*	*2*	*2*	
NAB Ocean		*57*	*18*			
Silver Strand State Beach		24	6			
NRRF		*13*	*3*	*5*	*5*	*4/16/02*
D Street Fill		0	0	0		
Salt Works		4	5			
Tijuana River Estuary						
	North	6	2			
	South	19	6			
Total		**323**	**159**			
	Navy	*99*				

Worst Case Scenario Direct = 34 Nests and/or 102 Eggs/Chicks Lost to Training
Harassment = 18 adult plovers
Relocated Nests = 8

Appendix C

Year 2002 Breeding Season Snowy Plover Survey Of California Coast — Gary Page, PRBO 9-10-2002

	1991	1995	2000	2002	2002 Breakdown					
Location	Adult #	Adult #	Adult #	Adult #	Ad M	Ad F	Ad Sex?	Juv	Broods	Nests
Del Norte County										
Smith River Mouth	0		0	0	0	0	0	0	0	
Lake Talawa	3	0		0	0	0	0	0	0	
Humboldt County										
Big Lagoon	5	0	0	0	0	0	0	0	0	
Clam Beach	7	4	6	12	4	6	2	0	0	
Mad River Spit	2	4		0	0	0	0	0	0	
Lanphere Dunes	0		0	0	0	0	0	0	0	
Humboldt Bay North Spit	1		0	0	0	0	0	0	0	
Humboldt Bay South Spit	0	0	0	0	0	0	0	0	0	
Eel River North Spit	11	6	11	9	5	4	0	0	0	
Eel River South Spit	4	5	0	2	1	1	0	0	0	
Eel River Gravel Bars			22	26	14	8	4	0		
McNutt Beach	0		0							
Mendocino County										
MacKerricher Beach	0		1	0	0	0	0	0	0	0
Sonoma County										
Salmon Creek Beach	9	3	0	0	0	0	0	0	0	0
Dillon Beach	0		0	0	0	0	0	0	0	0
Marin County										
Point Reyes Beach	23	8	17	25	13	12	0	0	3	6
Drakes Spit	2	0	0	0	0	0	0	0	0	0
Limantour Spit	0	0	4	0	0	0	0	0	0	0
Bolinas Spit	0		0							
Multiple Counties										
San Francisco Bay	176		96	78	31	32	15	0	3	19
San Mateo County										
Half Moon Bay	1		2	1	1	0	0	0	1	0
Tunitas Creek				2	1	1	0	0	0	1
Pescadero Beach	0		0	0	0	0	0	0	0	0
Gazos Creek	0		2	0	0	0	0	0	0	0
Ano Neuvo Beaches	0		0	0	0	0	0	0	0	0
Santa Cruz County										
Waddell Creek	11	3	0	0	0	0	0	0	0	0
Scott Creek		8	12	8	3	4	1	0	0	1
Laguna Creek	3	5	2	0	0	0	0	0	0	0
Four Mile Beach				1	1	0	0	0	0	1
Wilder Creek	8	10	5	0	0	0	0	0	0	0
Corcoran Lagoon Beach				2	1	1	0	0	0	1
Manresa/Sunset beaches	17	7	0	9	5	4	0	0	2	0
Pajaro Dunes	0	0	5	15	7	7	1	0	1	0

	1991	1995	2000	2002	2002 Breakdown					
Los Angeles County										
San Clemente Island			0							
Orange County										
Bolsa Chica Oil Fields	5	8	27	**38**	*20*	*12*	*6*			*8*
Upper Newport Bay	0	1								
San Diego County										
White Beach/French Creek/Cockle	0	4	13	**26**	*9*	*14*	*3*	*0*	*2*	*5*
Santa Margarita River Mouth	35	33	42	**41**	*7*	*15*	*19*	*0*	*4*	*20*
Agua Hedionda Lagoon	0		0	**0**	*0*	*0*	*0*	*0*	*0*	*0*
Batiquitos Lagoon	12	12	5	**13**	*7*	*5*	*1*	*1*	*2*	*7*
San Elijo Lagoon	1	0	3	**0**	*0*	*0*	*0*	*0*	*0*	*0*
San Dieguito Lagoon	0	0	0	**0**	*0*	*0*	*0*	*0*	*0*	*0*
Los Penasquitos Lagoon	0		0	**0**	*0*	*0*	*0*	*0*	*0*	*0*
San Diego Bay										
Sweetwater River Mouth	3	7	2	**0**	*0*	*0*	*0*	*0*	*0*	*0*
Zuniga Pt. North Island	2		7	**13**	*5*	*5*	*3*	*1*	*0*	*6*
Silver Strand Bay Shore	9	18	10	**6**	*3*	*2*	*1*	*0*	*0*	*0*
Western Salt Works	9		0	**4**	*2*	*2*	*0*	*0*	*0*	*2*
Silver Strand Beach incl. NAB	8	8	54	**38**	*15*	*17*	*6*	*0*	*3*	*15*
Tijuana River Mouth	4	10	8	**16**	*6*	*5*	*5*	*0*	*1*	*7*
Statewide Total	**1371**	**	**976**	**1387**	621	536	220	29	54	122

* Santa Maria River merged into Nipomo Dunes areas beginning in 2000.
** Note 1995 count incomplete; use only for site comparisons.

Appendix D

"Burr, Timothy A (EFDSW)" <BurrTA@efdsw.navfac.navy.mil>

05/06/03 10:18 AM

To: "'Kenney, Martin" <Martin_Kenney@fws.gov>, "'Copper, Elizabeth'" <ecopper@san.rr.com>
cc: "'Conkle, Tamara S. CIV (CNO N45)'" <Tamara.Conkle@navy.mil>
Subject: egg transporters

Martin,

Here is a list of folks involved in the transportation of the eggs:

Navy:

Danielle Flynn
Tammy Conkle
Steve Barnhill
Renee Joseph
Tim Burr

Liz's monitors

Lorraine
Monica
Marya

Liz, you will need to give Martin their full names; please copy me too. Thanks. Tim

Timothy A. Burr
Senior Wildlife Biologist
SOUTHWEST Division, NAVFACENGCOM
1220 Pacific Hwy. (Code 5NPR.TB)
San Diego, CA 92132-5190
Voice: (619) 532-3745 FAX: (619) 532-2518
Cell: (619) 726-5734
burrta@efdsw.navfac.navy.mil

Appendix E

		Collect Eggs	Transport Eggs	Relocate Nests
Ahmad	Marya		x	
Alfaro	Monica	x		x
Allen	Jeff	x		x
Arrazola	Sebastian		x	
Barth	Joe		x	
Basinski	Nick		x	x
Baumann	Lorraine		x	
Copper	Elizabeth	x	x	x
Evans-Layı	Marit	x	x	x
Fitch-Snydı	Helena		x	
Foster	Brian	x	x	x
Jackson	Jennifer	x	x	x
Koehm	Kara		x	
Lahre	Jane		x	
Norton	Lea	x	x	x
Parker	Dennis	x	x	x
Patton	Robert	x	x	x
Price-Jacks	Jennifer	x	x	x
Sadowski	Matt		x	
Shaw	Emily		x	
Steuer	Lee		x	
Taylor	Kim	x	x	x
Tripolitis	Vicki		x	
Wolf	Shauna	x	x	x

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

In Reply Refer To:
FWS-SDG-3452.2

Captain David R. Landon
Commanding Officer
Department of the Navy
Naval Air Station North island
P.O. Box 357033
San Diego, California 92135-7033

MAY 15 2003

Attn: Tammy Conkle and Tim Burr, Wildlife Biologists

Re: Amendment to Endangered Species Consultation on Military Training Operations on the Silver Strand and Naval Air Station North Island (NASNI) and Associated Management Strategies for the California Least Tern and Western Snowy Plover during 2003 Breeding Season at Naval Amphibious Base, Coronado; Naval Radio Receiving Station, Imperial Beach; and NASNI, San Diego; San Diego County, California

Dear Captain Landon:

This letter constitutes an amendment to the May 8, 2003, Biological Opinion (1-6-03-F-3452.1) on Military Training Operations on the Silver Strand and Naval Air Station North Island (NASNI) and Associated Management Strategies for the California Least Tern and Western Snowy Plover during 2003 Breeding Season at Naval Amphibious Base, Coronado; Naval Radio Receiving Station, Imperial Beach; and NASNI, San Diego. This amendment to Biological Opinion (1-6-03-F-3452.1) is in response to telephone calls Martin Kenney, of my staff, has received from Tammy Conkle and Tim Burr on the afternoon of May 8, 2003, concerning Term and Condition 2.3 that incorrectly defined the length of beach that would be staked with 3-foot tall markers. The markers will delineate the boundaries of a corridor that military troops, large vehicles, and heavy equipment can use when operating in the Alpha Area, Naval Amphibious Base, Coronado. Therefore, Term and Condition 2.3 is amended to read as follows:

> 2.3 A line of 3-foot tall blue markers approximately 10 to 15 feet apart shall be laid 35 feet landward for the entirety of training beach Green 1 (One) from the mean high tide line to delineate the boundaries of the corridor that military troops, large vehicles, and heavy equipment can use when operating in the Alpha Area of the ocean training beaches on NAB.

In addition, the Service wants to incorporate by reference into the current biological opinion (dated May 8, 2003), the Scheduling Procedures for Silver Strand Training Beaches, dated

October 2002, that were developed by the Navy in response to Term and Condition 2c, page 30, of the Service's Biological Opinion (1-6-02-2645.1), dated April 16, 2002, Consultation on Management Strategies during 2002 California Least Tern and Western Snowy Plover Breeding Seasons at Naval Amphibious Base, Coronado. These procedures should be incorporated as Appendix F. The current biological opinion needs to incorporate October 2002, that were Tim Burr's e-mail of January 13, 2003, that provides specifications regarding the incubation and hand rearing of California least tern and western snowy plover eggs that are collected. These specifications should be incorporated as Appendix G.

If you have any questions regarding this letter, please contact me or Mr. Kenney at (760) 431-9440.

Sincerely,

Martin J. Kenney

for Peter C. Sorensen
Acting Assistant Field Supervisor

Attachments: Appendix F and G

SCHEDULING PROCEDURES FOR SILVER STRAND TRAINING AREAS

Coronado, California
October 2002

1.) **Purpose** To provide the U.S. Fish and Wildlife Service a description of training request protocol for amphibious and clandestine activities at Naval Amphibious Base (NAB), Coronado and Naval Radio Receiving Facility (NRRF), Imperial Beach.

2.) **Scope** This protocol governs scheduling of training activities at:

a.) NAB via NAVBEACHGRU ONE Scheduling Officer (CNBG-1), and includes Beach Lanes 1 –10; Beaches Yellow, Red, Blue, Green and Orange; and Bayside areas Alpha, Bravo, Delta I –III, Echo, Foxtrot, Golf, and Hotel.

b.) NRRF via NAVSPECWARCEN Scheduling Officer (Code 08), and includes Beach Lanes 11- 14 and 528 acres inside the fenced area. Training exercises are not scheduled at Camp Surf (YMCA - leased property) or in the southeastern portion of NRRF.

3.) **Discussion** To ensure compliance with Navy training guidelines, a Scheduling Officer from NAVBEACHGRU ONE (NAB) and NAVSPECWARCEN (NRRF) must be established to coordinate and de-conflict training area requests. NASNI Instruction 3120.2 and NAVSPECWARCEN Instruction 3120.3 establish the Operations Officer as the scheduling authority for NAB and NRRF, respectively. To ensure communication and coordination between Navy and Marine Corps operators, Scheduling Officers at NAVBEACHGRU ONE and NAVSPECWARCEN, CNRSW Natural Resources Compliance Program Manager, and contracted biological monitors, formal scheduling procedures are followed by all commands requesting training area. In order to achieve the goals of mission readiness, civilian safety, force protection, and protection of the environment and federally listed species, formal scheduling procedures detail authorized training missions, training areas and environmental limitations.

4.) **Environmental Limitations** Nesting season for the California Least tern and western snowy plover typically begins 1 March and runs through 15 September annually. To avoid harm to these federally listed species, CNRSW Natural Resources Compliance Program Manager conducts a pre-nesting season brief in early February or March with all NAB commands. Units are instructed to:

a.) Remain in assigned beach training areas.

b.) Utilize the backshore road or hard pack sand below the high water mark for ingress and egress to training areas.

c.) Remain well clear of nesting areas identified by blue markers or traffic cones and small yellow caution signs.

5.) **Area Scheduling Procedures**

a.) Command determines desired training area.

b.) Complete NASNI Instruction 3120.2 Operational Request Form for NAB training areas or NAVSPECWARCEN Instruction 3120.3 Operational Request Form for NRRF training area. Operational Request Forms include information on type of evolution, activities included in training exercise, specific site requirement, length of time, and time of day/night.

c.) Fax or e-mail Operational Training Request to either NAVBEACHGRU ONE (NAB operations) or NAVSPECWARCEN (NRRF operations). Training requests are to be submitted no later than Wednesday of the week prior to the training exercise. Scheduling Officer will also respond to training request transmitted over the telephone, but verbal request must be followed by submission of written Operational Request Form.

d.) The Scheduling Officer will prioritize and de-conflict Training Area requests.

e.) The Scheduling Officer will maintain liaison with Commander, Navy Region Southwest Natural Resources Office regarding environmental and natural resources issues.

f.) Scheduling Officer receives weekly least tern and snowy plover reports produced by contract biological monitors. Weekly reports include distribution of nests by beach lane or NAB bayside preserve; number of active nests, eggs per nest, and fledged young; results of predation; and compilation of nesting status at time of report.

g.) Scheduling Officer must submit all beach operations that may potentially alter habitat or impact nesting birds to CNRSW Natural Resources Office for review. Scheduling Officer must receive approval from CNRSW Natural Resources Office before scheduling an activity that has been submitted for environmental review.

h.) If CNRSW Natural Resources Office denies a request for training, the Scheduling Officer can recommend alternate training sites to the command. If the alternate site supports training requirements, the command can resubmit Operational Request Form to Scheduling Officer.

i.) Scheduling Officer issues a weekly schedule of upcoming training activities.

"Burr, Timothy A (EFDSW)" <BurrTA@efdsw.navfac.navy.mil>

01/13/03 01:44 PM

To: "Wynn, Susan (USFWS) (E-mail)" <susan_wynn@r1.fws.gov>, "Kenney Martin (USFWS) (E-mail)" <Martin_Kenney@r1.fws.gov>
cc: "Robb Anne (USFWS) (E-mail)" <anne_robb@fws.gov>, "Larson, Jan K (NRSW N4515)" <Larson.Jan.K@ni.cnrsw.navy.mil>, "Conkle, Tamara S (NRSW N4515)" <Conkle.Tamara@ni.cnrsw.navy.mil>
Subject: RE: Assumptions for Incubation and Hand Rearing of CLT and WSP Eggs C ollected

Martin and Susan,
The person to contact at Sea World would most likely be the Curator
of Birds. Her name is Wendy Turner. Her number is 619+226-3900 X 3975; if there is no answer for some reason, her secretary's number is X 3836. Hope this helps. Tim

Timothy A. Burr
Senior Wildlife Biologist
SOUTHWEST Division, NAVFACENGCOM
1220 Pacific Hwy. (Code 5GPN.TB)
San Diego, CA 92132-5190
Voice: (619) 532-3745 FAX: (619) 532-2518
Cell: (619) 726-5734
burrta@efdsw.navfac.navy.mil

-----Original Message-----
From: Conkle, Tamara S (NRSW N4515)
Sent: Thursday, January 09, 2003 10:20 AM
To: Wynn, Susan (USFWS) (E-mail); Kenney Martin (USFWS) (E-mail)
Cc: Robb Anne (USFWS) (E-mail); Burr, Timothy A (EFDSW); Larson, Jan K (NRSW N4515)
Subject: Assumptions for Incubation and Hand Rearing of CLT and WSP Eggs C ollected

Susan and Martin -

Anne - Can you please ensure that Martin gets a copy of this message. Thanks so much as usual.

Per our meeting yesterday I have listed the requirements/assumptions that we used to receive a bid from CRES (the zoo) on captively rearing eggs collected. Please let me know if you have any questions.

- The purpose of the captive rearing effort is to incubate and hand-rear all western snowy plover and California least tern eggs collected on Navy lands.

- Incubation period is approximately 17-22 days at 99.5-100 degrees Fahrenheit and 55-65% humidity.
- Estimated number of eggs to be captively reared is 85 eggs (75 terns and 10 plovers) but may be more depending on the success of the California least terns
- Capacity per brooder is 5 hatched chicks
  - Days 1-2 = 93 degrees Fahrenheit with 40 watt bulb on mesh top, in an indoor brooder, water needs to be changed every other day
  - Days 2/3-9 = 82-92 degrees Fahrenheit with full spectrum light in an indoor brooder

- Days 10-14 = outside, no heat, dish/pool for bathing, outdoor cage (2'X2'X2' with full bottom)
- Feeding
  - Days 1-20 - 12 hours per day
  - Hand fed every 90 minutes for Days 1-10 - 8 feedings per day
- Food Consumption - Forage Material - Silverside/San eels'
  - Days 1-10 - 3 pounds for every 5 chicks per day
  - Days 14-21- 1 pound per bird per day
  - Day 14 to release (approximately 7 to 8.5 weeks old) - 1.6 pounds per bird per day, .25 pound mealworms per 40 birds, 200-250 feeder goldfish per day (approximately 25 fish per bird per day)
- Minimum qualifications for release of birds
  - Ability to fly when approached with no panting
  - Ability to capture feeder fish
  - Weight between 38-40 + grams post feeding
- Captive Rearing will be done adjacent to the NAB Coronado beaches at the Fiddler's Cove Marina. Water and power will be provided by the Navy. However, if it is easier for this to be done off-site that can be negotiated, but proper permits need to be obtained from CDFG and USFWS.
- The actual facility, assumed to be a trailer, needs to be provided by the agency that is to conduct the captive rearing.
- Predator control adjacent to the facility and the aviaries will be provided by the Navy.
- Aviaries/flight cages, approximately 10'X40'X10', need to be created on NAB Coronado, South Delta beach to have the birds near adult terns that are actively foraging.
  - Aviaries/flight cages need to have shade cloth as well as foraging pools (with anti-slip sides, clean sand every four days, raked daily, and dry mat perches). Chlorine removal drops are also required for the pools.
- Lyons Electronic Incubators are to be used for incubation purposes. Heat lamps are also needed for brooders.
- Food is to be obtained/provided by the agency to do the captive rearing.
- Birds are fed 0600-1800 with a ½ hour clean up at the end of the day 7 days a week=minimum of 87.5 hours per week. Estimate Person A: 0600-1430 M-F =40 hrs/wk
Person B: 1230-1830 M-F=30 hrs/wk and Person C: 1330- 1830 Fri & 0600-1830 Sat. & Sun. =30hrs/wk
- Work needs to start no later than 15 April and is expected to end Aug 30. All birds not released by 30 Aug will be maintained by the agency until the next breeding season.

Just a note, Meryl Faulkner, did this work for us last year as a volunteer and is familiar with what is needed to successfully hatch tern and plover eggs.

Tammy Conkle
Wildlife Biologist
Environmental Department
Commander, Navy Region Southwest

E-Mail: Conkle.Tamara@ni.cnrsw.navy.mil
Telephone: 619-545-3703
Cellular: 619-954-5840
DSN/AV: 735-3703

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2730 Loker Avenue West
Carlsbad, California 92008

In Reply Refer To: FWS-SDG-2321.1

OCT 1 9 2001

Mr. Jan Larson, Director
Department of the Navy
Natural Resources Office
P.O. Box 357088
Naval Air Station North Island, Building 3
San Diego, California 92135-7088

Re: Bird Aircraft Strike Hazard Program at Naval Air Station North Island, San Diego, California

Dear Mr. Larson:

This letter addresses your letter dated May 14, 2001, that requested concurrence from the U.S. Fish and Wildlife Service (Service) that Bird Aircraft Strike Hazard (BASH) program being implemented at Naval Air Station North Island (NASNI) does not result in "take" of Federally listed species such as the California least tern (tern) and brown pelican (pelican). At issue is the use of pyrotechnics to discourage waterfowl, shorebirds, and seagulls from loafing and/or roosting around the airfield and the placement of a wire gird over ponded water areas on the NASNI golf course. This issue has been previously discussed between Martin Kenney, of my staff, and Tamara Conkle, of your staff. This letter memorializes the preliminary discussions between our respective staffs and addresses the issues that raised in your letter.

No information was provided in your letter concerning the type of pyrotechnics used, frequency of use, noise levels generated with their use, and locations of where they have been used in the past. Your letter also did not mention the western snowy plover (plover), a Federally listed species that also occurs at NASNI.. Based on our knowledge of NASNI, we believe the use pyrotechnics would likely not result in "take", as defined in section 3 (18) of the Endangered Species Act, provided pyrotechnics are banned from use around the perimeter of the MAT site which is utilized by the tern as a nesting colony, the western beach areas south of Zuniga Point that utilized by the plover, or shoreline areas surrounding NASNI that can be utilized by the pelican. This prohibition would occur when the MAT site is utilized by the tern for nesting purposes, during April 1 to September 15. The beach areas south of Zuniga Point are potentially occupied by the western snowy plover throughout the year. The pelican are also likely to occur along the shoreline areas of NASNI throughout the year. The person(s) using pyrotechnics must be able to visually recognize the tern, plover, and pelican so that a conscious decision can be made if the use of these devises may affect a listed species. If use of pyrotechnics may adversely affect Federally listed species, the Navy would be responsible to consult with the Service pursuant to section 7 of the Endangered Species Act.

The second issue was potential use of the golf course ponds by the tern. Mr. Kenney consulted Clark Winchell, of my staff, who was a former staff biologist at NASNI and helped administer the U.S. Navy management program for the tern. Mr. Winchell saw no evidence during his seven year tenure at NASNI that the California least tern utilized these ponds for foraging. Based on this information, we can concur that this action is not likely to adversely affect the tern.

In summary, provided that the person(s) responsible for the use of pyrotechnics can visually recognize the tern, plover, and pelican and have been advised pyrotechnics shall not be used adjacent to the MAT, the western beach areas south of Zuniga Point, or the immediate shoreline areas of NASNI when the tern, plover, or the pelican are present and would be affected by their use, the Service can concur that implementation of this program will not adversely affect the Federally listed species discussed in this letter. Therefore, formal consultation with the Service would not be necessary.

We hope this letter clarifies the issues you raised concerning the BASH program. If you have any questions regarding this letter, please contact Martin Kenney at (760) 431-9440.

Sincerely,

Nancy Gilbert

Nancy Gilbert
Assistant Field Supervisor

DEPARTMENT OF THE NAVY
COMMANDER NAVY REGION SOUTHWEST
937 NO. HARBOR DR.
SAN DIEGO, CALIFORNIA 92132-0058

IN REPLY REFER TO:
5090
Ser N4515.tc/0193
May 14, 2001

Mr. Jim Bartel, Field Supervisor
U.S. Fish & Wildlife Service
2730 Loker Avenue West
Carlsbad, CA 92008

Dear Mr. Bartel:

Commander, Navy Region Southwest (CNRSW) requests written concurrence from your office that Bird Aircraft Strike Hazard (BASH) programs do not result in "take" (specifically harassment) of the federally endangered California least tern (*Sterna antillarum browni*) and California brown pelican (*Pelecanus occidentalis californicus*). The primary components of the BASH program perceived to represent risk to these species are described below.

First, pyrotechnics are actively used to discourage waterfowl, shorebirds, and seagulls from loafing and/or roosting in and around the airfield. Such practices significantly reduce the threat of birds flying into runway approach or departure corridors. In most instances, such corridors are not visited by these species. However, if terns or pelicans are in the proximity of these areas, caution is exercised to preclude disturbances. In past conversations with Ms. Nancy Gilbert, Mr. Martin Kenny, and Mr. Doug Krofta, the aforementioned activities were not considered a threat to either protected species.

Second, due to the proximity of the NAS North Island Golf Course to the runway approach corridor, water ponds have been treated as attractants to waterfowl, which include the American widgeon (*Anas americana*), mallard (*Anas platyrhynchos*), and the American coot (*Fulica americana*). To enhance aircraft safety, a grid wire system was installed over all such water impoundments. These were removed prior to last year's tern breeding season, since there was concern that the least tern might use the ponds. No terns, however, were observed in or around such ponds and the system was subsequently re-installed. A year-round deterrent is more effective because it provides a constant negative reinforcement and labor and maintenance costs are reduced. Last December, during conversations regarding this strategy, Mr. Kenney agreed that there was no evidence the grid wire system poses a threat to the California least tern.

5090
Ser N4515.tc/0193
May 14, 2001

Your support of our continued effort to reduce the risk to U.S. Navy pilots and their aircraft is appreciated. My point of contact in this matter is Ms. Tammy Conkle, Wildlife Biologist, at (619) 545-3703.

Sincerely,

J. LARSON
Director, Natural Resources
By direction of the Commander

Copy to:
CNRSW, ACOS ENVIRONMENTAL (CODE N45)
CNRSW, LEGAL DEPARTMENT (CODE N53)
NAVAL BASE CORONADO, AIR OPERATIONS DEPARTMENT
NAVFACENGCOM SWDIV