Integrated Natural Resources Management Plan

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SEPTEMBER 2013

Naval Support Activity Monterey

NAVAL SUPPORT ACTIVITY MONTEREY

Integrated Natural Resources Management Plan

Naval Support Activity Monterey, California

Final
September 2013

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INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Naval Support Activity Monterey, California

APPROVAL

This Integrated Natural Resources Management Plan (INRMP) fulfills the requirements for the INRMP in accordance with the Sikes Act (as amended), and DoDI 4715.3 and OPNAVINST 5090.1C (as amended). This document was prepared and reviewed in coordination with U.S. Department of the Interior, Fish and Wildlife Service, and California Department of Fish and Wildlife Central Region in accordance with the 2006 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations.

For Plan Period: 2013 - 2033

Approving Official - U.S. Navy, Naval Support Activity Monterey

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Approving Official - U.S. Navy, Naval Support Activity Monterey

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For Plan Period: 2013 - 2033

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For Plan Period: 2013 - 2033

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For Plan Period: 2013 - 2033

Concurring Agency - California Department of Fish and Wildlife

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For Plan Period: 2013 - 2033

Annual Naval Support Activity Monterey Metrics Meeting, Review, and Approval

Plan Period	Date of Annual Metrics Meeting and Review	Name and Title of Reviewer(s)	Signature(s)
2013			
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For Plan Period: 2013 - 2033

Annual U.S. Fish and Wildlife Service Metrics Meeting, Review, and Approval

Plan Period	Date of Annual Metrics Meeting and Review	Name and Title of Reviewer(s)	Signature(s)
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For Plan Period: 2013 - 2033

Annual California Department of Fish and Wildlife Metrics Meeting, Review, and Approval

Plan Period	Date of Annual Metrics Meeting and Review	Name and Title of Reviewer(s)	Signature(s)
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Executive Summary

This Integrated Natural Resources Management Plan (INRMP) is to provide Naval Support Activity (NSA) Monterey with a basis and criteria for sound use and management of natural resources integrated with its U.S. Navy mission. The Sikes Act (as amended) committed the U.S. Department of Defense (DoD) to prepare and implement INRMPs for its installations.

NSA Monterey functions as an administrative umbrella for the following tenant commands: the Naval Postgraduate School, the Fleet Numerical Meteorology and Oceanography Center, the Naval Research Laboratory Monterey, the National Oceanic and Atmospheric Administration regional forecast center, La Mesa Village Housing, the Center for Interdisciplinary Remotely-Piloted Aircraft Studies (CIRPAS), the Point Sur Ocean Acoustics Observatory, the Naval Industrial Reserve Ordnance Plant (NIROP), and the Naval Program Management Office Strategic Systems Program (NPMOSSP).

These tenant commands are located on the following properties, and it is these properties that are described in this INRMP: Monterey Area Properties (including the Main Grounds, Laboratory/Recreation Area, Annex, La Mesa Village, CIRPAS Marina Airport Facility); the Dune/Research Area; the Point Sur Facility; NIROP Santa Cruz; and NPMOSSP Mountain View.

Representing a total of over 1,000 acres, NSA Monterey's properties are all within the central California coast ecoregion. Ranging from sea level to 3,800 feet, these ecosystems include coastal beach and dune scrub, Monterey pine forests, coastal chaparral, mixed evergreen and redwood forests, grasslands, lakes, and wetlands.

As a multi-function organization, the primary mission of NSA Monterey is to provide: a responsive, high quality base operations support to enable its tenants to accomplish their mission; enhancement to the quality of life of NSA Monterey's employees and tenants; and, a responsible civic partner by building and nurturing effective relationships with local communities.

Consistent with the INRMP management goals, the 2012 INRMP Revision proposes the following conservation and stewardship measures:

- Sustainability principles for the management of natural resources and the built environment;
- Development, implementation, and updates for resources management plans;
- Continue existing studies and surveys and the development of new studies and surveys in the terrestrial and marine environment;
- Establishment of a central clearinghouse for data, reports, and publications pertaining to the NSA Monterey's Environmental Management System that addresses natural resources;
- Encourage participation in regional, interagency partnerships; and
- Improve NSA Monterey's community and environmental outreach.

This INRMP outlines 22 broad categories of projects and activities that are intended to support the conservation and stewardship measures.

Ecosystem Approach

- Implement a coordinated monitoring program using land ecosystem function and focal species indicators that can be implemented cost-effectively over time, and facilitates reporting on natural resource conditions in relation to other central coast areas and annual INRMP program metrics questions. Set habitat objectives based on ecological sites, ecosystem function indicators, and the requirements of focus species. Do this in a manner that can be scaled up to the work of other agencies, in order to report on the ecosystem function of NSA Monterey lands.
- Develop INRMP revisions and associated Environmental Assessments to incorporate current resources and management knowledge.
- Apply sustainability principles to the management of habitats, species, and ecological functions on NSA Monterey by identifying resource-specific best practices similar to Sustainable Sites Initiative approaches.

The Physical and Chemical Environment

- Continue to revise and refine the Del Monte Lake Management Plan.
- Conduct water quality sampling at high value habitat for the California red-legged frog (*Rana draytonii*).
- Preserve and restore the natural and beneficial values provided by floodplains.
- Develop and implement an erosion control plan.
- Develop and implement a Wildland Fire Management Plan (WFMP) for NIROP Santa Cruz.

Habitats and Communities

- Restore degraded vegetation communities.
- Continue to limit public access to sensitive species habitat.
- Monitor all federally listed plant populations.

- Develop a vegetation management plan for the historic Del Monte Lake that considers, among other issues, marine and aquatic invasives.
- Develop a map and database for invasive species.
- Conduct base-wide flora surveys.
- Conduct focused surveys annually for Yadon's rein orchid (*Piperia yadonii*) in coast live oak (*Quercus agrifolia*) and Monterey pine (*Pinus radiata*) habitat.
- Restore coast live oak and Monterey pine habitat for the Yadon's rein orchid.
- Protect coast live oak and Monterey pine habitat for Yadon's rein orchid using fencing, signage, and educational materials.
- Develop and implement a WFMP for NSA Monterey that includes coast live oak and Monterey pine forests.
- Conduct focused surveys for Yadon's rein orchid, Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*), and Monterey spineflower (*Chorizanthe pungens* var. *pungens*) in central maritime chaparral habitat.
- Restore central maritime chaparral habitat for the Yadon's rein orchid, Monterey gilia, and Monterey spineflower when appropriate.
- Protect central maritime chaparral habitat for Yadon's rein orchid, Monterey gilia, and Monterey spineflower using fencing, signage, and educational materials when appropriate.
- Protect federally listed species on the Dunes using fencing, signage and educational materials.
- Conduct focused surveys annually or semi-annually for federally listed species at the Dunes.
- Restore habitat for federally listed species at the Dunes.
- Continue to investigate soil erosion and control plan for the Dunes.
- Develop a NIROP Santa Cruz WFMP in conjunction with an overall forest management plan for NSA Monterey.
- Develop and implement a WFMP for NSA Monterey that includes chaparral and grasslands.
- Establish mitigation conceptual goals, success criteria, and a restoration approach using historical reference conditions and a watershed approach.
- Restore riparian and wetland habitat at the Point Sur Facility, NIROP Santa Cruz, and the Main Grounds.
- Implement Low Impact Development technology on all properties.
- Monitor riparian habitat for streambank condition, sedimentation, and invasive species.
- Cooperate and partner with neighbors when these actions promote efficiencies to achieve environmental goals.

Fish and Wildlife Management

- Continue to conduct baseline inventories and develop maps of high habitat value to manage focus species to help avoidance, minimization, and conservation of resources and reduce potential for conflict with the military mission.
- Conduct Smith's blue butterfly (*Euphilotes enoptes smithi*) surveys.
- Establish pollinator-friendly landscapes and gardens to promote the pollination of native vegetation where feasible at NSA Monterey, potentially as part of habitat enhancement activities and in coordination with construction and/or facility maintenance activities.
- Conduct a baseline pollinator survey at NSA Monterey and monitor pollinator populations at regular intervals. Pay special focus to the pollination requirements of threatened and endangered plant species.
- Participate in DoD Partners in Amphibian and Reptile Conservation initiatives.
- Inventory migratory and resident bird populations and develop and maintain information on the status and trend of populations and habitats.
- Implement bird conservation principles, measures, and practices through avoidance and minimization measures to protect resident and migratory bird populations.
- Participate in regional avian monitoring initiatives.
- Monitor and survey for terrestrial mammals as part of base-wide flora and fauna surveys every five years.
- Inventory and monitor bat populations on NSA Monterey as part of base-wide fauna surveys to adapt management strategies based on current population status.
- Continue to use educational events like Earth Day for the promotion, restoration, and creation of bat habitat.
- Educate staff on proper measures regarding sick, injured, or dead marine mammals.

Special Status Species

- Ensure that land use plans and activities in or near threatened or endangered species habitats are accomplished in accordance with the Endangered Species Act, in accordance with current Biological Opinions and with Endangered Species Act Section 7 Consultation Handbook (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998).
- Conduct focused surveys periodically for the California red-legged frog, and assess high value habitat at that time.
- Restore/enhance habitat for the California red-legged frog where suitable.
- Conduct focused surveys periodically for the western snowy plover (*Charadrius nivosus nivosus*).

- Restore/enhance habitat for the western snowy plover where suitable.
- Conduct focused surveys for the Smith's blue butterfly.
- Restore and revegetate habitat for the Smith's blue butterfly.
- Conduct focused surveys annually for the Yadon's rein orchid.
- Restore habitat for the Yadon's rein orchid.
- Protect habitat for the Yadon's rein orchid using fencing, signage, and educational materials.
- Conduct focused surveys annually for the Monterey spineflower.
- Restore habitat for the Monterey spineflower.
- Protect habitat for the Monterey spineflower using fencing, signage, and educational materials.
- Conduct focused surveys annually for the Monterey gilia.
- Restore habitat for the Monterey gilia.
- Protect habitat for the Monterey gilia using fencing, signage, and educational materials.

Other Special Status Species

- Provide for the recovery, enhancement, and protection of species warranting Navy stewardship, as a proactive strategy to prevent federal listings and continue to resolve baseline biological data gaps.

Invasive Species

- Restore habitat for federally listed species that is degraded due to occupation by invasive species.
- Develop a map that depicts all invasive species concerns on NSA Monterey.
- Provide for early detection, rapid assessment, and rapid response to control the spread of newly discovered invasive species.

Prevention and Control of Wildlife Damage

- Ensure pests and feral animals are managed according the Integrated Pest Management Plan (IPMP).
- Ensure that applications of pesticides will be compliant with the IPMP.

Data Integration, Access, and Reporting

- Ensure Geographic Information Systems data and products that pertain to NSA Monterey natural resources are available to staff via a dedicated CITRIX share drive folder. Data and products that would be of general interest, such as listed species habitat areas, should be made available via GeoReadiness Explorer.

Sustainability of the Military Mission in the Natural Environment

- Ensure long-term and accurate data is available for adaptive management and reporting.

- Apply sustainability principles to the management of historic preservation, habitats, species, and ecological functions on NSA Monterey.

Adapting to Effects of Climate Change and Regional Growth

- Adapt and mitigate the adverse impacts of climate change through annual goal setting based on science-based scenarios, targets, collaborative planning with Land Conservation Cooperatives, and adaptive management.

Sustainability in the Built Environment

- Sustain natural resources and the NSA Monterey mission by supporting innovation in planning, design, project management, and implementation for development projects affecting the built environment.
- Conduct construction and facility maintenance in a way that allows for protection of sensitive environmental resources and the timely, cost-effective completion of environmental documentation requirements, while ensuring full accomplishment of the military mission.

Beneficial Partnerships and Collaborative Resource Planning

- Be proactive in cooperative resources planning partnerships to create regional conservation, ecosystem-based solutions of mutual benefit, while protecting the military mission.

Outdoor Recreation

- Promote compatible, sustainable outdoor recreation opportunities to enhance quality of life for military personnel and the visiting public while conserving natural resources and without compromising the military mission.

Environmental Education and Public Outreach

- Promote an effective public outreach and environmental education program.

Public Access

- Provide opportunities for public engagement via public access to NSA Monterey properties such that it does not conflict with the military mission, safety and security, and sensitive natural and cultural resource management.

Integrating Other Plans

- Continue to incorporate the prescriptions and recommendations of the Integrated Cultural Resources Management Plan, IPMP, Stormwater Management Plan, potential Installation Restoration Plan, and Installation Appearance Plan.

NEPA Compliance

- Encourage earlier collaboration between project proponents and the Environmental Division through the use of an Environmental Checklist.

Natural Resources Consultation Planning

- Streamline natural resources consultation through clear communication of regulatory requirements. Collaborate with project proponents to plan mitigation and conservation measures to avoid or minimize effects on natural resources first, then rectify, reduce, eliminate, or compensate for the impact of unavoidable effects.
- Develop a master list that includes all environmental agreements, including National Environmental Policy Act projects, Army Corps permits, and Biological Opinions. This master list should: 1) identify all requirements and restrictions associated with these agreements, and 2) document all progress made to comply with these agreements until project completion.

Landscaping and Grounds Maintenance

- Maximize landscaping for efficiency in labor, water, natural resources benefits, and herbicide use.

Training of Natural Resource Management Personnel

- Expand training opportunities to accommodate the expanding scope of natural resources management needs.

Natural Resources Law Enforcement

- At the Dune/Research Area, provide for enforcement of natural resources laws and regulations by professionally trained personnel, taking proper safety and security measures into account.

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1.0 Introduction and Overview

1.1 Purpose and Scope

The Naval Support Activity (NSA)[1] Monterey adopts this Integrated Natural Resources Management Plan (INRMP or Plan) as the framework for managing natural resources on land it owns or controls. The purpose of the INRMP is to help NSA Monterey's Commander manage natural resources effectively so as to ensure that installation lands remain available and in good condition to support the military mission.

The legal requirement for INRMPs derives from the Sikes Act.

This INRMP is a requirement of the Sikes Act[2] (as amended) and the U.S. Department of Defense (DoD) Instruction (DoDI) 4715.03 18 March 2011. The Sikes Act (as amended) states that the INRMP is the primary means by which natural resources compliance and stewardship priorities are set, and funding requirements are determined (U.S. Congress 2000). The organization of this INRMP follows the 2006 DoD Template for INRMPs (Office of Undersecretary of Defense [OUSD] Acquisition, Technology and Logistics Memorandum, 14 August 2006 [DoD 2006a]). The U.S. Department of the Navy (Navy) guides implementation of the Sikes Act (as amended), and the aforementioned DoDI and DoD template through Chief of Naval Operations (CNO) Instruction (OPNAVINST) 5090.1C CH-1 dtd 18 July 2011, Environmental Readiness Program Manual (hereinafter 5090.1C CH-1).

This INRMP considers a long-term planning horizon with annual reviews and updates to be made as necessary. A commitment to implement priority projects, as funding permits, is provided with the signatures in the front of this Plan.

Projects are proposed that cover the range of topics identified by the Sikes Act (as amended), which stipulates that this INRMP provides for:

- Conservation and rehabilitation of natural resources;
- Sustainable, multipurpose use of resources;
- Public access that is necessary and appropriate for the use described above, subject to safety and military security requirements;
- Specific natural resource goals and objectives, and time frames for acting on them;

1. Note that all acronyms are presented in Appendix A.
2. Note that all laws and regulations relevant to this INRMP are presented in Appendix B.

- Fish and wildlife management, land management, and forest management;
- Fish and wildlife habitat enhancement or modifications;
- Wetlands protection, enhancement, and restoration where necessary for support of fish, wildlife, or plants;
- Integration of and consistency among various activities conducted under the Plan;
- Sustainable use by the public of natural resources to the extent that use is not inconsistent with needs of the fish and wildlife resources;
- Enforcement of natural resources laws and regulations;
- No net loss in the capability of the military installation lands to support the military mission of the installation; and
- Such other activities as the Secretary of the Navy (SECNAV) determines appropriate.

- Beach and dune erosion, altered fire regime, invasive species, and climate change that threaten the condition and biodiversity of terrestrial vegetation communities and may affect the abundance and diversity of wildlife and rare plants;

OUSD Memorandum of 08 August 1994 and DoDI 4715.03 require an ecosystem management approach.

The DoD is required to ensure that ecosystem management is the basis for all management of DoD lands and waters (OUSD Memorandum of 08 August 1994, Implementation of Ecosystem Management in the Department of Defense, and DoDI 4715.03). Based on an ecosystem approach, this INRMP takes a large geographic view to ensure achievement of the overriding goal of protecting the properties and functions of natural ecosystems. Since ecosystem boundaries are rarely synonymous with property ownership, installations such as NSA Monterey are encouraged to form cooperative partnerships with nearby communities, as appropriate, and take part in public awareness initiatives in an effort to manage ecosystems more successfully. The OUSD Memorandum provides principles and guidelines for implementing ecosystem management on DoD lands. This is discussed further in Section 1.10, and in Sections 4.0 and 5.0.

Consistent with all of the above, this INRMP provides goals and objectives for the use and conservation of natural resources at NSA Monterey that integrate regional ecosystem, military, social (community), and economic concerns. It establishes planning and management strategies; identifies natural resource constraints and opportunities; supports the resolution of land use conflicts; provides baseline descriptions of natural resources necessary for the development of conservation strategies and environmental assessment; serves as the principal information source for the preparation of future environmental documents for proposed NSA Monterey actions; and provides guidance for annual natural resources management reviews, internal compliance audits, and annual budget submittals.

1.2 Authority

The Sikes Act (as amended) directs the DoD to take the appropriate management actions necessary to protect and enhance the land and water resources on all installations under its control. The DoD Directive (DoDD) 4700.4 Natural Resources Management Program, and DoDI 4715.03 Natural Resources Conservation Program, are implemented herein to establish fundamental land management policies and procedures for all military lands to preserve the military mission, but at the same time protect natural resources. In Chapter 24 of 5090.1C CH-1, program responsibilities and standards are set for complying with resource protection laws, regulations, and Executive Orders (EOs) to conserve and manage natural resources on Navy installations in the United States and its territories and possessions. Finally, the CNO INRMP Guidance for Navy Installations, How to Prepare, Implement, and Revise INRMPs, April 2006 supplies guidelines on the process and procedure for developing an INRMP. Additional policy, regulation, and legislation regarding land management are contained in the remaining references cited in this chapter.

Federal and state legal requirements that are the primary drivers for natural resources management are listed in Appendix B (U.S. Codes [USC], Public Laws [PL], EOs, and Code of Federal Regulations [CFR]).

All federal and state legal requirements related to natural resources management are listed in Appendix B.

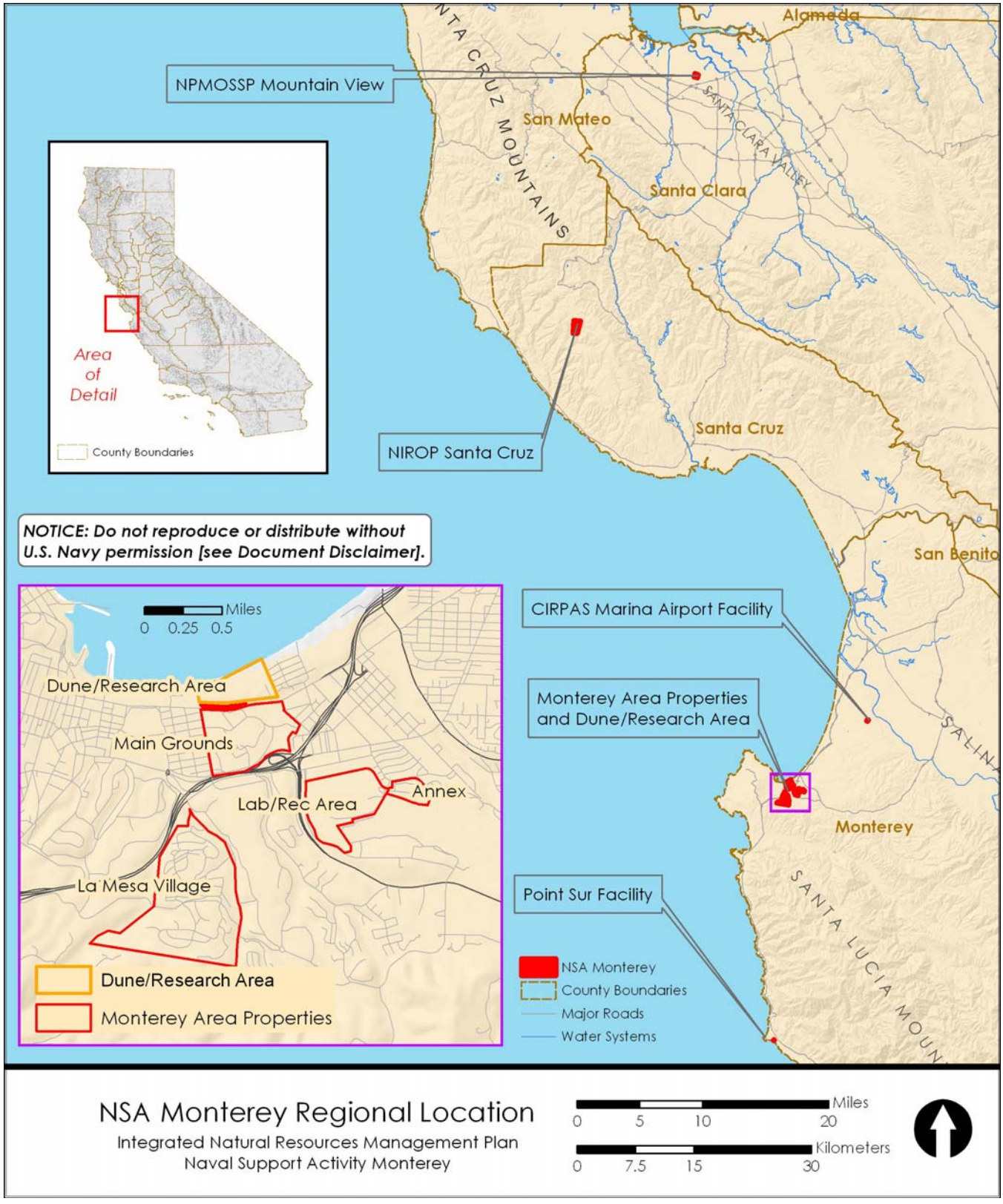
Organization of this INRMP contains all the elements of the DoD Template for INRMPs (DoD 2006a). Since both DoD and Navy guidance (DoDI 4715.03, CNO Guidance of April 2006, and 5090.1C CH-1) are more comprehensive than that identified in the DoD template, the outline has been re-worked so that additional material is added in the document to ensure compliance with all guidelines. A cross-walk between the DoD template and this INRMP's contents is provided in the front of this INRMP.

1.3 Location and Real Estate Summary

NSA Monterey is comprised of an assemblage of properties (Refer to Map 1-1 and Table 1-1).[3] For the purposes of the INRMP, several properties are grouped into what is referred to as the Monterey Area Properties due to their proximity and similarity of natural resources.

For the purposes of the INRMP, NSA Monterey is composed of an assemblage of nine properties in five groups.

3. All maps in the INRMP were compiled by Tierra Data Inc., except if noted, using data believed to be accurate at the time of publication. However, a degree of error is inherent in all maps. The maps are distributed "AS-IS," without warranties of any kind, either expressed or implied, including, but not limited to, warranties of suitability to a particular purpose or use. No attempt has been made in either the design or production of the maps to define the limits or jurisdiction of any federal, state, or local government. The maps are intended for use only at the published scale. Detailed on-the-ground surveys and historical analyses of sites may differ from the maps.



Map 1-1. Regional location of Naval Support Activity Monterey and its properties.

Table 1-1. Naval Support Activity Monterey properties, Integrated Natural Resources Management Plan grouping, and acreage.

Property	INRMP Grouping	Acreage
Main Grounds	Monterey Area Properties	133 acres
Laboratory/Recreation Area	Monterey Area Properties	110 acres
Annex	Monterey Area Properties	20 acres
La Mesa Village	Monterey Area Properties	299.4 acres
Center for Interdisciplinary Remotely-Piloted Aircraft Studies Marina Airport Facility	Monterey Area Properties	1.49 acres
Dune/Research Area	None	55 acres
Point Sur Facility	None	2.5 acres
Naval Industrial Reserve Ordnance Plant Santa Cruz	None	271 acres
Naval Program Management Office Strategic Systems Program Mountain View	None	59.6 acres

1.3.1 Monterey Area Properties (563.89 Acres)

- Main Grounds (133 acres)
- Laboratory/Recreation Area (110 acres)
- Annex (20 acres)
- La Mesa Village (299.4 acres)
- Center for Interdisciplinary Remotely-Piloted Aircraft Studies (CIRPAS) Marina Airport Facility (1.49 acres)

Location

The Main Grounds, Laboratory/Recreation Area, Annex, La Mesa Village, and CIRPAS Marina Airport Facility are collectively referred to hereinafter as the Monterey Area Properties (Refer to Map 1-2).[4] Excepting the CIRPAS Marina Airport Facility (Refer to Map 1-3), the Monterey Area Properties are within the city limits of Monterey and are adjacent to major travel routes: California Highway 68 traverses along the western boundary of the Laboratory/Recreation Area and extends west to Pebble Beach and northeast to Salinas. California Highway 1 abuts the southern boundary of the Main Grounds and the northwestern boundary of La Mesa Village, extending southwest towards Carmel and northeast to Seaside and Marina. Del Monte Avenue is a major thoroughfare for the city of Monterey and defines the northern boundary of the Main Grounds and the southern boundary of the Dune/Research Area.

In the city of Marina in Monterey County, also accessed by Highway 1, NSA Monterey manages the CIRPAS Marina Airport Facility, at Marina Airport Hangar 507. This property is accessed via Reservation Road, also known as County Road G17 (Refer to Map 1-3).

Real Estate Summary

Excepting the CIRPAS Marina Airport Facility, the Navy owns all of the properties that comprise the Monterey Area Properties. The La Mesa Village housing area is leased to the Army under a Host-Tenant agreement, which in turn contracts with Pinnacle Housing Group to manage the housing area under a Private Property Venture.

NSA Monterey owns all Monterey Area Properties except the CIRPAS Marine Airport Facility, which is leased from the city of Marina.

4. In this document, the Dune/Research Area is treated separately due to its unique biophysical character.

Map 1-2. Location of the Monterey Area Properties and the Dune/Research Area.

Map 1-3. The Center for Interdisciplinary Remotely-Piloted Aircraft Studies Marina Airport Facility at Hangar 507, also a part of the Monterey Area Properties.

The CIRPAS Marina Airport Facility at Hangar 507 consists of a 64,920 square foot building and parking lot with some landscaping and a very small natural area (Refer to Map 1-3). It is located in the city of Marina. This parcel is leased from the City of Marina.

1.3.2 Dune/Research Area (55 Acres)

Location

The Dune/Research Area is treated as separate from the Monterey Area Properties due to its unique biophysical character.

The Dune/Research Area is within the city limits of Monterey (Refer to Map 1-2). Del Monte Avenue is a major thoroughfare for the City of Monterey and defines the northern boundary of the Main Grounds and the southern boundary of the Dune/Research Area.

Real Estate Summary

Under an agreement with the Navy, the City of Monterey manages the beach adjacent to the Dune/Research Area for public recreation (City of Monterey Del Monte Beach), and it is accessible from adjacent beaches. The Navy leases part of the defunct sewage treatment plant to the Monterey Regional Water Pollution Control Agency for a lift station.

1.3.3 Point Sur Facility (2.5 Acres)

Location

The Point Sur Facility is accessed via Highway 1, Pacific Coast Highway, on the coast of Monterey County about 23 miles south of the city of Monterey.

Real Estate Summary

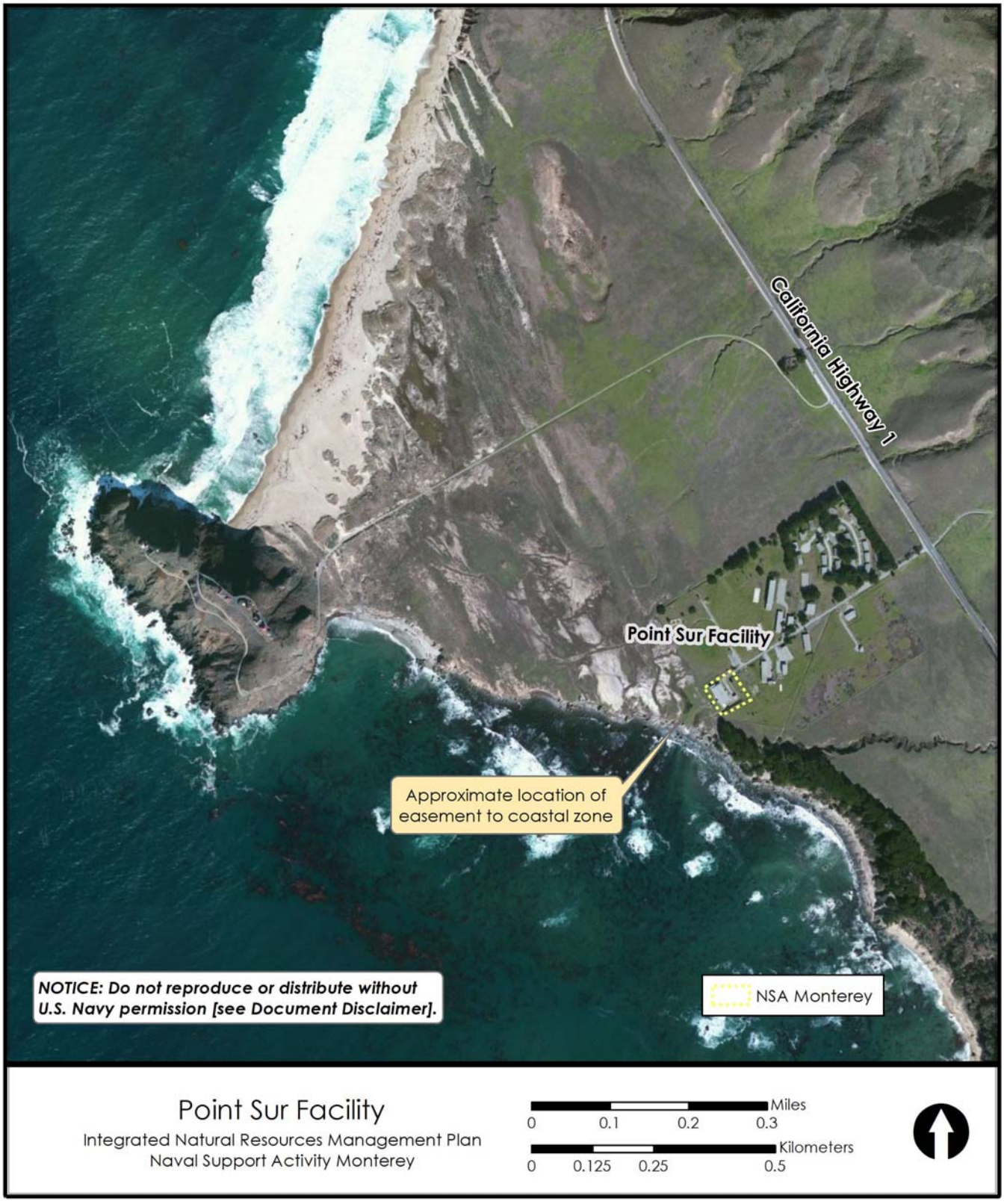
The Navy maintains an easement for access to the ocean across the El Sur Rancho.

The 1.15 acre Point Sur Facility is one fenced structure situated on the Monterey County coast (Refer to Map 1-4). There are no leased properties at the Point Sur Facility. However, the U.S. government at the behest of the U.S. Navy acquired in 1967 a perpetual easement and right-of-way for access to the Pacific Ocean and for the installation, operation, maintenance, repair, and replacement of necessary utility lines in, over, on, under, and across the property referred to as Lot 1 of Rancho El Sur, as said lot is shown on Map of the Partition of El Sur Rancho, filed on 21 March 1891 in Volume 1 of Outside Lands at Page 8, Records of Monterey County. The approximate location of this easement is shown on Map 1-4. This easement connects the Point Sur Facility to the coastal zone and the nearshore environment.

1.3.4 NIROP Santa Cruz (271 Acres)

Location

Naval Industrial Reserve Ordnance Plant (NIROP) Santa Cruz is located within Santa Cruz County in the coastal mountains of central California, approximately 16 miles northwest of the city of Santa Cruz. The only road access to this property is through the gated entrance via Empire Grade Road. Once within the gate, Poseidon Road connects NIROP Santa Cruz to the Empire Grade entrance.



Map 1-4. Location of the Point Sur Facility.

Real Estate Summary

NIROP Santa Cruz is owned by the Navy, but operated by Lockheed Martin.

NIROP Santa Cruz is a 271.37-acre Government Owned Contractor Operated (GOCO) parcel owned by the Navy and managed by the adjacent property owner, Lockheed Martin (Map 1-5).

In 1956, an Agreement Respecting Timber Rights was made between the Locatelli et al. (doing business as the Santa Cruz Land and Development Company) and Gaylord D. Hart. This agreement was part of a real estate transaction involving the sale of 20 parcels of Locatelli real property to Hart. The current NIROP Santa Cruz parcel was contained within lands delineated in the agreement. Per this agreement, Locatelli et al. was to retain and reserve the timber rights to the 20 parcels. In 1959, when Lockheed purchased the property, these timber rights remained with Locatelli et al. Presumably these rights reserved by Locatelli have remained in force through subsequent transfers of title. As a consequence the issue of forest management on NIROP Santa Cruz, as related to timber harvest, must of necessity involve Locatelli et al. (Doak et al. 1996).

A Final Certificate of Title issued to the 12th Naval District by the California Pacific Title Company recognized and incorporated this 1956 Agreement Respecting Timber Rights, as well as reserving for the Pacific Gas and Electric Company (PG&E) a portion of the rights to all oil, gas, asphaltum, and other hydrocarbons and other minerals. A series of easements were also created or affiliated in the Final Certificate of Title. These easements include non-exclusive easements for ingress and egress, utilities (including overhead power lines), underground water lines, and related facilities (Doak et al. 1996).

1.3.5 NPMOSSP Mountain View (59.6 Acres)

Location

Naval Program Management Office Strategic Systems Program (NPMOSSP) Mountain View is on Mathilda Avenue (between Third and Fifth Avenues) and accessed by Moffett Park Way north of Highway 101 (Bayshore Freeway) and Highway 237, in the city of Sunnyvale, Santa Clara County, California. It is associated with the Moffett Field federal airfield complex adjacent to San Francisco Bay.

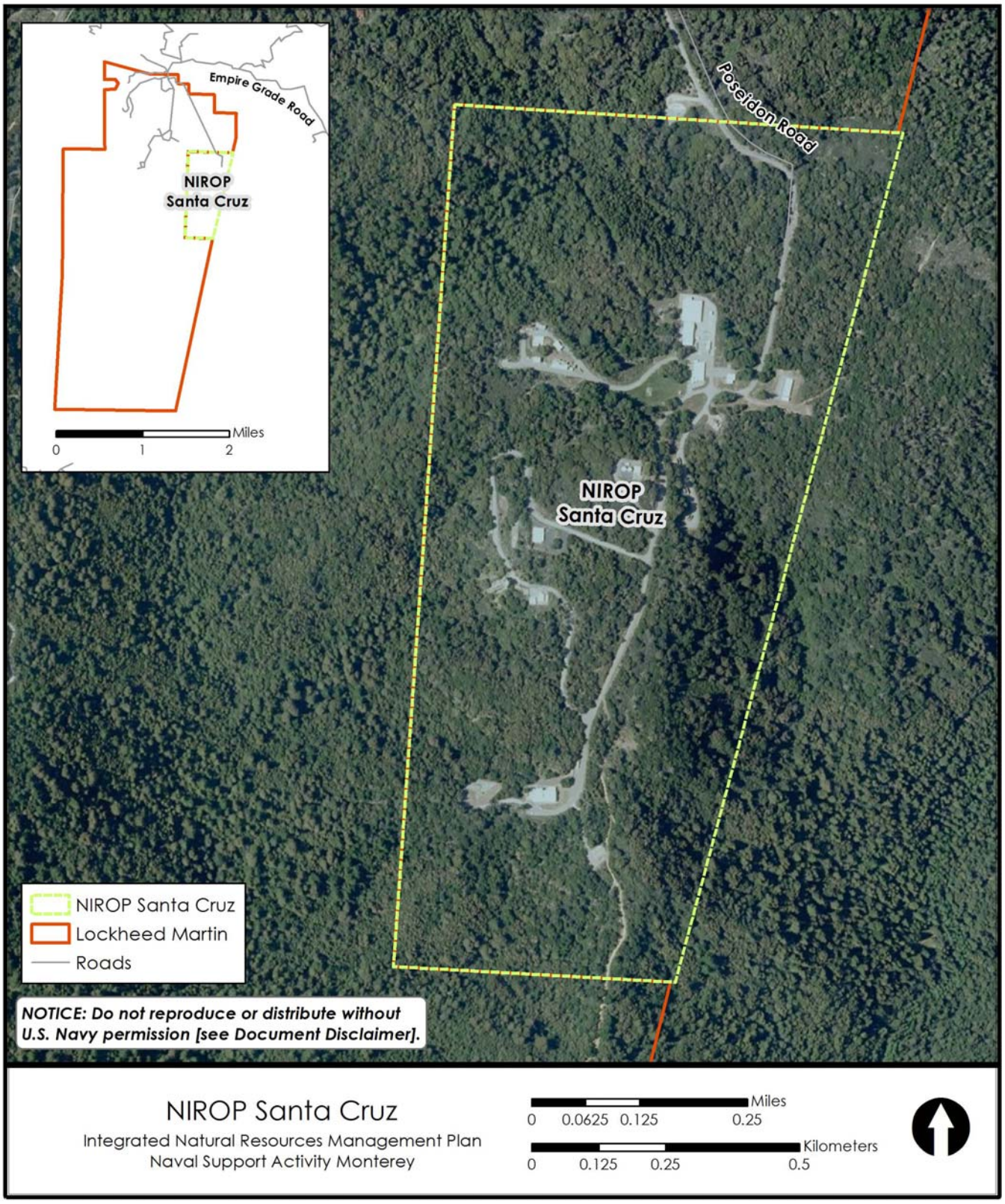
Real Estate Summary

Similar to NIROP Santa Cruz, NPMOSSP Mountain View is operated by Lockheed Martin.

NPMOSSP Mountain View is an urban facility in Sunnyvale on 59.6 developed acres with landscaped ornamental trees and shrubs. This property is owned by the Navy and operated by Lockheed Martin.

1.4 NSA Monterey and Tenant's Military Mission

As landholder, NSA Monterey's oversees base operations of several tenant commands located on its central California coast properties (Refer to Map 1-1).



Map 1-5. Location of Naval Industrial Reserve Ordnance Plant Santa Cruz.

The mission statement for NSA Monterey states that the command is "a multifunctional organization dedicated to providing responsive high-quality base operational support to enable tenants to accomplish their mission, enhancing their quality of life and to be a responsive civic partner by building and nurturing effective relationships with the local communities."

Naval Postgraduate School Monterey

The Naval Postgraduate School's (NPS) mission is to "…provide high quality, relevant and unique advanced education and research programs to increase the combat effectiveness of the Naval Service, other Armed Forces of the U.S., and our Partners, and to enhance our National Security" (NPS Monterey 2008).

This vision from the 2008 Strategic Plan describes the school's future: As a naval/defense-oriented research university, the NPS will operate as a geographically distributed educational system that provides a broad range of high-quality graduate education in support of national and international security.

> "Here is where you find cutting-edge technological research; advanced training in civil-military dynamics; the best and only master's program for government officials in Homeland Security operations; and critical real-time training exercises in peacekeeping and stabilization and reconstruction activities. Nowhere else does a single dollar of investment go so far in advancing America's agenda of peace through strength. I am proud of the work done by faculty, staff and students at this institution." The Honorable Sam Farr, Congressman, 17th District of California.

While the Main Grounds is the core of the campus, the ancillary properties serve support functions of laboratories, research facilities, and recreation.

Annex

The Fleet Numerical Meteorology and Oceanography Center (FNMOC) is the DoD's primary central production site for worldwide computer-generated operational meteorological and oceanographic analysis and forecast products. It is one of a half dozen internationally recognized operational weather centers and the world's leader in global oceanographic and coupled air-ocean forecasting. This property also houses an office of the Naval Research Laboratory Monterey and a National Oceanic and Atmospheric Administration (NOAA) regional forecast office.

La Mesa Village

The La Mesa Village housing area functions to provide affordable housing to service members that are located in the Monterey area. Starting in 2003, the Navy began leasing La Mesa Village to the Army, with management duties performed through a public/private venture with Clark Pinnacle Family Communities LLC.

CIRPAS Marina Airport Facility

Through the deployment of aircraft as well as ground based instrumentation, the CIRPAS Marina Airport Facility supports atmospheric and ocean research. Since 1996, the CIRPAS Marina Airport Facility has supported numerous scientific experiments and expeditions all over the world sponsored by the Office of Naval Research, National Science Foundation, National Aeronautics and Space Administration, NOAA, Department of Energy, California Air Resources Board, Naval Research Laboratories, and others.

Point Sur Facility

The Point Sur Naval Facility was a part of the Navy's underwater monitoring network of sound powered hydrophones between 1958 and 1986. The Navy used the cabled undersea hydrophone array to monitor ship and mammal traffic in the area.

The NPS established the Point Sur Ocean Acoustics Observatory (OAO) in 1993 for the purpose of undersea research. On 27 January 2001 the array cable suffered a catastrophic failure. The cable fault, first noted in 1991, is located approximately 0.86 nautical miles from the terminal building and a progressive failure was noted over the years.

The NPS is currently pursuing funding to reactivate the Point Sur OAO with plans to install a new cable and build a new building in support of this mission, and in support of a multitude of scientific equipment and research projects.

Naval Industrial Reserve Ordnance Plant Santa Cruz

Used for the development, testing, and storage of components for the Navy, NIROP Santa Cruz functions primarily as an ordnance research and testing facility. Emphasis is on quality assurance testing of missile engines, Confined Detonating Fuses, and associated release systems built by Lockheed Martin Missiles and Space Company. Stress testing of components and products is conducted to ensure that failures do not occur. NIROP Santa Cruz also partially assembles and tests components of various guided missiles engineered by Lockheed Martin.

NPMOSSP Mountain View

NPMOSSP Mountain View is operated by Lockheed Martin and is a Strategic Systems Program Facility for flight systems. It provides life-cycle support for various weapon systems.

1.5 Achieving INRMP Success

1.5.1 INRMP Implementation

SECNAV Instruction 6240.6E assigns responsibility for establishing, implementing, and maintaining the natural resources programs under the jurisdiction of SECNAV to the Commander, Navy Installations Command (CNIC). At the installation level, the Commander ensures that military operations and natural resources conservation measures are integrated and consistent with stewardship and legal requirements through the development of the INRMP.

1.5.1.1 Definition of *Must Fund* Implementation

Naval Operations N45 ERLs are separated into four levels, 1-4, with Level 4 having the highest priority.

For the purposes of this INRMP, the terms compliance and stewardship have specific meanings as criteria for implementing project lists. Overall project or activity rankings are aligned with Naval Operations N45 Environmental Readiness Levels (ERLs) to ensure the installation's highest priorities are promoted in future budget cycles. The highest priority, ERL 4, is assigned to projects or activities based on compliance with legal requirements, such as the Endangered Species Act (ESA), Clean Water Act (CWA), or Migratory Bird Treaty Act (MBTA). Alternatively, a project or activity may be considered good land stewardship but is not considered a legal obligation, and this investment may yield only undefined future benefits. High priority compliance projects to comply with legal obligations are generally funded within annual budget constraints, but future federal budgets could decrease available funding for both compliance and lower ranked stewardship projects. Annual funding for all conservation projects are ranked on a regional basis and each project must compete for available funds among multiple Navy installations. It is the Navy's policy to promote long-term mission and environmental sustainability measures, including good stewardship practices, and all valid compliance and stewardship requirements are submitted for consideration during budget programming cycles.

The various project ranking scenarios are described in Section 6.2.2: Navy Assessment Levels for Budget Prioritization.

1.5.1.2 Anti-Deficiency Act

The Navy and NSA Monterey intend to implement recommendations in this INRMP within the framework of regulatory compliance, national Navy mission obligations, anti-terrorism and force protection limitations, and funding constraints. The execution of any of the INRMP projects will be dependent on the availability of appropriate funding sources. Any requirement for the obligation of funds for projects or actions in the INRMP shall be subject to the availability of funds appropriated by Congress. None of the proposed projects or actions shall be interpreted to require obligations or payment of funds in violation of any applicable federal law, including the Anti-Deficiency Act, 31 USC § 1341.

1.5.2 Mission Sustainability and the INRMP "No Net Loss" Requirement

Implementation of the NSA Monterey INRMP must not result in a net loss to the military mission.

Under the Sikes Act (as amended), NSA Monterey must see that there is no net loss to the military mission due to implementation of this INRMP in conserving natural resources. To do this, the link between Navy land use, environmental compliance, the mission of academic excellence to enhance national security, and other aspects of the military mission served by NSA properties needs to be described. Anticipating and protecting against all encroachment on resources available for fulfilling the military mission, and providing for the protection of environmental resources that are key to sustaining the military mission, is what this INRMP attempts to achieve.

The U.S. Congress endowed the Navy with public lands as an investment in national security. The common denominator between national security and public land stewardship is the concept of sustainability. Sustainability is a relative condition of the ecosystem and the military mission that can be measured. Measures of sustainability are scale-dependent.

The sustainability and no net loss of the resources that support NSA Monterey are considered further in Chapter 5. Sustainability may be considered as having at least several components in the context of this INRMP: facilitation of military use now and into the future; security considerations for information, property, and human life; protection of soil and water resources; ecological integrity; and protection of cultural resources.

For the purpose of this INRMP, an impact to mission accomplishment has occurred when any of the above are constrained or when one of the following conditions occurs:

- Quality of military research and education is impacted by natural resource restrictions.
- Security of life, property, or information is impaired.
- Soil and water resources are impaired such that environmental compliance has become a problem and irretrievable damage has occurred. Protection of soil and water resources will protect the capacity of the ecosystem to recover from disturbance, and sustain its natural carrying capacity to support plants and animals and provide as natural a landscape as possible. Water supply, natural hydrologic processes, and water quality are essential to most ecological functions, including recoverability from disturbance.
- Ecological integrity is irretrievably harmed. Compliance under the Sikes Act (as amended) for mission sustainability (no net loss) is also defined in this Plan to include the ecological integrity of the land, since this integrity will carry these lands into the long-term future with all the elements that allow recovery on its own to remain intact. Keeping all the pieces (habitats and species) that allow the ecosystem to function at various scales and at the highest level possible, given the mandate for use of natural resources, is a component of sustainability.

- Cultural resources compliance is impaired. Long-term strategies include cultural resources surveys of areas that are not targeted for immediate use. Under Section 110 of the National Historic Preservation Act (NHPA), federal land managers are directed to inventory cultural resources on lands under their control even when no activity or undertaking is planned. Such investigations aid in long-term planning and also contribute to the archaeological context that is developed to evaluate resources.

1.5.3 Relationship to Other Operational Plans

The INRMP provides for a consistency and consilience between various NSA Monterey plans.

Several plans have been developed providing direction and guidance in the operation of NSA Monterey and the protection of its resources. These plans include the Integrated Cultural Resources Management Plan (ICRMP) (SWCA Environmental Consultants 2011), Integrated Pest Management Plan (IPMP) (NAVFAC 2009), Del Monte Lake Management Plan (currently in revision), and Storm Water Management Plan (AHTNA Government Services Corporation 2004). These documents are interrelated with natural resources planning. Coherency with these plans is a function of this INRMP and is detailed in Chapter 4 and Chapter 5.

1.6 INRMP Vision, Goals, and Objectives

The NSA Monterey natural resources management program is managed by the Public Works Department (PWD), Environmental Division (ED) and supports the Navy's mission through responsible stewardship of the installation's natural resources. NSA Monterey seeks to use integrated natural resource management and principles of ecosystem management to ensure ecosystem viability and biodiversity, while providing recreation and educational opportunities to installation personnel and, where appropriate, the public.

The NPS originally drafted an INRMP in August of 2001 (Navy 2001). This INRMP was signed by the stakeholders but was not kept up to date nor was it reviewed every five years for operation and effect as required. Lockheed Martin drafted an INRMP for NIROP Santa Cruz in 1996 that was signed but never reviewed or updated (Doak et al. 1996). In 2009, NIROP Santa Cruz was assigned to NSA Monterey as a special area and the information in the 1996 and 2001 INRMPs has been updated and included in this document.

The purpose of this INRMP is to support the vision of the Commanding Officer (CO) by charting the management and use of installation natural resources, establishing conservation priorities, and providing a basis for formulating budgets. Where appropriate, specific methods for reaching stated goals are outlined within the document. These may change as evolving resources and priorities dictate and are not meant to be a prescriptive or exhaustive list.

This document is intended to be a living document and will be updated annually as needed to keep the material, goals, and objectives relevant to current conditions. The INRMP and any proposed revisions will be reviewed every year, during the annual INRMP metrics review meeting. Signatures will be requested each year from the two primary stakeholders and the NSA Monterey CO, documenting concurrence for operation and effect.

This INRMP is intended to be a living document and will be updated to keep the material, goals, and objectives relevant to current conditions.

The CO of NSA Monterey issued an Environmental Policy Statement (December 2010) stating that NSA Monterey is committed to full compliance with federal, state, and local environmental laws and regulations and will achieve this by:

1. Complying with EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management.
2. Complying with Navy environmental and energy policies and directives listed in 5090.1C CH-1.
3. Integrating sound environmental practices into all operations and business decisions.
4. Continuously improving environmental performance through use of effective environmental management and planning.
5. Striving to identify and implement pollution prevention opportunities.
6. Educating employees about their responsibilities to the environment as well as assigning accountability for individual acts of non-compliance.
7. Conducting routine management reviews to assess progress towards environmental goals.

This INRMP and the goals it establishes are consistent with the DoD Ecosystem Management Policy directive issued in 1994 by the Deputy Under Secretary of Defense (DUSD) (Environmental Security). This directive states that military installations will use ecosystem management as the basis for future management of DoD lands and waters. The directive specifies five key elements of ecosystem management:

1. **Ecological approach** - The DoD will continue to shift its focus from protection of individual species to management of ecosystems.
2. **Partnerships** - The DoD will form partnerships to achieve shared goals. Ecosystems cross political boundaries, making the need for cooperation, coordination, and partnerships essential for managing ecosystems.
3. **Participation** - Public involvement, communication, and incorporation of public needs and desires into management decisions will be emphasized.
4. **Information** - The best available scientific and field-tested information will be used in making decisions and selecting the most appropriate technologies in management of natural resources.
5. **Adaptive management** - Resources managers will incrementally implement adaptive management techniques as they become

known through the dynamic process of applying the best available commercial and scientific data.

DoDI 4715.03 provides guidance on employing ecosystem-based management as well as the use of adaptive management. Adaptive management accommodates the reality that ecosystems are complex and continually changing by employing flexible management practices that can be modified as the environment changes. Based on observations, data, or increased scientific knowledge, adjustments may be made to the goals and management activities altered to meet the current situation. This flexibility in management practices is permissible if executed within the constraints of the INRMP.

Table 1-2 lists planning terms and definitions used in this INRMP.

Table 1-2. Definitions of planning terms used in this document.

Hierarchy	Definition
Goal	Broad statement of intent, direction, and purpose. An enduring, visionary description of where you want to go, an end outcome. A goal is not necessarily completely attainable. It does, however, describe a desired outcome related to the mission, rather than an activity or a process.
Objective	Specific statement that describes a desired future condition or successful outcome. Can be quantitative. Should be followed by a standard, which is an observable indicator by which successful attainment of a condition stated in the objective is measured. "How do we know we are making progress or have attained the desired condition or successful outcome?" Should be good for at least five years.
Strategy	Explicit description of ways and means chosen to achieve objectives or standards. "What are we going to do about it?"
Task	Specific step, practice, or method to get the job done, usually organized sequentially with timelines and duty assignments. These go out of date quickly and should be updated annually.

1.7 Roles and Responsibilities

The following is a list roles and responsibilities for the Navy chain of command in supporting the installation and the development, revision, and implementation of this INRMP. Policy leadership and liaison with non-Navy partners is provided by Commander, Navy Region Southwest (CNRSW) N40, Naval Facilities Engineering Command (NAVFAC) Southwest, and NSA Monterey.

Chief of Naval Operations

The CNO serves as the principal leader and overall Navy program manager for the development, revision, and implementation of this INRMP. The CNO provides policy, guidance and resources for the development, revision, and implementation of the INRMP and associated National Environmental Policy Act (NEPA) documentation. The CNO approves all INRMP projects prior to submittal to regulatory agencies for signature (Navy 2006).

Commander, Navy Installations Command

The CNIC reviews the entire INRMP. Their role is to ensure that installations comply with DoD, Navy, and CNO policy on INRMPs and their associated NEPA documentation. They also ensure the programming of resources necessary to maintain and implement INRMPs, participate in the development and revision of INRMPs, and provide overall

program management oversight for all natural resources program elements. CNIC reviews and endorses projects recommended for INRMP implementation prior to submittal for signature, and evaluates and validates Environmental Program Requirements System (EPR-Web) project proposals (Navy 2006).

Navy Region Southwest

Regional Commanders ensure that installations comply with DoD, Navy, and CNO policy on INRMPs and their associated NEPA documentation. They ensure that installations under their control undergo annual reviews and formal five-year evaluations. They ensure the programming of resources necessary to maintain and implement INRMPs, which involves the evaluation and validation of EPR-Web based project proposals and the funding of installation natural resources management staff. Navy Region Southwest maintains close liaison with the INRMP signatory partners (U.S. Fish and Wildlife Service [USFWS], NOAA, and California Department of Fish and Wildlife [CDFW]) and other INRMP stakeholders. They provide endorsement of the INRMP through the Regional Commander signature (Navy 2006).

Installation Commanding Officers

Installation COs ensure the preparation, completion, and implementation of INRMPs and associated NEPA documentation. Their role is to: act as stewards of natural resources under their jurisdiction and integrate natural resources requirements into the day-to-day decision-making process; ensure natural resources management and INRMPs comply with all natural resources related federal regulations, directives, instructions, and policies; involve appropriate tenant, operational, training, or Research and Development commands in the INRMP review process to ensure no net loss of military mission; designate a Natural Resources Manager/Coordinator responsible for the management efforts related to the preparation, revision, implementation, and funding for INRMPs, as well as coordination with subordinate commands and installations; involve appropriate Navy Judge Advocate General or Office of the General Counsel legal counsel to provide advice and counsel with respect to legal matters related to natural resources management and INRMPs; and endorse INRMPs via CO signature.

Public Affairs Office

The Public Affairs Office is involved in aspects of an environmental program. This includes being informed of the public notice process required in various NEPA analysis processes.

Office of Counsel

The Office of the General Counsel, CNRSW, provides legal services on a variety of environmental matters. Particularly pertinent to natural resources management is their review of NEPA documentation and legal interpretations involving compliance with natural resources laws as they pertain to base operations.

Naval Facilities Engineering Command Southwest

Public Works Department

The NSA Monterey Facilities Management Division, PWD, is responsible for the comprehensive oversight and planning of all land use issues relating to the installation. Their role for this INRMP is to provide document review to confirm that this INRMP describes compatible land uses.

Environmental Division

The ED is responsible for the preparation and implementation of this INRMP. The Natural Resources Manager provides technical support and oversight of INRMP implementation. This duty is delegated by the CO formally through an appointment letter (See Appendix P). This INRMP is the direct vehicle for accomplishment of many of the responsibilities of the CO detailed above.

Business Line Team Leader (N45)

Natural resources business line team specialists (N45) provide technical support and contractual oversight in the development, revision, and implementation of this INRMP. In addition, NAVFAC Southwest is responsible for providing support for natural resources management when requested. NAVFAC Southwest personnel, such as the NEPA and INRMP coordinators, have natural resources programming and/or technical support roles in developing this INRMP.

1.7.1 Sikes Act Stakeholders

The Sikes Act stakeholders for this INRMP are:

- USFWS
- CDFW

Preparation of this INRMP, as required by the Sikes Act (as amended), will be accomplished in cooperation with the USFWS and CDFW. This cooperation ensures the INRMP reflects mutual agreement concerning the conservation, protection, and management of fish and wildlife resources at NSA Monterey.

1.7.2 Internal Stakeholders

The internal Navy stakeholders for this INRMP include:

- CNRSW
- NAVFAC Southwest
- All NSA Monterey departments
- NSA Monterey tenant commands
- Lockheed Martin

1.7.3 External Stakeholders

External partners in the writing and execution of this INRMP include:

- California Native Plant Society (CNPS)
- California Historical Society

1.8 Management Approaches

The DoD and Navy adopted a policy of ecosystem management in INRMP development.

In an effort to manage from a broader perspective than merely funding classifications, the DoD and Navy have adopted a policy of ecosystem management for INRMPs. DoDI 4715.03 describes ecosystem management as "a goal-driven approach to managing natural and cultural resources that supports present and future mission requirements; preserves ecosystem integrity; is at a scale compatible with natural processes; is cognizant of nature's timeframes; recognizes social and economic viability within functioning ecosystems; is adaptable to complex and changing requirements; and is realized through effective partnerships among private, local, state, tribal, and federal interests. Ecosystem-based management is a process that considers the environment as a complex system functioning as a whole, not as a collection of parts, and recognizes that people and their social and economic needs are a part of the whole."

1.8.1 Ecosystem Management

DoD and Navy Instructions mandate an ecosystem framework and approach for the INRMP (DoDI 4715.03 and 5090.1C CH-1). Ecosystem management in the DoD draws on a long-term vision of integrating ecological, economic, and social factors. This approach shall take a long-term view of human activities, including military uses, and biological resources as part of the same environment. Managing for sustainability and ecosystem management are both approaches that attempt to integrate long-term goals with short-term project lists. Consistent with Navy policy, ecosystem-based management shall include (5090.1C CH-1):

- A shift from single species to multiple species conservation.
- Formation of partnerships necessary to consider and manage ecosystems that cross boundaries.
- Use of the best available scientific information and adaptive management techniques.

Besides a component of ecosystem management, adaptive management is also a separate requirement for INRMPs under DoDI 4715.03, when it states "whenever practicable to manage and monitor resources over sufficiently long time periods to allow for adaptive management and assessment of changing ecosystem dynamics (i.e. incorporate a monitoring component to management plans)."

1.8.2 Environmental Management System

DoD policy states that “DoD Components shall adopt an environmental management system and work to integrate it in all core business areas.” The goal is to “establish robust systems that sustain compliance, avoid risk and pollution, inform the public, and promote interoperability among the DoD components, other nations' militaries, and with industry.” The remainder of this policy is found in the memorandum from the OUSD for Acquisition, Technology and Logistics dated 05 April 2002.

A robust EMS is essential to sustaining compliance, reducing pollution, and minimizing risk to the mission.

The Navy's Environmental Management System (EMS) integrates environmental considerations into day-to-day activities across all levels and functions of Navy enterprise with regard to best practices for the use of renewable and non-renewable resources and how pollution and wastes are prevented and processed. It is a formal management framework required under EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance (05 October 2009), that provides a systematic way to review and improve operations, create awareness, and improves environmental performance (CNO policy 06 December 2001). Systematic environmental management as an integral part of day-to-day decision making and long-term planning processes is an important step in supporting mission readiness and effective use of resources. The most significant resource for every organization is their senior leadership's commitment and visibility in EMS implementation and sustainability. A robust EMS is essential to sustaining compliance, reducing pollution, and minimizing risk to the mission. The Navy EMS conforms to the International Organization for Standardization 14001:2004 EMS standard. A working EMS “should be a tool to help organizations not only stay in compliance with legislated and voluntary environmental requirements, but also continuously improve their overall environmental performance.”[5]

EO 13514 requires that each federal agency conduct a self audit of pollution prevention practices using an accepted EMS framework. Components of the approach includes: advancing the national policy that, whenever feasible and cost-effective, pollution should be prevented or reduced at the source. Funding for regulatory compliance programs shall emphasize pollution prevention as a means to address environmental compliance. Each agency must: reduce its use of toxic chemicals and hazardous substances; reduce the toxic release inventory and off-site transfers of toxic chemicals for treatment and disposal; develop a plan to phase out the procurement of Class I ozone-depleting substances for all non-excepted uses; and promote the sustainable management of federal facility lands through the implementation of cost-effective, environmentally sound landscaping practices, and programs to reduce adverse impacts to the natural environment.

5. https://www.denix.osd.mil/denix/Public/Library/EMS/emswhat.html.

1.9 Organization of Plan, Review and Revision Process

The organization of this INRMP is consistent with the 2006 DoD Template for INRMPs (DoD 2006a). Since Navy guidance (both CNO Guidance of April 2006 and 5090.1C CH-1) is more comprehensive than that identified in the DoD template, the outline has been re-worked so that additional material is added in the document to ensure compliance with all guidelines (Navy 2006, 2011).

DoD policy requires installations to review INRMPs annually in cooperation with the two primary parties to the INRMP (USFWS and CDFW). Annual reviews facilitate adaptive management by providing an opportunity for the parties to review the goals and objectives of the plan, as well as establish a realistic schedule for undertaking proposed actions.

Section 101(b)(2) of the Sikes Act (as amended) [16 USC 670a(b)(2)] specifically directs that the INRMPs be reviewed "as to operation and effect" by the primary parties "on a regular basis, but not less often than every five years," emphasizing that the review is intended to determine whether existing INRMPs are being implemented to meet the requirements of the Sikes Act (as amended) and contribute to the conservation and rehabilitation of natural resources on military installations. The Office of the Secretary of Defense (OSD) guidance (17 May 2005) states that joint review should be reflected in a memorandum or letters between the parties at least every five years. Informal annual reviews are mandatory to facilitate adaptive management, during which INRMP goals, objectives, and must fund projects are reviewed, and a realistic schedule established to undertake proposed actions. This written documentation should be jointly executed or in some other way reflect the parties' mutual agreement and summarize the rationale for the conclusions the parties have reached.

The public has an opportunity to comment on initial draft INRMPs and initial draft Revisions.

According to Public Comment On INRMP Reviews Legislative Language Section 2905 of the Sikes Act Improvement Act of 1997 [16 USC 670a note] the Secretary of each military department is required to provide the public an opportunity for the submission of comments on the initial INRMPs prepared pursuant to the new Section 101(a)(2) of the Sikes Act (as amended) [16 USC 670a(a)(2)]. An INRMP is a public document that requires the mutual agreement of the installation, USFWS, and state fish and wildlife agencies; therefore it is crucial that a common understanding be reached regarding which projects contained in a draft INRMP are most likely to be funded under existing policy. The installation shall provide the public with a meaningful opportunity to review and comment upon the initial draft INRMP and initial draft INRMP revision (other than minor technical amendments). Concerning the length of public review, barring extraordinary circumstances, the public should be afforded a minimum of 30 days to review and comment (CNO Guidance April 2006).

There is no legal obligation to invite the public either to review or to comment upon the parties' mutually agreed upon decision to continue implementation of an existing INRMP without revision (DUSD Installations and Environment [I&E] Memorandum, 10 October 2002). If the parties determine that substantial revisions to an INRMP are necessary, public comment shall be invited in conjunction with any required NEPA analysis.

1.10 Integrating Other Plans

This INRMP is fully integrated with the installation planning processes of NSA Monterey, including NEPA documentation, Biological Opinions (BOs), and all existing plans and documents. The DoD policy seeks to ensure that current and planned installation activities (e.g. site development plans, construction requests, site approval requests, host-tenant agreements, and outleases) are effectively coordinated and consistent with activities described in this INRMP.

Integrated Cultural Resource Management Plan

The ICRMP describes cultural resources at the NSA Monterey and the regulatory framework affecting these resources, and prioritizes management objectives and the programs and processes used to accomplish these objectives.

Integrated Pest Management Plan

The NSA Monterey IPMP puts pesticide management within the framework of the DoD and Navy EMS. The IPMP provides the tools and products to include pesticide management in NSA Monterey's overall EMS program.

Stormwater Management Plan

The NSA Monterey Stormwater Management Plan needs to be updated, and should complement the sustainable development, wetlands, and water resource portions of this INRMP.

State Comprehensive Wildlife Plans

The California Wildlife Action Plan (CWAP) (California Wildlife: Conservation Challenges [Bunn et al. 2007]) is a comprehensive state wildlife conservation strategy. The plan can be accessed online at http://www.dfg.ca.gov/wildlife/wap/report.html.

It has two sections that pertain to NSA Monterey: the Central Coast Region, and the Marine Region. For the Central Coast Region, these stressors for wildlife were identified:

- Growth and development
- Intensive agriculture (such as vineyards)
- Excessive livestock grazing
- Water management conflicts and degradation of aquatic ecosystems
- Recreational pressures
- Invasive species

The CWAP identifies the northern portion of Santa Cruz County as largely protected by 1996 General Plan restrictions, Local Coastal Plans, and State Parks and University of California management, and southern Santa Cruz County as built out to the maximum extent possible. As a result, strong development pressures are focused on the open space areas between the Santa Cruz-Monterey County line and the protected Big Sur coastline south of Yankee Point. It recommends a careful update of the Monterey General Plan for conservation concerns in the face of development pressures.

The CWAP focuses on conservation of increasingly rare maritime chaparral and Monterey pine forest habitats, valley oak woodlands, coastal dune and grassland habitats of the endemic Smith's blue butterfly (*Euphilotes enoptes smithi*), and aquatic habitats supporting the California red-legged frog (*Rana draytonii*). It identified a number of management focus species for the region.

This recommendation was made for military installations in the region:

> "Renew and continue to implement adequately protective INRMPs on military installations. Currently, all of the Central Coast's installations currently have INRMPs approved or under review by the CDFW and USFWS. State and federal wildlife agencies should continue to work with military installations to set goals for wildlife populations and habitats on military lands, update and implement INRMPs that will achieve those goals, and measure accomplishments."

These recommendations are made for federal agencies such as NSA Monterey:

- Federal, state, and local agencies, along with nongovernmental conservation organizations, should work to protect large, relatively unfragmented habitat areas, wildlife corridors, and underprotected ecological community types.
- Federal, state, and local public agencies should sufficiently protect sensitive species and important wildlife habitats on their lands.
- Federal, state, and local agencies should work to restore fish passage in aquatic systems important for anadromous and wide-ranging fish populations.
- State and federal agencies should work to protect and restore biologically significant regional river systems.
- Federal, state, and local agencies should provide greater resources and coordinate efforts to control existing occurrences of invasive species and prevent new introductions.

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2.0 Military and Other Uses of Land and Natural Resources

This Chapter describes both past and current use of natural resources on NSA Monterey. Together with Chapter 3, which describes the natural resources themselves, a picture of the current condition of NSA Monterey is provided. Based on an analysis of these base conditions, management strategies are developed in Chapter 4 and Chapter 5.

2.1 Installation Overview

This chapter describes the operations, facilities, services, and other land uses at all NSA Monterey properties that support the installation's military mission and ongoing activities. In addition, the following descriptions include recreational uses and access. Together, they provide a picture of day-to-day use and capabilities of the installation properties, as well as the foundation for discussing management strategies to achieve sustainability and compatible use in Chapter 6.

Regional Land Use

A focus on regional land use provides insight into neighboring land uses including potential encroachment issues that may need to be addressed, as well as any opportunities to collaborate with neighbors to improve both support for NSA Monterey's mission and the management of both developed and natural resources at each property.

Operations and Facilities

The Operations and Facilities section provides an overall description of activities and land uses at each of the NSA Monterey properties that support the military mission. As a part of this, there is a brief description of those services and utilities whose provision or maintenance directly or indirectly overlaps and/or impacts natural resources on the installation, for example, fire protection, water supply, sanitary and wastewater disposal, stormwater runoff, electricity and natural gas, and solid waste.

Landscaping

This section describes the nature of landscaping at each property and its location. Non-landscaped vegetation communities present at each property are discussed in detail in Chapter 3. In addition, any resource management areas that exist are identified in this section.

Installation Restoration Sites

This section provides information on what Installation Restoration (IR) Sites exist at each property, if any. Sites may be identified for potential environmental cleanup pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 or the Resource Conservation and Recovery Act (RCRA) of 1976.

Real Estate Leases

Real estate agreements at NSA Monterey consist of properties leased for continual use by lessees (such as La Mesa Housing, NPMOSSP Mountain View), utility corridors, and other easements. Easements and utility corridors are established to allow passage through NSA Monterey properties or other access for maintenance purposes. In some cases NSA Monterey benefits from easements from third parties; for example, in the case of Point Sur, where an easement from an adjacent ranch permits the installation access to the ocean from the Navy-owned facility there. NSA Monterey leases the CIRPAS Marina Airport Facility from the city of Marina. Refer to Appendix C for the complete list of ingrants and outgrants and other relevant documents for NSA Monterey.

Responsibilities for management of natural resources on outgrant and easement properties at NSA Monterey vary and are often specific to the outgrant or easement.

Public Access and Recreation

The Sikes Act (as amended) requires that INRMPs provide for sustainable public use of natural resources to the extent that the use is consistent with both the needs of fish and wildlife resources and the military mission. The purpose of this section is to describe (a) what measures may allow the public to access Navy property and use natural resources for recreational or commercial purposes, and (b) what recreational opportunities are available to the general public and for personnel stationed at any of NSA Monterey's properties.

Combining operations, facilities and land use information, Table 2-1 provides an overview of facility and land uses at each of the NSA Monterey properties.

Historic Land Use

This section includes a discussion of land use during the European Settlement period for relevant properties and historic Navy use for each of the properties.

Table 2-1. Overview of operations and land use at Naval Support Activity Monterey.

Facility/Land Use	Main Grounds	Lab/Rec Area	Annex	La Mesa Village	CIRPAS Marina Airport Facility	Dune/Res Area	Point Sur Facility	NIROP Santa Cruz	NPMOSSP Mountain View
Academic	X	X							
Administrative	X								
Housing	X			X					
Public Works	X			X					
Personnel Support	X		X	X					
Open Space	X	X	X	X		X	X	X	
Recreation	X	X	X	X		X			
Landscaping & Water	X	X	X	X	X				X
Research/Laborato-ries/Operations	X	X	X		X	X	X	X	X
Sensitive Species/Habitats	X	X	X	X		X	X	X	

Historical Overview of Land Use

A broad discussion of Native American use of natural resources and land use during the early European Settlement period in the Monterey Bay and Santa Cruz Mountains region is provided.

Overview of Government Regulatory Context of Natural Resource Management

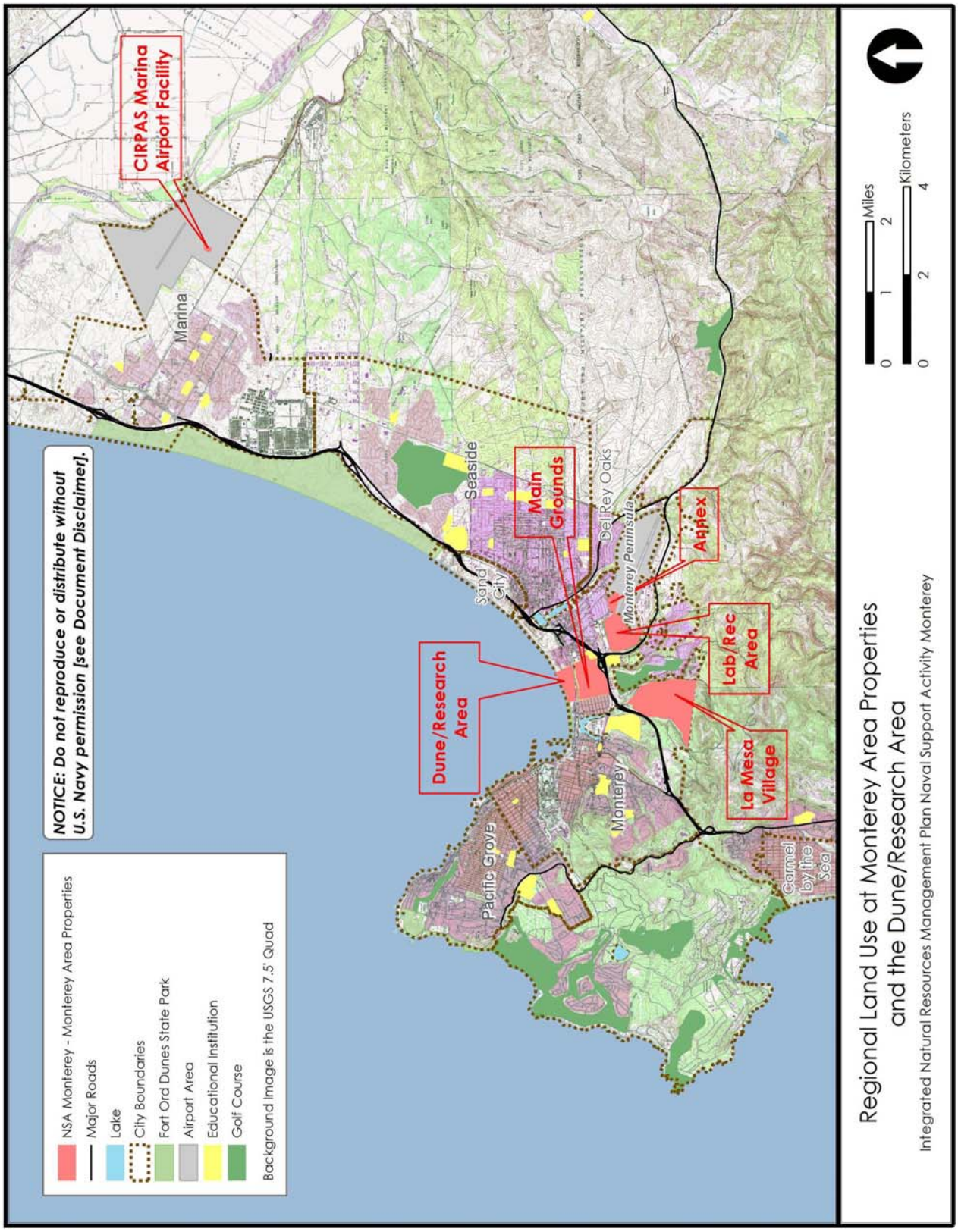
Important natural and cultural resources laws are presented that may influence facility and land management at NSA Monterey properties as they intersect with such resources.

2.2 Monterey Area Properties

The Monterey Area Properties are herein defined as Main Grounds, Laboratory/Recreation Area, Annex, La Mesa Village, and the CIRPAS Marina Airport Facility. The population of Monterey County continues to grow; the 2010 population of Monterey County was 415,057 (U.S. Census Bureau 2011b).

2.2.1 Regional Land Use

The Monterey Area Properties are located in the city of Monterey and within the vicinity of Pacific Grove, Del Rey Oaks, Sand City, Seaside, and Carmel by the Sea; all of which are located in Monterey County. Map 2-1 provides an overview of the regional land use adjacent to these properties.



Map 2-1. Regional land uses at the Monterey Area Properties and Center for Interdisciplinary Remotely-Piloted Aircraft Studies Marina Airport Facility.

All of these properties are surrounded by the amenities of the Monterey Bay metropolitan region which include, but are not limited to, tourism destinations, urban, commercial and residential development, recreational areas, and designated open space. The most notable tourism destinations are located within downtown Monterey and include Cannery Row, the Monterey Bay Aquarium, and the Presidio of Monterey. The urbanized commercial and residential development within the Monterey area supports primary and secondary schools in addition to post-secondary schools such as the Monterey Peninsula College and California State University Monterey Bay (CSUMB). The Monterey Municipal Airport is also located adjacent to several of the Monterey Area Properties. Recreational areas within the vicinity of the Monterey Area Properties include the Del Monte Golf Course and the Monterey County Fairgrounds. Designated open space areas are either administered by a municipality or the state and include Veterans Memorial Park, Quarry Park, Iris Greenbelt, El Estero Park, Work Memorial Park, Washington Park, Rip Van Winkle Open Space, Laguna Grande Regional Park, Jacks Peak County Park, Asilomar State Beach, Monterey State Beach, and Fort Ord Dunes State Park.

Notable tourism destinations are located within downtown Monterey and include Cannery Row, the Monterey Bay Aquarium, and the Presidio of Monterey.

CIRPAS Marina Airport Facility

The Marina Municipal Airport is located within the city of Marina. Nearby cities include Moss Landing, Castroville, Salinas, Seaside, and Monterey. Adjacent to the airport is the former Fort Ord Army Post, now occupied by CSUMB, California State Parks (CSP), and various smaller entities. Designated open spaces within the city of Marina are administered by the federal government, state, and municipality and include Salinas River National Wildlife Refuge, Fort Ord Dunes State Park, Marina State Park, Marina State Beach, Zmudowski Beach State Park, Marina City Park, Vince Dimaggio Park, Glorya Jean Tate Park, and the Marina Dunes Open Space Preserve. The Salinas River is located to the east of the airport. The predominant land use east of the Salinas River is agriculture. Refer to Map 2-2.

The CIRPAS Marina Airport Facility is a large hanger leased from the city of Marina about ten miles north of the NPS.

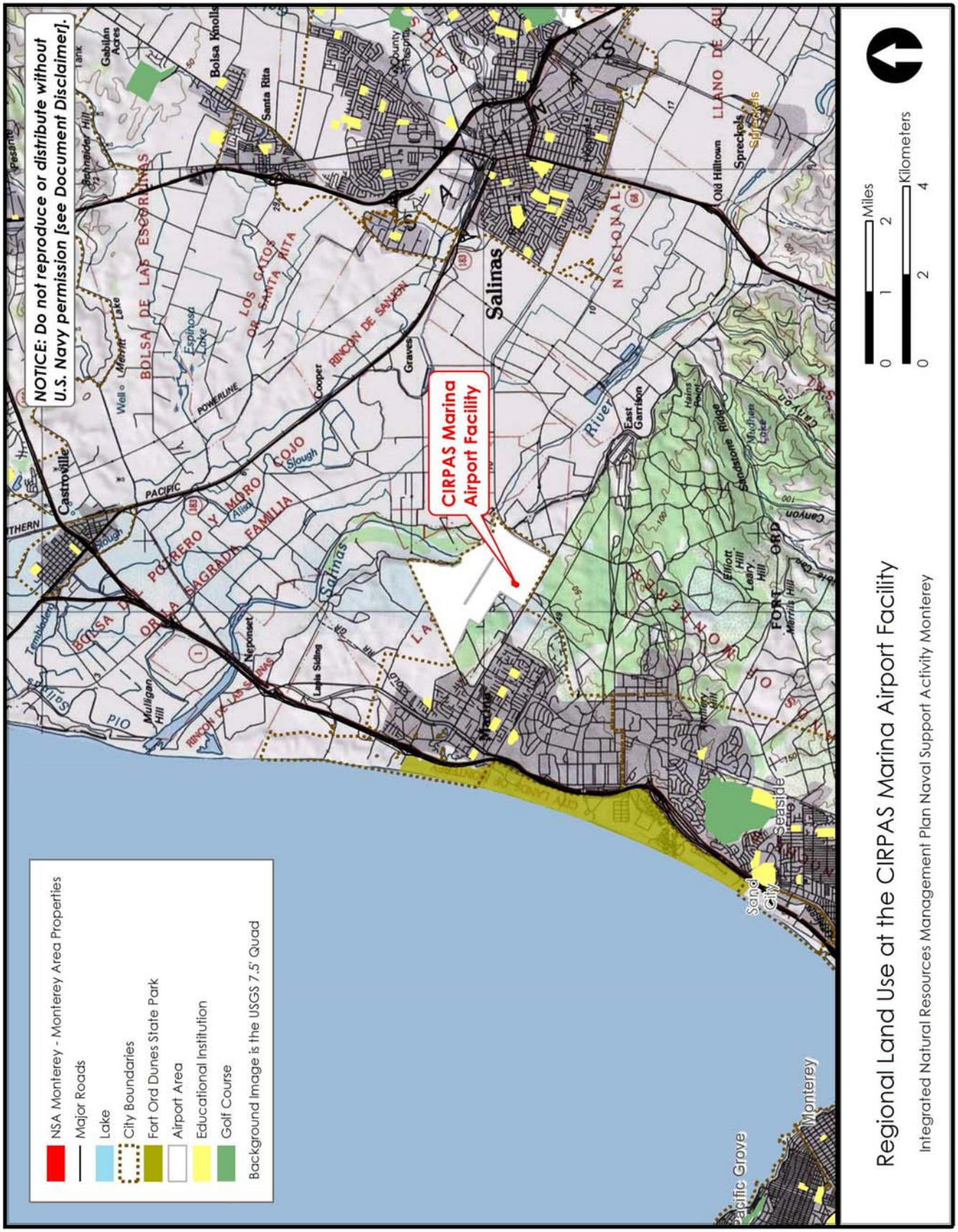
2.2.2 Operations and Facilities

Main Grounds

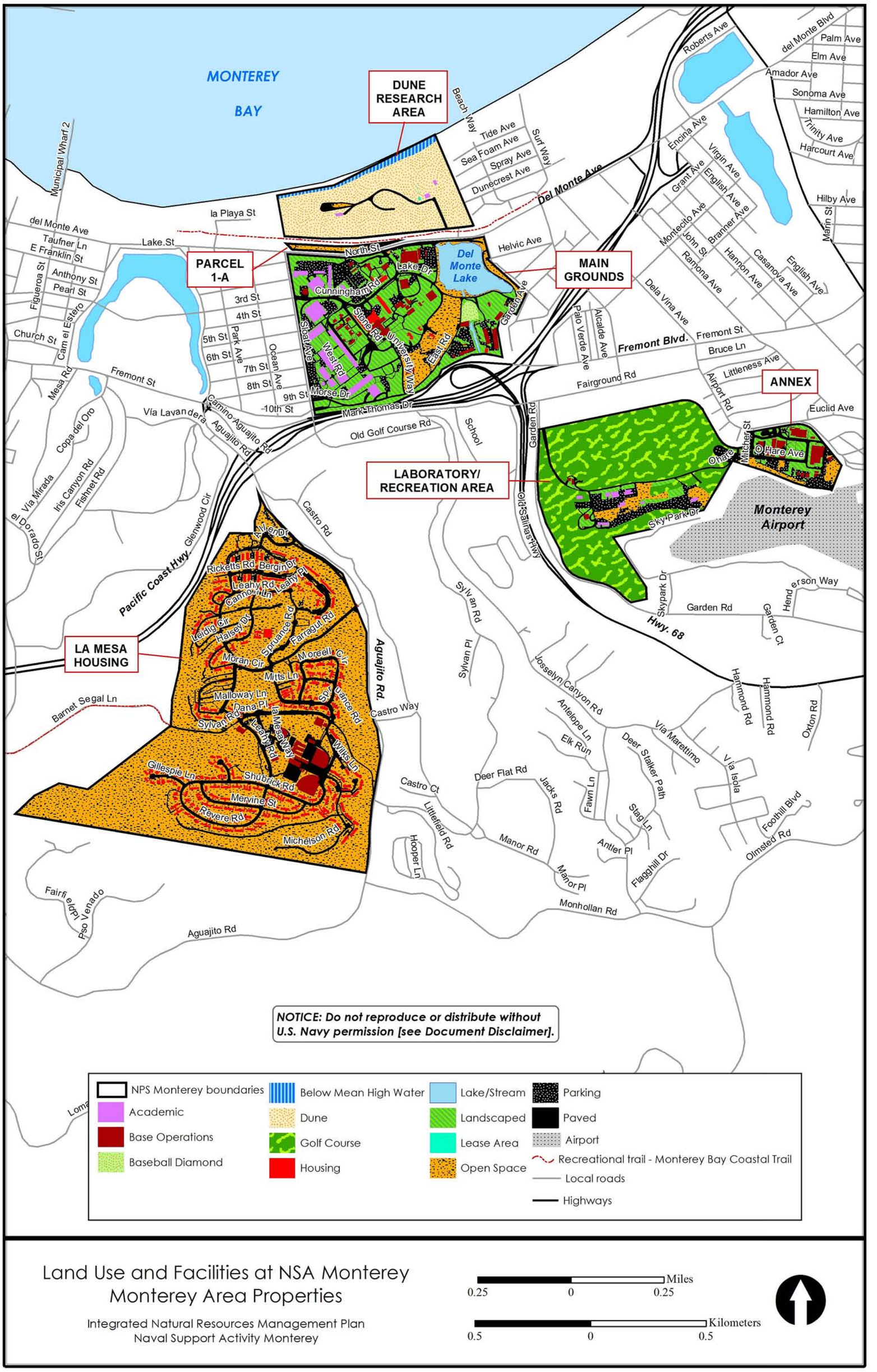
The NPS is the primary tenant on the Main Grounds of NSA Monterey. The NPS is an academic and research institution with emphasis on study and research programs relevant to the Navy's interests, as well as the interests of other arms of the DoD. The programs are designed to accommodate the unique requirements of the military.

The NPS administers graduate education programs for 1,700 officers from all branches of the U.S. military and foreign militaries, federal, state and local government employees, and some civilian students. Additionally, 700 faculty and 500 administrative and support personnel work at NPS. Spaces here are used primarily for classrooms, offices, computer operation, and various research programs. Refer to Map 2-3.

The NPS enrolls about 1,700 students.



Map 2-2. Regional land use at the Center for Interdisciplinary Remotely-Piloted Aircraft Studies Marina Airport Facility.



Land Use and Facilities at NSA Monterey
Monterey Area Properties

Integrated Natural Resources Management Plan
Naval Support Activity Monterey

0.25 0 0.25 Miles

0.5 0 0.5 Kilometers

Map 2-3 Monterey area properties facilities map. *Naval Support Activity Monterey Integrated Natural Resources Management Plan*

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The Main Grounds is the functional centerpiece of NSA Monterey and the majority of NSA Monterey staff are headquartered there. Facilities include classrooms, laboratories, administrative offices, PWD offices and shops, a Navy Exchange store and service station, fitness center, softball fields, U.S. Post Office, food services, Del Monte Lake, and several historic gardens (Photo 2-1). Headquarters functions are centralized in the former Hotel Del Monte and adjacent historic vacation cottages, now known as Herrmann Hall and the enclave. This area, combined with the Roman plunge pool, solarium and some garden areas, comprises a historic district that is eligible for listing in the National Register of Historic Places (NRHP). Today most of Herrmann Hall, including the east and west wings, is used as a Navy Gateway hotel. Several small tenant commands also use spaces in Herrmann Hall, including the NPS Foundation and Defense Language Institute English as a Second Language courses. Three historic Hotel Del Monte vacation cottages to the east of Herrmann Hall are managed by Pinnacle Corp. as senior officer housing. Most of the NPS academic facilities are on the western half of the Main Grounds and include a library and several large auditoriums. The southwest corner of the Main Grounds is an area historically known as the Engineering School Quadrangle, which is also eligible for inclusion in the NRHP as a district.

The NPS is located at the historically significant Hotel Del Monte.

Photo 2-1. Main Grounds, Arizona Garden.

The Main Grounds are bound by Sloat Avenue to the west, Del Monte Avenue to the north, Palo Verde to the east, and California Highway 1 and Garden Avenue to the south. Several streets permit internal traffic circulation within the Main Grounds property and these include: North Street, Butler Road, Cunningham Road, Lake Drive, Garden Drive, West Road, East Road, Stone Road, Menneken Circle, South Road, Morse Drive, and University Way.

Laboratory/Recreation Area

The Laboratory/Recreation Area is dominated by the Monterey Pines Golf Course, which hosts both military and civilian guests.

The majority of this multi-use property is landscaped and supports an 18-hole golf course with water traps and a driving range, all open to the public. Facilities associated with the golf course include a pro shop, clubhouse, and snack bar. There is also a 38-site recreational vehicle (RV) park with a sewage dump station and small vehicle storage lot.

The NPS Aeronautics and Astronautics Department has facilities on this property that are used for laboratory shop activities and testing. The NPS Physics Department has several smaller research laboratories on the property.

The Laboratory/Recreation Area is located approximately one mile southeast of the Main Grounds. The Laboratory/Recreation Area is bounded by the Monterey County Fairgrounds to the north, Airport Road to the northeast, the Monterey Peninsula Airport to the east, Sky Park Drive to the southeast, and Garden Road to the southwest and west. Michael J. Smith Lane permits internal traffic circulation within the Laboratory/Recreation Area property. Refer to Map 2-3.

Annex

The Annex houses research laboratories dedicated to atmospheric and meteorological science.

The Annex houses three distinct operations, all focused on atmospheric study and forecasting (as described in Section 1.4):

- The FNMOC provides worldwide meteorology and oceanography support to U.S. and coalition forces from their 24/7 operations center. Most spaces are used for offices or computer equipment and the facility includes a diesel generator and uninterruptable power supply for the supercomputer center.
- The NOAA National Weather Service Regional Office is composed of a 24/7 operations floor and associated computer and communications equipment that occupy a building leased from FNMOC.
- Naval Research Laboratory Marine Sciences Division is a research and development office composed primarily of office and computer spaces.

PWD buildings in the southeast portion of the Annex are used for storage and utility support.

Land at the Annex was formerly used as a Naval Auxiliary Landing Field. It is located adjacent to the Laboratory/Recreation Area on the northwest corner of the active runway of the Monterey Peninsula Airport. The Annex is bounded by Euclid Avenue to the north, Aviation Lane and Airport Road to the east, the Monterey Peninsula Airport to the south, and the Laboratory/Recreation Area to the west. Several streets permit internal traffic circulation within the Annex property and include O'Hare Avenue and Halsey Avenue. Refer to Map 2-3.

Other tenant groups that use the Monterey Area Properties include the Defense Investigative Service, Defense Resources Management Institute, Defense Institute for Training Resources Analysis, Fleet Industrial Supply Center San Diego Detachment Monterey, Center for Information Dominance Detachment Monterey, Naval Branch Dental Clinic, NAVFAC Monterey, and Training and Doctrine Analysis Command.

La Mesa Village

La Mesa Village is a military housing development leased to the Army.

La Mesa Village provides housing for military personnel and families. It is leased to the Army and is managed by Pinnacle under a public/private venture agreement with the Army. In La Mesa Village, NSA Monterey maintains responsibility for the Fleet and Family Service Center, Navy Lodge, child development center, and teen center.

La Mesa Village is located one mile south of the Main Grounds, across Highway 1. The property bound by Highway 1 to the northwest and Aguajito Road to the northeast and east. Ingress and egress to the La Mesa Village Housing Area is permitted from the east via Sylvan Road to Aguajito Road, from the west via Pacific Coast Highway 1, or from the northeast via Allen Drive to Aguajito Road. Several streets permit internal traffic circulation within the La Mesa Village Housing Area property and include: Allen Drive, Bergin Drive, Leahy Road, Halsey Drive, Spruance Road, Ledidig Circle, Farragut Road, Moran Circle, Moreell Circle, Fechteler Drive, Mallow Way Road, Dana Place, Sylvan Road, Shubrick Road, Biddle Road, Mervine Street, Gillespie Lane, Revere Road, and Michelson Road. Refer to Map 2-2.

CIRPAS Marina Airport Facility

The CIRPAS Marina Airport Facility maintains and operates aircraft to support atmospheric and oceanographic measurements.

The CIRPAS Marina Airport Facility is currently based at Marina Municipal Airport Hangar 507 (Photo 2-2). It is a partnership program between NPS and the California Institute of Technology that employs both manned and unmanned aircraft to support atmospheric and oceanographic measurements. The 10,000 square foot facility includes a machine shop, electronics room, calibration lab, offices, and storage areas. Refer to Map 1-3 in Chapter 1 for the layout of facilities at the CIRPAS Marina Airport Facility property.

The CIRPAS Marina Airport Facility is accessed from Imjin Road via Reservation Road (Monterey County Road G17). The facility is bounded by Blanco Road to the southeast, Reservation Road to the southwest, and Imjin Road to the northwest.

Photo 2-2. Airfield use area at Marina.

2.2.2.1 Services and Utilities

Fire Protection

Through an April 2004 Memorandum of Understanding (MOU) between the city of Monterey and the Navy all fire related services are provided by the city of Monterey.

Water Supply

Potable water is provided by the California-American Water Company and is supplied to every building via an underground network. The distribution system is owned and maintained by NSA Monterey. The central steam plant is located in one of the PWD facilities and supplies domestic hot water to the school.

Water from Del Monte Lake is used for irrigation of the Main Grounds.

Irrigation water for the Main Grounds is provided by Del Monte Lake. Water from the lake is pumped and filtered at the pump house adjacent to the lake; NSA Monterey pays for only pumping costs and periodic pump and filter maintenance. About half the base has modern irrigation systems installed that are controlled remotely by the PWD Facilities Maintenance Contracts Division. Remaining areas have manually operated systems or are irrigated with movable hoses. These areas will have remotely controlled modern irrigation systems installed when other renovations make changes in the area necessary. Areas that do not have remotely controlled irrigation tend to be overwatered, sometimes for hours at a time.

Irrigation water for the golf course at the Laboratory/Recreation Area is provided by three wells located there, with supplemental water being purchased from the nearby Monterey County Fair Grounds as needed. NSA Monterey has drilled a well at the Annex and installed some non-potable irrigation lines on the property and is in the process of evaluating this water quality and testing the 500,000 gallon storage tank for soundness. In the meantime, irrigation water for this property is provided by the California-American Water Company. Original irrigation systems at the Annex are in poor condition (DeLorenzo Inc. 2007).

The limited vegetation and landscaping at the CIRPAS Marina Airport Facility is not irrigated, but rather rain-fed.

NSA Monterey retains landscape maintenance responsibilities for a small portion of the La Mesa Village common areas. These are irrigated using California-American Water Company water and older, manually operated irrigation systems.

Sanitary Wastewater Disposal

The Monterey Regional Water Pollution Control Agency provides sewage services.

Stormwater Runoff

Stormwater that drains onto the Main Grounds from its southern boundary provides a majority of the water that enters Del Monte Lake.

Stormwater runoff from the Main Grounds flows into both Del Monte Lake via storm drains, bioswales, and a small intermittent creek to the south of the lake, and also into Lake El Estero via the Sloat Avenue storm drain system. There is also a storm drainage culvert that comes onto the base from the south and runs into a catchment basin before flowing into Del Monte Lake.

Runoff from the Laboratory/Recreation Area ends up in Del Monte Lake. Discharges from the Annex are transported into Roberts Lake in Seaside via the Monterey Storm drain system.

Run off from La Mesa Village discharges into Monterey Bay via Lake El Estero. It reaches the lake via surface drainage features.

NSA Monterey has a valid stormwater permit. In 2003, it also submitted a small MS4 National Pollutant Discharge Elimination System (NPDES) permit application but it has not been approved yet.

Electricity and Natural Gas

PG&E provides electricity and natural gas service to the Monterey Area Properties.

Solid Waste

The city of Monterey is contracted to collect solid waste from the Monterey Area Properties.

2.2.3 Other Land Uses

2.2.3.1 Landscaping

Landscaping is a common feature at the Monterey Area Properties, including the Main Grounds, Laboratory/Recreation Area, Annex, and La Mesa Village. Landscaping provides important functions to support the missions, historical significance, and continued use of these properties (Refer to Appendix D: Grounds Maintenance Maps).

Main Grounds

Robert Ulrich, the landscape architect for the Main Grounds chose a naturalistic style. He drew heavily from the the British designer Capability Brown, known for his naturalistic designs that countered 18th century formalistic design.

The Main Grounds of NSA Monterey are located on the historical site of Hotel del Monte, built in 1879 as a premier resort. The extensive grounds took advantage of the natural hydrology of the site, which produced a large marshy area at the low point of the property. Robert Ulrich, the landscape architect for the hotel, transformed the marsh and gently sloping natural landscape into a series of pleasure gardens, with Del Monte Lake and its mechanically driven fountains as a primary focal point. The entire design was European in style and thus incorporated the dominating influence of Capability Brown, the renowned British landscape designer. Brown was known for his naturalistic designs that countered 18th century formalistic design. His gardens featured long alleys, themed gardens hidden from view by hedges, and the incorporation of artificial ruins, water, and extensive lawns. These gardens were supported by the gentle and damp climate of the British Isles, though they also relied on abundant, cheap labor for maintenance. Late 19th and early 20th century estates and hotel resorts in California were designed in a similar fashion, but had to rely on irrigation to maintain the British, pastoral look of the landscape of extensive lawns and lush plantings in general. Ulrich's early gardens at the Hotel del Monte were reliant on the site's natural water supply to maintain, which for California was an unnatural landscape. Neverthe-

less, Capability Brown's ideas dominated much of landscape architecture during this historical period of development in coastal California and many other locales, despite the differences in climate and rainfall between Britain and much of North America.

Remnants of Ulrich's design for the hotel grounds persisted into the 1940s, when the U.S. Navy became the owners of the property. These remnants were maintained with varying degrees of attention, but even today, certain features persist, such as the Arizona Garden and Del Monte Lake. Extensive lawns still dominate the historical gardens. Many trees and shrubs planted during the hotel days remain as heritage elements of today's gardens.

Today, vegetation predominantly consists of well-maintained landscaped lawns of introduced grasses such as Kentucky blue grass (*Poa pratensis*) and Bermuda grass (*Cynodon dactylon*), and mature native and non-native trees. Groundcover includes periwinkle (*Vinca minor*), ice plant (*Carpobrotus edulis*), Carmel creeper (*Ceanothus griseus horizontalis*), creeping St. John's wort (*Hypericium anagalloides*), and English ivy (*Hedera helix*) (NAVFAC Western Division [WESTDIV] 1993). Landscaped areas are interspersed with narrow belts of native coast live oak (*Quercus agrifolia*), Monterey pine (*Pinus radiata*), and Monterey cypress (*Cupressus macrocarpa*), with coast live oak as the most abundant tree species.

Native and drought tolerant plants are used for landscaping near new buildings at the Main Grounds.

New buildings at the Main Grounds are landscaped with native and drought tolerant plants, including California lilac (*Ceanothus* sp.), sage (*Salvia* sp.), tree mallow (*Lavatera* sp.), manzanita (*Arctostaphylos* sp.), and rockrose (*Cistus* sp.). Organic wood mulches such as tree prunings that are chipped on site and commercial bark mulch are used extensively in outlying areas such as parking lot islands and the Main Grounds perimeter (DeLorenzo Inc. 2007).

Tree plantings originally included approximately 1,200 individuals. Of 104 different tree species, the ten most common are: coast live oak, Monterey pine, Monterey cypress, blackwood acacia (*Acacia melanoxylon*), blue gum eucalyptus (*Eucalyptus globulus*), silver wattle (*Acacia baileyana*), eucalyptus (*Eucalyptus* sp.), redwood (*Sequoia sempervirens*), Sydney golden acacia (*Acacia longifolia*), and Chinese holly (*Ilex cornuta*) (HortScience Inc. 1991). The introduced species have fared well under local climatic conditions (Matheny and Clark 1991).

Del Monte Lake is also a landscaped feature (Photo 2-3). Originally a marsh called Lake Como, it was expanded to become a 15-acre lake with one large island and several smaller ones. Subsequent names for the lake included Laguna del Suenos and Laguna del Rey. Ornamental trees (oaks, willows, dracaenas, pampas grass, agaves, and palms) and flowering shrubs were planted around its edges, near the boat landing and along pathways to the lake. A rock garden was also created nearby. Water lilies, such as the Amazon water-lily (*Victoria amazonica*), floated on the lake's surface.

Photo 2-3. Del Monte Lake.

The lake currently covers ten acres and supports riparian and wetland vegetation on its edges (refer to Chapter 3 for more detail). Stormwater runoff and natural seepage from local springs collect in the lake and are used to irrigate the Main Grounds (DeLorenzo Inc. 2007).

Laboratory/Recreation Area

Landscaping in the Laboratory/Recreation Area primarily consists of a golf course with the associated monoculture of grass and related shrub and tree plantings. This area may have at one time supported maritime chaparral vegetation (Navy 2001; Greening Associates 1999). The RV park in this area has some landscaped trees as well.

Annex

Buildings at the Annex are landscaped with drought tolerant plants.

The Annex is densely developed with some individual coast live oaks scattered throughout. Buildings there are generally well landscaped with drought tolerant plants. Shrub beds to the north screen the site from adjacent residential properties and are also planted with drought tolerant plants. Spark's Park and the area south of O'Hare Avenue (and east of parking lot 6) are two large turf areas at the Annex. Spark's Park is used for ceremonies and special events as well as sports and physical fitness. There is a narrow strip of native remnant central maritime chaparral (Greening Associates 1999) along the southern boundary adjacent to the Monterey Peninsula Airport (Refer to Chapter 3).

La Mesa Village

The residential areas of La Mesa Village have lawns, shrubs, and trees typical of suburban areas in the region. This property also contains a significant portion of remnant natural vegetation including Monterey pine and coast live oak (Refer to Chapter 3).

The areas NSA Monterey is currently responsible for include turf play areas and drought tolerant landscaping.

CIRPAS Marina Airport Facility

The CIRPAS Marina Airport Facility has a few trees and some ground cover located immediately adjacent the building and in the parking lot (Photo 2-4). Other vegetation is generally disturbed or weedy with low cover of native species.

Photo 2-4. Remotely Piloted Aircraft Studies Marina Airport facility.

2.2.3.2 Installation Restoration Sites

There are no IR Sites present at the Monterey Area Properties.

2.2.3.3 Real Estate Leases and Outgrants

A table of real estate outgrants and easements, as well as relevant real estate documents at the Monterey Area Properties are provided in Appendix C.

Main Grounds

At the Main Grounds there is an outfall from Del Monte Lake that passes under the sewage treatment plant that is owned by the city of Monterey. Previously, NSA Monterey was responsible for managing the outfall to ensure flood control measures. The city constructed a new outfall and now manages it.

La Mesa Village

La Mesa Village is managed by the Pinnacle Corporation, under a public/private venture agreement with the Army.

The housing area in La Mesa Village is leased to the Army under a Host-Tenant agreement. It is managed by Pinnacle under a public/private venture agreement with the Army. The only areas of La Mesa Village that NSA Monterey remains responsible for are the Fleet and Family Service Center, Navy Exchange mini-mart, Navy Lodge, child development center, and teen center. NSA Monterey does not currently regulate environmental review of actions and activities at the housing area. Instead, that area is required to use the Presidio INRMP for environmental guidelines and review of projects.

CIRPAS Marina Airport Facility

The NPS leases the hangar and surrounding property that constitutes the CIRPAS Marina Airport Facility from the city of Marina. The ED is responsible for environmental issues on the property including natural resources, stormwater, hazardous materials, and spill response. All operations are conducted on property owned by the city of Marina. There is no requirement for a Bird/Animal Aircraft Strike Hazard (BASH) program.

2.2.3.4 Public Access and Recreation

Public access varies depending on the property and special events. Recreational users at the Monterey Area Properties include students, faculty, civilian employees, family members, and the public.

Refer to Map 2-3 for the location of recreation areas on the Monterey Area Properties.

Main Grounds

Recreational facilities at the NPS are managed and operated by the MWR.

Personnel support facilities are dispersed throughout the Main Grounds and mostly include community services and recreation functions. The fitness center, bathhouse, tennis courts, and Navy Exchange facilities are located just northeast of Herrmann Hall. Additional tennis courts are located in the southern portion of the campus. A softball field is located in the eastern portion of the campus just south of Del Monte Lake. Developed recreational facilities are managed and operated by the Morale, Welfare and Recreation Program (MWR). The Main Grounds also has a trail system along some edges of the property.

Del Monte Lake, located in the northeast corner of the Main Grounds, encompasses about ten surface acres and is populated with bluegill sunfish (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*). However, there is currently no recreation fishing program at Del Monte Lake. The lake is surrounded by a pedestrian/jogging trail (which connects to a larger trail system on the Main Grounds) with a bridle path through the wetland area nearby, picnic areas, and par course stations (Photo 2-5).

Security requirements prohibit public access to certain buildings or computer areas. There is no public access to recreational facilities at the Main Grounds; access is only granted to base personnel, family members, and sponsored visitors.

The public is welcomed to the Main Grounds during special events such as Memorial Day and Labor Day activities and concerts and NPS International Day. Volunteer groups are granted access to maintain the historic gardens; for example, the local succulent society that maintains the Arizona garden. The NSA Monterey base historian conducts tours of the campus on a by-request basis. Other groups and individuals are permitted on the installation for project-specific programming on a case-by-case basis.

Photo 2-5. Main Grounds trail around Del Monte Lake.

Laboratory/Recreation Area

The majority of this property is landscaped and supports an 18-hole golf course with water traps and a driving range, which is managed by MWR. Facilities associated with the golf course include a proshop, clubhouse, and snack bar. There is an RV park in the center of the property with a shower house and laundry facility. NSA Monterey has set a goal to take part in the Audubon Cooperative Sanctuary Program for Golf Courses (Audubon International 2012).

The golf course is open to the public while the RV park is open only to military and government personnel and sponsored family members.

Annex

The Annex has a small exercise facility. There is no public access to this facility.

La Mesa Village

Personnel support facilities for which NSA Monterey is responsible include the child care center, teen center, Navy Exchange mini-mart, and Fleet and Family Support Center. Pinnacle Corp manages a community center and swimming pool for residents only. None of these facilities is open to the public.

Much of the area surrounding the housing units is steeply sloped and covered with mixed stands of Monterey pine and coast live oak. There are several recreation trails through this area.

CIRPAS Marina Airport Facility

There is no public access to the CIRPAS Marina Airport Facility. There are no recreational facilities at the property.

2.2.4 Historical Overview of Land Use

2.2.4.1 Early European Settlement - Period Between 1770-1900

In 1602, Sebastián Vizcaíno, came ashore at Monterey Bay, naming the peninsula after the viceroy of New Spain, Condé de Monterey.

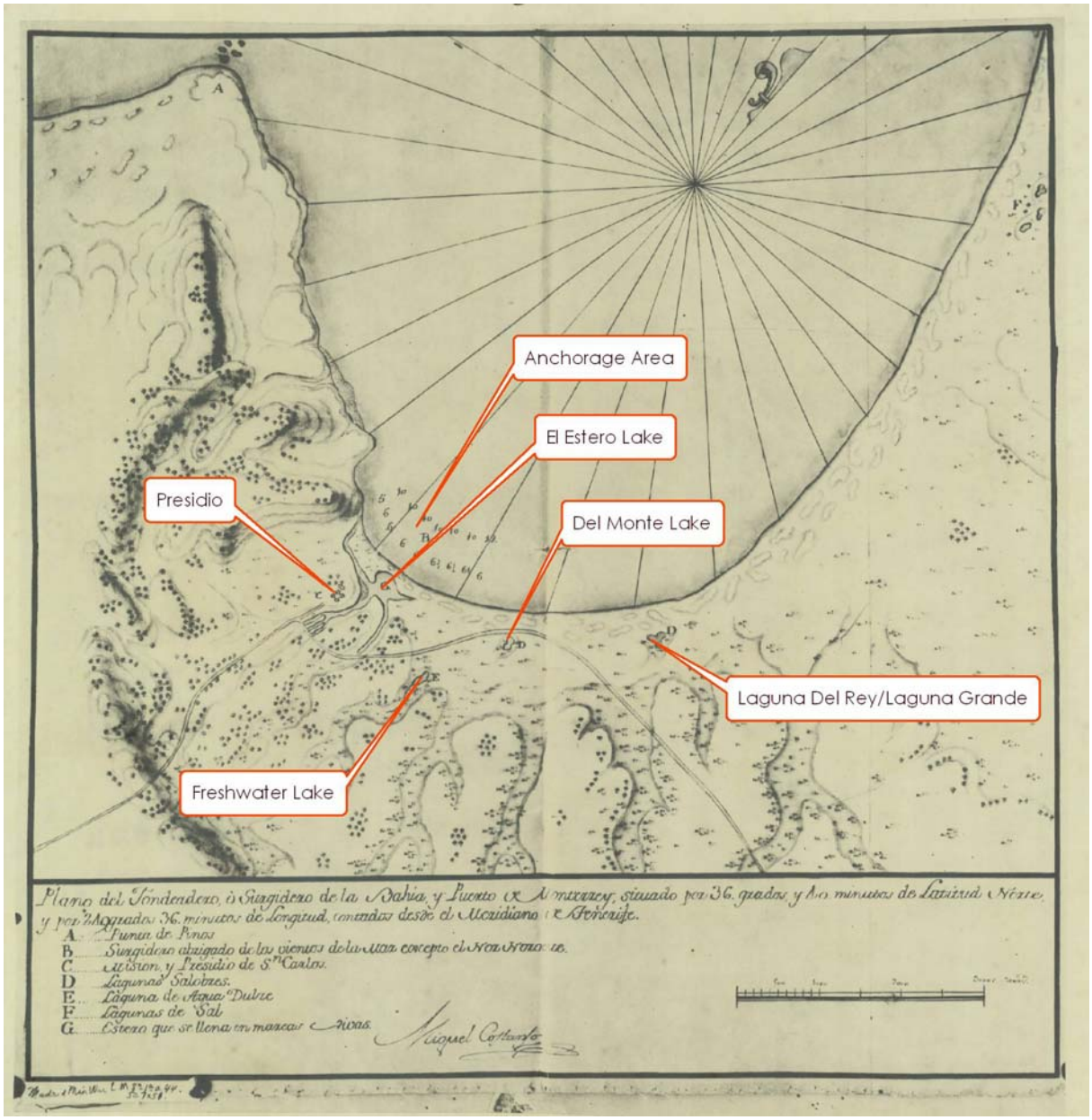
In 1602, Sebastián Vizcaíno, following the route traveled by Juan Rodriguez Cabrillo sixty years before, came ashore at Monterey Bay, naming the peninsula after Condé de Monterey, the viceroy of New Spain and sponsor of Vizcaíno's expedition (Walton 2001; Shillinglaw 2006). Europeans would not return to the Monterey peninsula until 1770, with the arrival of Father Junipero Serra and Captain Gaspar de Portolà, who made Monterey the headquarters of Spain's frontier colony and the Franciscan mission system (Walton 2001; Shillinglaw 2006). The Mission and Presidio of San Carlos de Borromeo de Monterey and the city of Monterey were founded the same year. A few years later Spain named Monterey the capital of Baja and Alta California and the city became an important node in the fur trade (Navy 2001, 2001b). Refer to Map 2-4 for a Spanish period map that depicts the safe anchorages off Monterey harbor, and identifies the water body that is now Del Monte Lake as a brackish lagoon or *laguna salobre*.

From 1777-1846, Monterey was the capital of both Baja and Alta California.

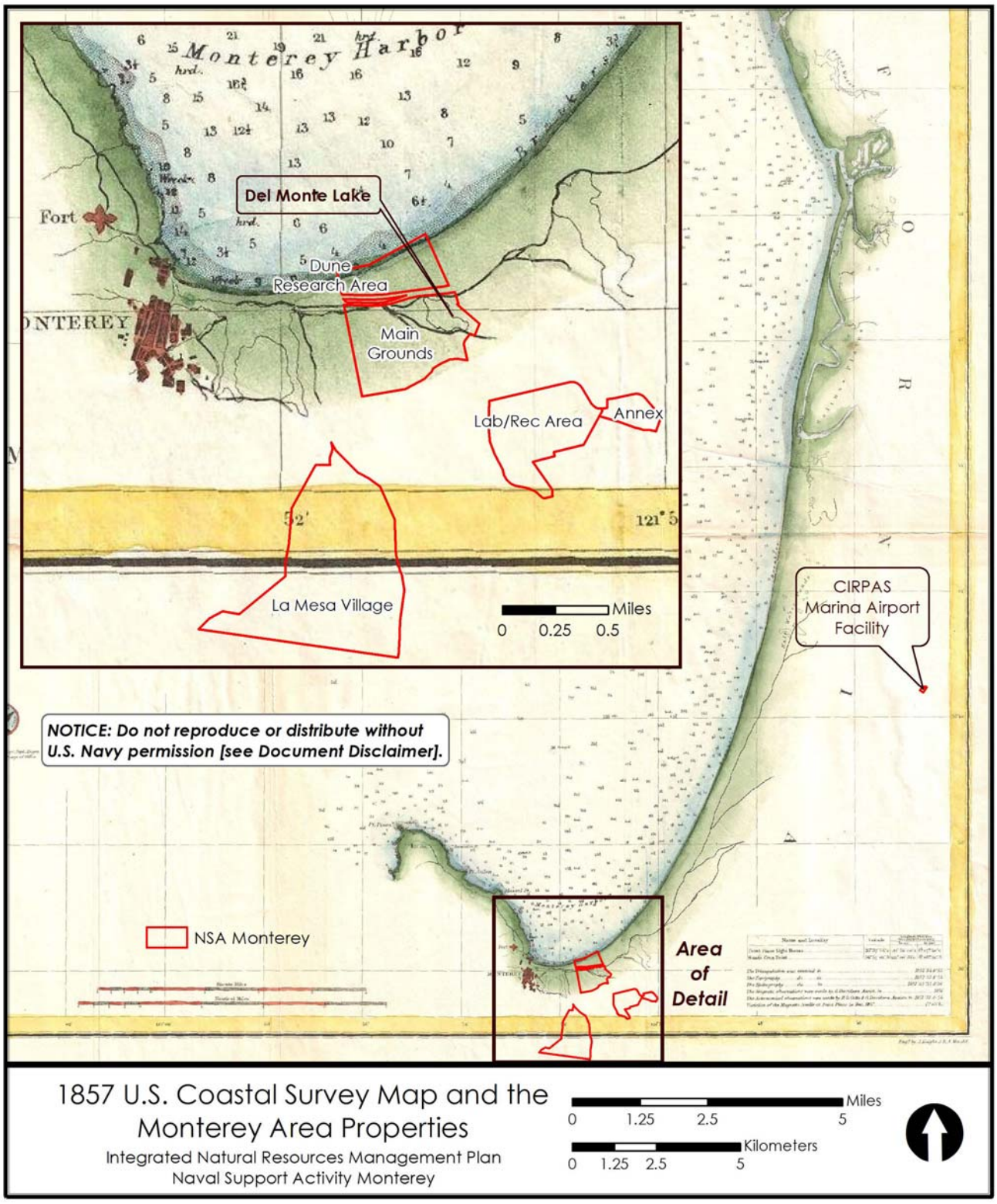
Settlement brought about vast changes in landscape and ecology. New plants and animals, especially cattle, were introduced. Tillage and irrigation began on a limited scale. The far-reaching ecological effects of Spanish occupancy were out of proportion to the number of settlers; even during the later part of the Spanish-Mexican Period human populations were sparse over most of the area (Doak et al. 1996). Spanish use of the surrounding landscape proved incompatible with Native American use of the land. The Native Americans relied on wild game, seafood, and native plants and were greatly affected by the introduction of domestic plants and livestock by the Spanish. Herds of cattle, horses, mules, sheep, goats and pigs consumed native grasses and seeds that formed the base of Native Americans' food supply (Walton 2001). Competition for native grasses and seeds also reduced the food supply of the wild game that the Native Americans hunted. Grizzly bears, abundant in the coastal mountains, were hunted by the European settlers to reduce cattle predation, also affecting the Native American diet (Walton 2001).

During the Mexican era, between 1821-1848, 50 private ranchos were granted to settlers in the Monterey area.

In 1821, Mexico won its independence from Spain and a year later, California pledged allegiance to Mexico, making Monterey California's sole port of entry for international trade (Navy 2001). From 1826 to 1840, the population of Monterey grew dramatically, from 114 to 700 residents, stimulated in part by the hide and tallow trade (Walton 2001). During the Mexican Period many land grants, known as ranchos, were awarded to Spanish-speaking settlers. In the Monterey area, 50 private ranches were granted, the properties including a number of family farms. Although most of the grants had been in existence scarcely 20 years when California became an American possession, they indelibly marked the landscape by establishing a framework within which future subdivisions of land were made (Gordon 1977). Refer to Map 2-5 for the U.S. Coastal Survey map of Monterey from 1857.



Map 2-4. Spanish period map of Monterey's safe anchorages.



Map 2-5. United States Coastal Survey map of Monterey from 1857.

In 1849, California's Constitutional Convention was held in Monterey, and upon ratification, the State Capitol was moved from Monterey to San José.

In 1846, American forces took Monterey. The Mexican-American War ended two years later in 1848 with the signing of the Treaty of Guadalupe-Hidalgo, and Alta California was made part of the U.S. (Navy 2001). In 1849, California's Constitutional Convention was held in Monterey, and upon ratification, the state capitol was moved from Monterey to San José. This, in combination with the California gold rush, changed the economy and population of Monterey, which declined to 400 by 1879. The establishment of the Hotel del Monte in that same year, however, marked the rebirth of Monterey as an international resort location (Navy 2001). In 1882, Rudolph Ulrich created the Arizona Garden of cacti and succulents. The Arizona Garden was one of a dozen that Ulrich created at hotels and estates in California, of which, only two remain: the Arizona Garden, restored in the 1990s by NPS volunteers, and another restored garden at Stanford University (NPS Foundation 2012).

2.2.4.2 European Settlement - Period Between 1900-1948

The Hotel Del Monte was constructed in 1879 and established itself as one of the great resort hotels of California. This hotel was built on what is now the NSA Monterey Main Grounds. The main hotel burned and was replaced twice. Photo 2-6 and Photo 2-7 depict the first and second iterations of the Hotel in the 1880s and in 1920, respectively.The most recent rebuilding occurred in 1926 with a design by Lewis P. Hobart and Clarence A. Tantau Associated Architects. The hotel business declined during the Great Depression, and in 1942 an agreement was made with the Navy to operate a pre-flight school in the hotel. Throughout World War II, Monterey was a center of military training.

Photo 2-6. The Del Monte Hotel in the 1880s.

Photo 2-7. Aerial photo of the Del Monte Hotel, taken in 1920.

2.2.4.3 Historic Navy Land Use

Naval Postgraduate School

In 1909, in recognition of the need for postgraduate education for Naval officers, a postgraduate school was established as the School of Marine Engineering at the U.S. Naval Academy in Annapolis, Maryland (Navy 2001). During the next few decades, the importance of graduate studies increased and student enrollment grew, primarily as a result of World War II-era technological development.

During World War II, Monterey became a center of military training and the Navy had leased the Hotel Del Monte as a pre-flight school. During 1943 and 1944, 4,750 pilots were trained at the Hotel Del Monte facility. Thereafter, the facility served as an electronics technician school and a rehabilitation center for wounded veterans (Navy 2001).

In 1947, Congress authorized and appropriated funds to purchase the Hotel Del Monte and the 627 acres of land surrounding the hotel to provide an independent campus for the NPS (NPS Public Affairs Office 1997). The transition from Annapolis to Monterey was completed in 1952.

CIRPAS Marina Airport Facility

The CIRPAS Marina Airport Facility is located at the former Fort Ord's Fritzsche Army Airfield. Fort Ord was established in 1917 as a U.S. Army post on Monterey Bay to function as a maneuver area and field artillery target range. During the 1940s and 1950s, a small airfield within the Fort Ord Main Garrison was present in what is now the South Parade Ground. In the early 1960s, Fritzsche Army Airfield was completed in the northern portion of Fort Ord on the north side of Reservation Road. The Main Garrison airfield was then decommissioned and its facilities were redeveloped as motor pools and other facilities. The primary land use for Fritzsche Army Airfield was for military/industrial support operations. The facilities present at the Airfield included air strips, a motor park, aircraft fuel facilities, a sewage treatment plant, aircraft maintenance facilities, an air control tower, a fire and rescue station, and aircraft hangars. On 01 July 1991

the Base Realignment and Closure Commission recommended closure of Fort Ord and the relocation of the 7th Infantry Division to Fort Lewis, Washington. Fort Ord was officially closed in 1994 and the Fritzsche Army Airfield was subsequently renamed the Marina Municipal Airport. CIRPAS was located at the Marina Municipal Airport in 1996 (CIRPAS 2010).

2.3 Dune/Research Area

2.3.1 Regional Land Use

Refer to Monterey Area Properties, and Map 2-1.

2.3.2 Operations and Facilities

The NPS Oceanography Department has two buildings and some small storage containers on this property. The city of Monterey leases space for a sewage pump station and beach rake truck here, adjacent to an abandoned sewage treatment facility. There is beach access open to the public via a gated road and boardwalk. Most of the property is committed to a restored dune ecosystem, including the presence of federally threatened and endangered plants (refer to Chapter 3). Signs are posted to discourage walking on the dunes.

The NPS Oceanography Department conducts coastal ocean monitoring and research offshore using stationary and free-floating sensing instruments. Stationary, non-permanent instruments and instrument arrays are marked with a floating buoy that also transmits data from the sensors to computers on shore. No cables or alteration to the sea floor are required. Placement of these sensing units is determined by the research data requirement. Free-floating or drifting sensors can be seen above the water due to a brightly colored pole that sticks up. These drifters can transmit data to shore or record data on board, depending on the experiment. These drifters are reusable and are collected following data collection events; they transmit a signal to aid in their retrieval.

The Dune/Research Area is located to the north of the Main Grounds (Refer to Map 2-1 and Photo 2-8). The Dune/Research Area is bounded by Monterey Bay to the north, residential development accessible via Beach Way to the east, Del Monte Avenue to the south, and residential development accessible via La Playa Street to the west. The Monterey Bay Coastal Trail/Monterey Peninsula Recreational Trail traverses the Dune/Research Area property along the southern boundary of the property and parallel to Del Monte Avenue.

2.3.2.1 Services and Utilities

Stormwater from the Dune/Research Area flows directly into Monterey Bay.

Photo 2-8. Dune/Research Area facility and paved road access.

2.3.3 Other Land Uses

2.3.3.1 Landscaping

Most of the Dune/Research Area is open beach and a protected habitat zone with controlled public access as compatible with mission requirements for academic research, training, and resource protection.

2.3.3.2 Installation Restoration Sites

There are no IR Sites at the Dune/Research Area.

2.3.3.3 Real Estate Outgrants

The Navy leases part of the defunct sewage treatment plant to the Monterey Regional Water Pollution Control Agency for a lift station. The city of Monterey also leases space for a beach rake truck here, adjacent to the defunct sewage treatment facility.

At the Dune/Research Area there is an easement in place for the recreational trail.

2.3.3.4 Public Access and Recreation

Most of this property is open beach and a protected habitat zone. Public access to the Dune/Research Area is confined to the boardwalk, the beach, and the city of Monterey recreation trail immediately adjacent to the dunes as compatible with mission requirements. The boardwalk stretches from the recreation trail, over the dunes, and down to the beach. The boardwalk has railings, benches, and interpretive signs to direct the public away from the fragile habitat.

There are railings, benches and interpretive signs directing the public from fragile habitat at the Dune/Research Area.

Special permission is required for academic research, training, resource protection, and recreational natural resource interpretation activities is granted on a case-by-case basis for the dunes themselves. The city of Monterey rakes the beach periodically, buries dead marine mammals and empties the two trash cans on the beach.

2.3.4 Historical Overview of Land Use

After the fires that destroyed the Hotel Del Monte, much of the debris was deposited in a landfill that now makes up the rear dune area. This management history contributes to the present vegetative and edaphic character of the rear dunes which favors non-native invasive species.

2.4 Point Sur Facility

2.4.1 Regional Land Use

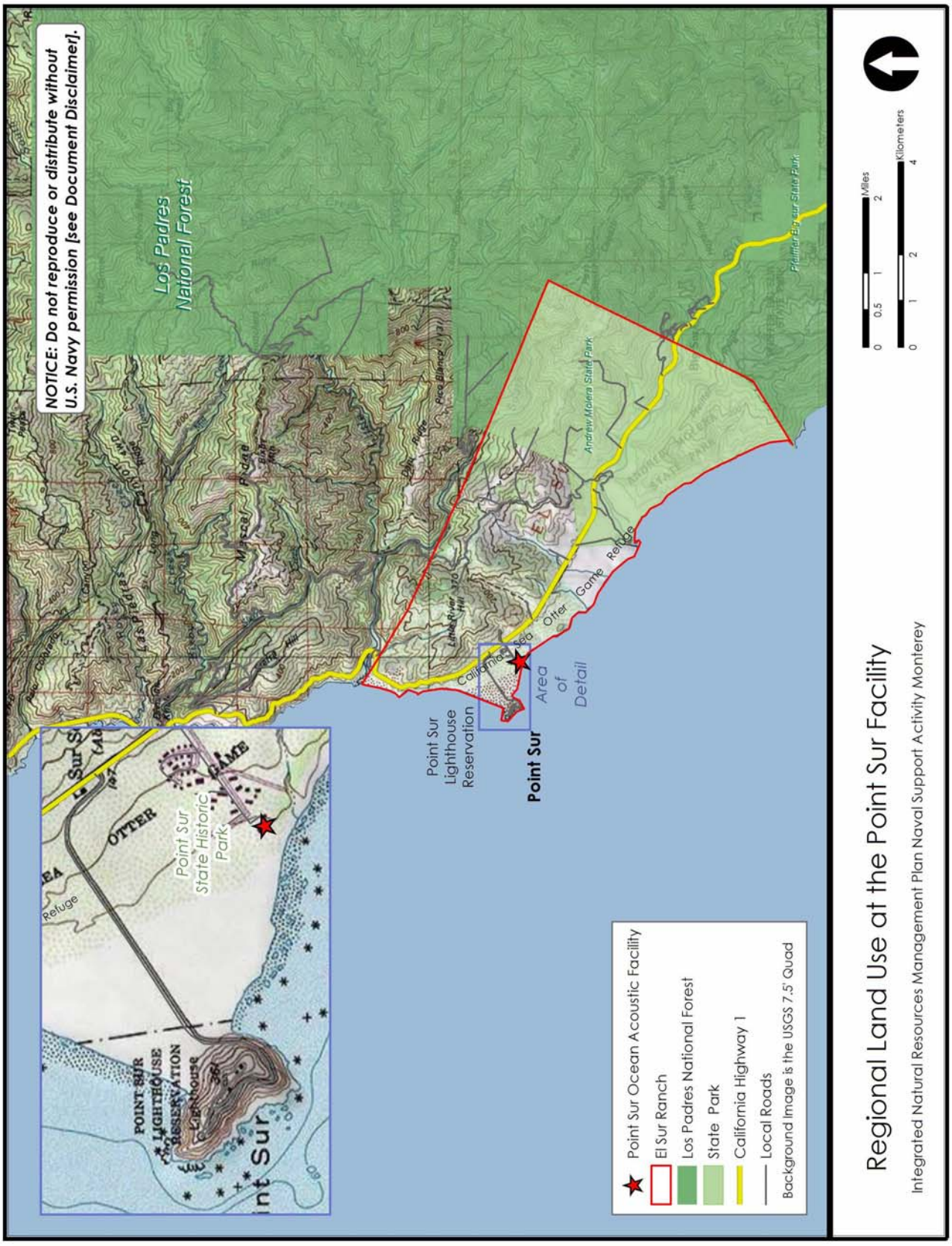
The Point Sur Facility is surrounded by public and private property and is a remnant of the Point Sur Naval Facility. Most of the original Naval facility was given to the CSP in 2000 as part of the Point Sur State Historic Park (CSP 2004). The Point Sur State Historic Park is located along Pacific Coast Highway 1 on the coast of Big Sur, California and includes several non-contiguous parcels and easements traversing private property. The public and private neighbors to the Point Sur Facility and the State Historic Park include the El Sur Ranch, U.S. Coast Guard (USCG), California Department of Transportation, and the Monterey Bay National Marine Sanctuary (MBNMS). Refer to Map 2-6 for an overview of the regional land use adjacent to this property.

The El Sur Ranch is private property that encompasses the boundaries of the State Historic Park. In 1967 the U.S. government, at the request of the U.S. Navy, acquired land as a perpetual easement and right of way for access to the Pacific Ocean and for the installation, operation, maintenance, repair, and replacement of necessary utility lines in, over, on, under, and across a portion of the El Sur Ranch private property.

The USCG previously operated facilities to support aids to maritime navigation on Moro Rock; however, the USCG transferred the Point Sur Lighthouse to the CSP as part of the Point Sur State Historic Park under the National Historic Lighthouse Preservation Act of 2000 on 23 April 2004 (Lighthouse Friends 2012; CSP 2004).

The California Department of Transportation has jurisdiction over Pacific Coast Highway 1 and maintains and administers that transportation corridor.

Adjacent to the Point Sur State Historic Park is the California Sea Otter Game Refuge and the MBNMS. In addition to these designated marine protected areas there are nearby designated open spaces including Andrew Molera State Park and the Pfeiffer Big Sur State Park.



Map 2-6. Regional land use at the Point Sur Facility.

There are no major population centers within the vicinity of the Point Sur Facility; but rather a dispersed community throughout the Big Sur area of the California coast.

2.4.2 Operations and Facilities

The Point Sur Facility was a part of the Navy's underwater monitoring network of powered hydrophones between 1958 and 1986. The Point Sur Facility is designed for undersea research, but is currently at reduced capacity; the undersea hydrophone array that connects to the Terminal Equipment Building through a property easement suffered a catastrophic failure in January 2001. The Navy is able to use the undersea hydrophone array to monitor both ship and mammal traffic passing through the MBNMS, and to provide unclassified data (a single hydrophone time series to scientific and educational studies). The cable fault, first noticed in 1991, is located approximately 0.86 nautical miles from the terminal building and a progressive failure was noted over the years.[1]

NSA Monterey maintains the Point Sur Terminal Equipment Building as well as two ancillary buildings that are used by the school's Oceanography and Meteorology departments to support research activities. Refer to Map 1-4 in Chapter 1 for the layout of facilities at the Point Sur Facility (Photo 2-9).

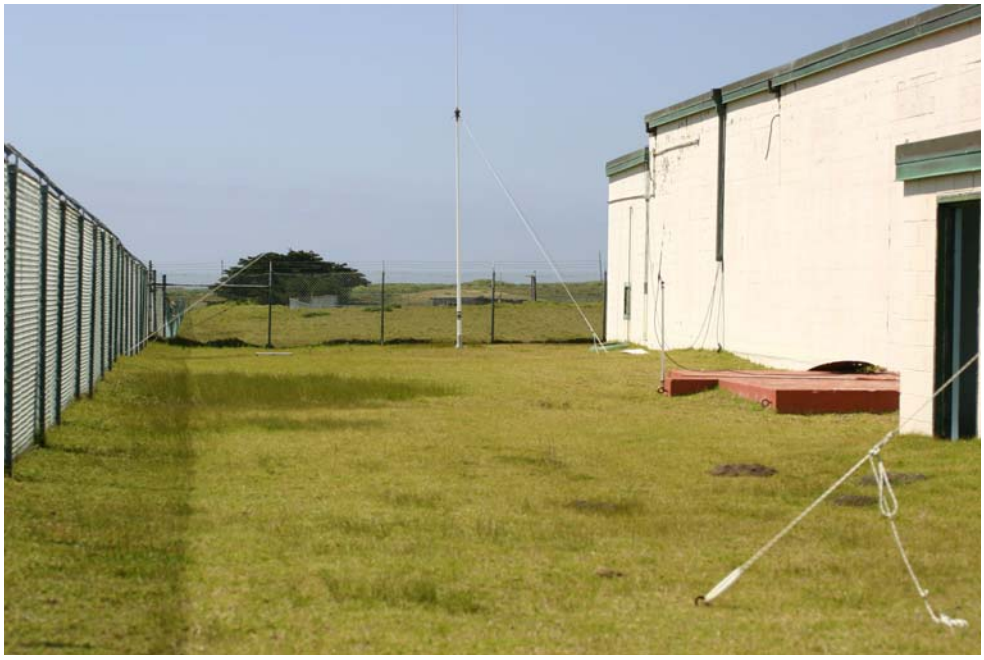


Photo 2-9. Point Sur Ocean Acoustic Observatory showing fence around the classroom building, antennae.

1. A Remotely Operated Vehicle dive by the Monterey Bay Aquarium Research Institute was performed in 1993, which located the cable suspended over a large rock, with the tidal surge causing the cable to wear. The Navy's Underwater Construction Team Two conducted a hydrographic survey in July 2001. The team returned in August to execute the cable repair. The divers conducted an extensive nearshore cable survey and located the seaward cable fault in 1,000-foot depth. The M/V Independence was used as a cable recovery platform, where the seaward end of the cable was recovered, cut back, and tested for connectivity to the hydrophone array. An additional fault was seen approximately 0.5 nautical miles seaward of the break point. Cable repair efforts were stopped in August 2001, due to the lack of sufficient replacement cable and additional funding.

Pacific Coast Highway 1 provides access to the Point Sur State Historic Park. Access to the Point Sur Facility is gained through the Point Sur State Historic Park.

2.4.2.1 Services and Utilities

Electricity is available on the property from PG&E. No other utilities exist.

Stormwater runoff is channeled into a drainage ditch on the property that is maintained relatively clean. Runoff ultimately flows into the Pacific Ocean (Photo 2-10).

Photo 2-10. Point Sur Ocean Acoustic Observatory showing drainage ditch inside fenced classroom area.

2.4.3 Other Land Uses

2.4.3.1 Landscaping

There is no landscaping at Point Sur Facility. Invasive non-native kikuyu grass (*Pennisetum clandestinum*) dominates the vegetation inside the fence.

2.4.3.2 Installation Restoration Sites

There are no IR Sites present at Point Sur Facility.

2.4.3.3 Real Estate Outgrants

NSA Monterey benefits from an easement on the adjacent El Sur Ranch property, which provides access to the ocean, but NSA Monterey is not responsible for any maintenance of the easement. The easement is approximately 15 feet wide and no more than 90 feet down to the ocean.

2.4.3.4 Public Access and Recreation

There is no public access to the Point Sur Facility. There are no recreational facilities at the property.

2.4.4 Future Patterns and Plans

NSA Monterey is currently pursuing funding to reactivate the OAO with plans to install a cabled junction box. A junction box design would provide both power and high speed data connection to the sea floor for a multitude of scientific equipment and research projects. In addition to acoustic receivers, additional oceanographic sensors as well as docking stations for autonomous vehicles, etc. would further expand the scientific opportunities and understanding of this area.

2.4.5 Historic Navy Land Use

The Point Sur Facility is the remnant of the now decommissioned NAVFAC Point Sur. Early in 1949, the Naval Research Laboratory reported submarine detection ranges of 10-15 nautical miles in tests using Sound Fixing and Ranging hydrophones off Point Sur, California (Navy Commander Undersea Surveillance [CUS] 2012a). By the end of that year, ranges of several hundred miles had been achieved (Navy CUS 2012a). The subsequent discovery of a deep underwater sound channel on the beach just below the Light Station on Moro Rock, led to the establishment of NAVFAC Point Sur (CSP 2004).

NAVFAC Point Sur was commissioned less than a decade later on 08 January 1958 (Navy CUS 2012b). Similar in mission and facility size to hundreds of Sound Surveillance System (SOSUS) bases worldwide, its official mission was to conduct oceanographic research (CSP 2004). The SOSUS technology utilized at NAVFAC Point Sur was built upon the Sound Fixing and Ranging technology that had been previously used there. In 1967, the U.S. government, at the behest of the U.S. Navy, acquired a perpetual easement and right-of-way for access to the Pacific Ocean and for the installation, operation, maintenance, repair, and replacement of necessary utility lines in, over, on, under, and across the property referred to as Lot 1 of Rancho El Sur, as said lot is shown on Map of the Partition of El Sur Rancho, filed on 21 March 1891 in Volume 1 of Outside Lands at Page 8, Records of Monterey County. This property easement connected the NAVFAC Point Sur Terminal Equipment Building to the offshore undersea hydrophone array.

All of the high security, sensitive data collecting took place in the Terminal Equipment Building located near the shoreline facing Moro Rock (CSP 2004). The Terminal Equipment Building is a rectangular concrete fortress-like structure with a flat roof and no windows. Inside, sonar men would man banks of consoles on a 24-hour basis, as a stylus recorded sound patterns directly from undersea hydrophone arrays. These gram recorders were able to identify submarines by shaft, firing, and cylinder rates (CSP 2004).

During NAVFAC Point Sur's 26 years of operation, it provided continuous support to the Navy's underwater monitoring network of sound powered hydrophones (Navy CUS 2012b). Since the inception of the SOSUS programs in 1954, personnel stationed at Naval facilities such as Point Sur have pursued the Undersea Warfare mission (Navy CUS 2012c). During the time period when operations were active at NAVFAC Point Sur the Naval facility was manned by ten officers, 96 enlisted, and 18 civilians (Navy CUS 2012b).

NAVFAC Point Sur was disestablished in 1984; however, the Navy retained ownership of the Terminal Equipment Building to use it and the undersea hydrophone array for oceanographic acoustic data collection.

As with most military facilities, evolving technology and changing personnel needs impacted the design and operations at NAVFAC Point Sur (CSP 2004). The most dramatic changes occurred as intelligence gathering equipment was removed when it became outmoded. During the late 1970s, the Terminal Equipment Building was used to collect data but no longer had to rely on a large number of sonar men to collect it. Automation in the form of computer tracking made this unnecessary, and most of the data collected was remoted to a more active and centralized SOSUS site referred to as Naval Facility Centerville Beach, which was located in Mendocino, California (CSP 2004). By the late 1970s, at least six antennae towers and their cable houses were removed from NAVFAC Point Sur. Other buildings and structures related to security, recreation, and general operations were also listed as removed in the Navy's 1981 Master Plan, including several sentry gates, a fallout shelter, a vehicular bridge, flag poles, and an indoor swimming pool and tennis court (CSP 2004). NAVFAC Point Sur was disestablished on 01 October 1984 and all of its acoustic data was remoted to Naval Facility Centerville Beach, California (Navy CUS 2012b). However, the Navy retained its ownership of the Terminal Equipment Building in order to continue to use it and the undersea hydrophone array to collect oceanographic acoustic data.

The NPS acquired ownership of the Terminal Equipment Building in 1993 to support the establishment of the OAO for the purpose of undersea research. They continued to use the Terminal Equipment Building and its undersea hydrophone array until the cable failed (NPS 2010).

2.5 NIROP Santa Cruz

2.5.1 Regional Land Use

NIROP Santa Cruz is located in the Santa Cruz Mountains of Santa Cruz County. The closest major population centers to this facility are Santa Cruz and Mountain View. The population of Santa Cruz County is relatively stable at just over a quarter of a million (U.S. Census Bureau 2011c).

Small residential communities do exist near the facility and include Forest Springs, Boulder Creek, Brookdale, Ben Lomand, Bonnie Doon, Felton, and Swanton. The California Youth Authority operates Camp Ben Lomond which is accessible from Empire Grade Road and is near Forest Springs. The Boulder Creek Golf and Country Club is the closest

recreational area to NIROP Santa Cruz. The closest airport to the facility is the Bonny Doon Village Airport located near the community of Bonny Doon. Designated open space areas that occur near NIROP Santa Cruz are Big Basin Redwoods State Park, Rancho del Oso State Park, West Waddell Creek State Wilderness, and Fall Creek State Park.

Properties immediately surrounding NIROP Santa Cruz and the Lockheed Martin property are characterized by steep, forested lands. Other large landowners with property contiguous to or near the site include: Logan and Miller (325 acres), Harvey (160 acres), and Filice (320 acres) (Doak et al. 1996; Table 2-2). Land uses on these properties are generally limited to resource extraction activities, such as timber harvest, mineral extraction, and grazing.

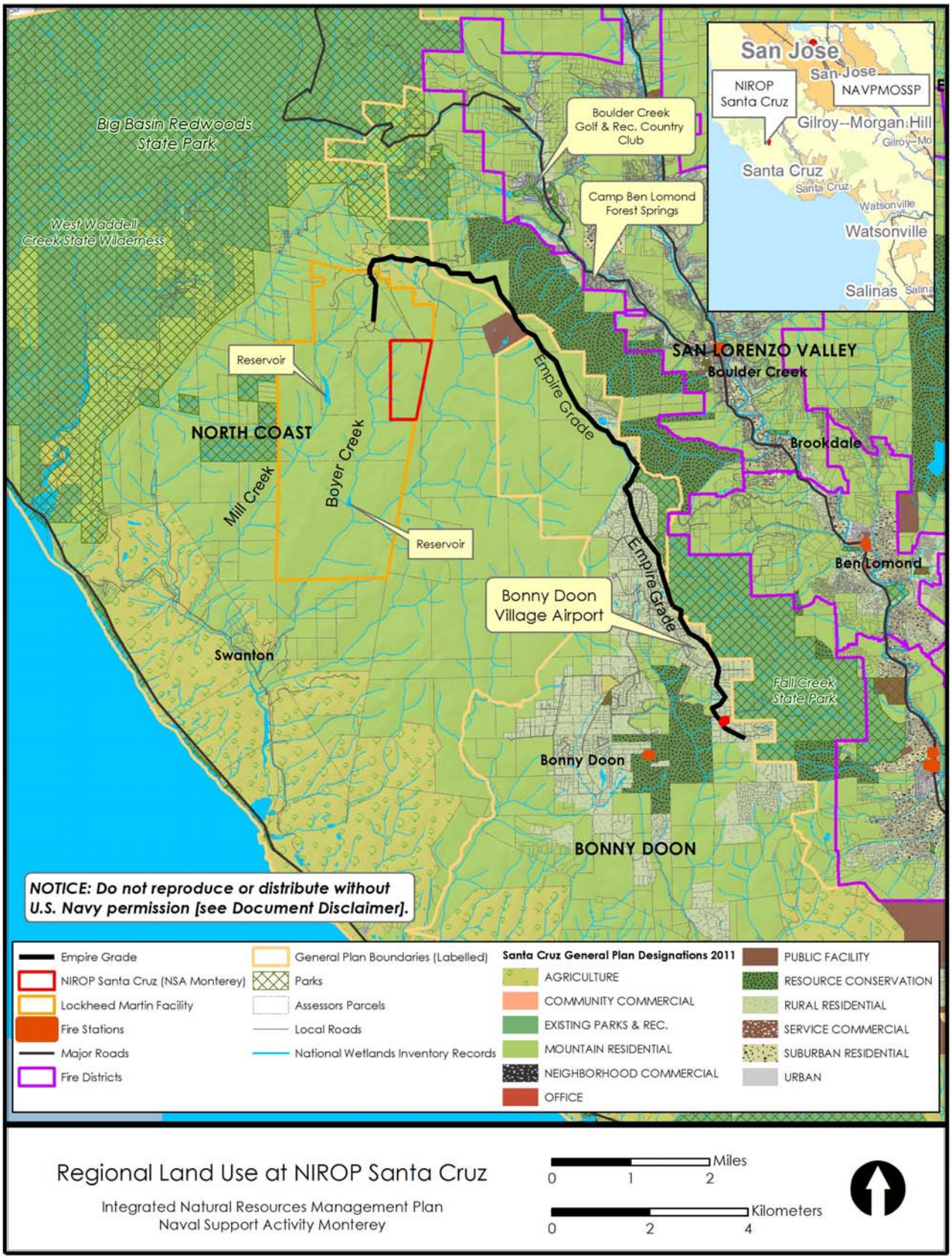
Refer to Map 2-7 for an overview of the regional land use adjacent to this property.

Table 2-2. Naval Industrial Reserve Ordnance Plant Santa Cruz adjacent land ownership and land uses (Doak et al. 1996).

Parcel	Acreage	Land Use
Locatelli Ranch	264.799 acres	74.77 acres zoned Timber Preserve, No Residence 181.7 acres zoned Open Space Easement with Residence 8.329 acres zoned California Land Conservation Act Property No Residence
Big Basin Redwood State Park	18,000 acres	Principal Land Use: Recreation
Lone Star Cement Company	3,022.12 acres	Principal Land Uses: Mineral extraction, grazing, and timber harvest All zoned Timber Preserve, No Residence except for 41.91 acres zoned Rural Vacant Land.
Big Creek Lumber (Purdy Property)	390.14 acres	Principal Land Uses: Timber harvest and grazing 161.86 acres zoned Rural Vacant Land [100-199.99 acres] 228.28 acres zoned Rural Vacant Land [200-399.99 acres]
Church of Jesus Christ Latter Day Saints	612.081 acres	267.427 acres zoned Timber Preserve, No Residence 21.065 acres zoned Rural Vacant Land 323.616 acres zoned Non-Profit Organization Camps
Logan & Miller	160 acres	160 acres zoned Timber Preserve, No Residence
Hobart Harvey	160 acres	160 acres zoned Timber Preserve, No Residence
John Filice & Janice F. H/W CP	320 acres	320 acres zoned Timber Preserve, No Residence

2.5.2 Operations and Facilities

NIROP Santa Cruz in the upper Santa Cruz Mountains functions as a research and testing facility used for the development, testing, and storage of components for Navy ordnance. NIROP Santa Cruz and Lockheed Martin use the property primarily for testing missile engines and components. NIROP Santa Cruz also performs a variety of thermal effects and propulsion testing on missile ordnance components such as gas generators, initiators, and flight termination systems. There are many Explosive Safety Quantity Distance arcs and high noise environments on the property that must be carefully observed.



Map 2-7. Regional land use at Naval Industrial Reserve Ordnance Plant Santa Cruz.

State-of-the-art equipment and engineering support available within the facility include computer-aided design, systems testing, environmental testing, chemical analysis, photo instrumentation and ordnance manufacturing. Among the manufacturing capabilities of NIROP Santa Cruz are ordnance initiation systems, transmission lines, through-bulkhead initiators, exploding bridge wire initiators, hot wire initiators, and separation systems. Testing capabilities include reentry thermal simulation, propulsion systems, hot gas control, particle erosion, gas dynamics simulations, space simulation and cryogenics, and blast effects vulnerability.

NIROP Santa Cruz is reached through the adjacent Lockheed Martin property on Empire Grade Road and then Poseidon Road. Both are dead end roads. NIROP Santa Cruz is supported by a network of paved roads that access over 20 buildings. Unpaved roads lead to locations on the larger property owned by Lockheed and access Boyer Creek and Mill Creek reservoirs (Refer to Map 2-7). A small trout hatchery was located at Mill Creek in the past (Lockheed 1979). One unpaved road also follows a pipeline on NIROP (based on 1979 site map).

2.5.2.1 Services and Utilities

Fire Protection

Fire protection services are provided by the California Department of Forestry and Fire Protection.

Water Supply

A water treatment plant on the adjacent Lockheed Martin property treats water from Mill Creek Reservoir also on the property to provide water to NIROP Santa Cruz.

Sanitary Wastewater Disposal

All sanitation and wastewater disposal services are provided by Lockheed Martin under the GOCO agreement.

Stormwater Runoff

[No information]

Electricity & Natural Gas

[No information]

Solid Waste

[No information]

2.5.3 Other Land Uses

2.5.3.1 Landscaping

Based on a 1979 report to the Santa Cruz County Board of Supervisors, NIROP Santa Cruz was initially landscaped after construction in 1958 by reseeding and planting native species where possible. Currently, the site is heavily forested with coast live oak, redwood, and pine trees and native understory vegetation is present (Refer to Chapter 3).

2.5.3.2 Installation Restoration Sites

There are no IR Sites present at NIROP Santa Cruz. A previously proposed IR site at NIROP Santa Cruz was investigated and it was concluded that the site warranted no action. Table 2-3 shows the entry registered with the California Department of Toxic Substances Control (CDTSC) for NIROP Santa Cruz (CDTSC 2010).

Table 2-3. Installation Restoration sites at Naval Support Activity Monterey.

Name	Key Problem	Status	Projected Clean-up Date	CDTSC Case #
Sunnyvale NIROP, Santa Cruz Facility	Potential for effects on the aquifer for drinking water supply affected, indoor air, soil, surface water affected, soil vapor. Contaminants of concern include metals, waste oils, perchlorate, volatile organic compounds, polychlorinated biphenyls, and photo-processing chemicals.	No further action required as of 12/10/2009 Summary Report.	None required.	71000004, Site Code: 201665

2.5.3.3 Real Estate Outgrants

NIROP Santa Cruz is operated by Lockheed Martin under a GOCO arrangement. Timber rights are retained by the previous owner of the property, Locatelli et al. For more information refer to Chapter 1.

2.5.3.4 Public Access and Recreation

There is no public access to NIROP Santa Cruz. Access may only be obtained by entrance through the Empire Grade gate on the Lockheed Martin property. Access to NIROP Santa Cruz property is only permitted with security clearance for access to the Lockheed property. There are no developed recreational facilities at the property.

2.5.4 Future Patterns and Plans

[No information]

2.5.5 Historical Overview of Land Use

2.5.5.1 European American Land Use - Late 19th Century - 1948

Commercial agriculture, with extensive plowing, drainage, and irrigation, began under the Americans. In addition, the intentional and inadvertent introduction of non-native species, begun during the Spanish period, continued unabated. Lumbering was started by the mission fathers using Native American laborers, but the scale was so small that ecological consequences were slight. However, under subsequent western European and U.S. occupancy, timber operations were conducted on a grand scale, particularly the harvest of redwood trees. Lumber companies penetrated virtually the entire redwood area, leaving almost no virgin stands. The logs were dragged out of the forest on skid roads using first oxen and later steam power. Deep gulches were gouged out as the landscape underwent a dramatic transformation.

Tanoak (*Lithocarpus densiflorus*) from the Santa Cruz Mountains was extensively harvested during the late 1800s, when hide-tanning was a major industry in Santa Cruz. Ten separate tanneries existed in 1870. Great quantities of tanoak were hauled out of the Santa Cruz Mountains on mule back, with over 5,000 cords of bark harvested in 1886 alone. Within a few decades the tanning industry was threatening the existence of the oak and the industry began to decline. By 1918 it was estimated that three-quarters of the tanoak of Santa Cruz County had been peeled. The tree was eventually saved by protective legislation (Doak et al. 1996).

In 1894, Frank Locatelli purchased the property that is currently owned by Lockheed, when the homestead had been repossessed from its former owner. The Locatelli family harvested timber on the property over the next half century. In addition to timber harvest, the Locatelli's ran cattle on the property and put a modest acreage under cultivation (Doak et al. 1996).

Except as otherwise noted, the following history of the Big Creek area in northwestern Santa Cruz County is excerpted from an interview with Homer T. McCrary of Big Creek Lumber Company (Doak et al. 1996). The Lockheed and NIROP sites are located within this larger geographic area, and are situated in the upper Big Creek watershed.

In 1905, construction of the Ocean Shore Railroad from Santa Cruz to a point several miles above Davenport (situated on the coast 11 miles northwest of Santa Cruz) opened the Big Creek watershed to profitable timber harvest. This initial period of timber harvest took virtually all the standing timber in the Big Creek drainage except for that on the Deselhorst ranch, on the west branch, where the Locatelli family logged 15 years later (Dayes 1987). The Locatelli family had harvested all the choice timber by the time that the property was sold to Coast Counties Electric Company in 1938.

Coast Counties Electric Company provided power to the Santa Cruz region through hydroelectric dams on Mill Creek, Big Creek, and Boyer Creek. In all, the generating plant was in operation from about 1895 to 1948, when the flume that went around Ben Lomond Mountain burned in a fire. During the 1940s, Coast Counties Electric Company sold the property back to the Locatelli family, and the Locatelli's held the property until the sale to the Lockheed Corporation in 1967. Improvements made to the property during the Locatelli's tenure included numerous reservoirs and lumber trails, many of which are no longer maintained or utilized (Gamman 1978).

The timber on some of the land now owned by Lockheed was harvested around 1915 or 1920 by the San Vicente Lumber Company. The company constructed a railroad from the coast at the town of Swanton, up to Little Creek, and hence around to Big Creek and to the forks of Big Creek and Deadman's Gulch. Another branch of the railroad went into the San Vicente Rancho, now a part of the Loan Star Cement Company holdings.

In the mid-1920s, the CDFW built a fish hatchery on Big Creek, northeast of Swanton near the Big Creek Fire Station. Known as the Big Creek Fish Hatchery, it only operated from 1927 to 1940, when it was partially

destroyed by a flood. Since 1985, the Monterey Bay Salmon and Trout Project has been located on the same site. This nonprofit operation is raising and maintaining wild strains of steelhead trout (*Oncorhynchus mykiss*) and coho salmon (*Oncorhynchus kisutch*) in the streams of Monterey Bay in an attempt to preserve these two endemic species.

In 1948 a forest fire swept through the region, consuming 16,500 acres. Property loss, including the wooden flumes that delivered water to the Swanton Power Plant, was estimated to be $168,270 in improvements and $11,632 in merchantable timber, young growth, and forage according to the California Department of Natural Resources-Division of Forestry Official Fire Report on the Pine Mountain Fire.

2.5.5.2 Historic Navy Land Use

Lockheed Martin Ownership

Construction of the 4,000-acre Lockheed Martin Santa Cruz facility began in 1957. During the 1960s, Lockheed assembled and tested components of various guided missile systems engineered at the NPMOSSP Mountain View plant, most notably the Polaris, Agena, Trident, and Poseidon missiles. At the peak of this period of activity, there were over 600 employees at the Lockheed site. Following the completion of the Polaris and Agena projects, the facility was used for research and development of aerospace materials, emphasizing the engineering and production of small aerospace components. In recent years, the facility has continued with component testing and the development of special insulation materials, including re-entry body and nose-cone materials integral to the space exploration program (Doak et al. 1996).

Navy Ownership

The 271-acre NIROP site was purchased by the Navy from Lockheed Corporation in 1957.

2.6 NPMOSSP Mountain View

2.6.1 Regional Land Use

The NPMOSSP Mountain View facility is located in Santa Clara County within Sunnyvale but near Mountain View. The population of Sunnyvale continues to grow with the 2010 population reaching just over 140,000 (U.S. Census Bureau 2011d). Land use in the vicinity of NPMOSSP Mountain View is urban/suburban. The cities of Mountain View and Sunnyvale are home to numerous industries including electronics, high tech, and aerospace firms; this area is part of the "Silicon Valley" at the southern end of San Francisco Bay. Industrial and military properties that are in the vicinity of NPMOSSP Mountain View include the Moffett Federal Airfield, Onizuka Air Force Station, and Lockheed Martin Space Systems facilities. Moffett Federal Airfield is currently operated by the National Aeronautics and Space Administra-

tion Ames Research Center. Other commercial developments that are within the vicinity of the facility are the salt evaporation ponds located in the Guadalupe Slough and Alviso Slough areas in the southern areas of San Francisco Bay. The San Francisco Bay National Wildlife Refuge is the largest designated open space that is near the facility. The closest recreational area to the facility is the Moffett Field Golf Course. The proximity of NIROP Santa Cruz to NPMOSSP Mountain View and other Lockheed Martin Space Systems facilities complements the military uses and strategic locations of these facilities. Refer to Map 2-7 for an overview of the regional land use context for this property and its geographic relationship to NIROP Santa Cruz.

2.6.2 Operations and Facilities

NPMOSSP Mountain View is a Strategic Systems Program Facility for flight systems. It provides life-cycle support for sea-based Strategic Weapons System and Attack Weapons Systems programs. NPMOSSP Mountain View includes buildings 180-189. Buildings 181 and 182 provide life-cycle support for sea-based Strategic Weapons System and Attack Weapons Systems. Building 110 is a visitor's center.

NPMOSSP Mountain View is located in Sunnyvale, California and is bordered by Mathilda Avenue to the east, 5th Avenue to the south, E Street to the west, and 3rd Avenue/Lockheed Martin Way to the north. A security check point is located on 3rd Avenue/Lockheed Martin Way before the entrance to the parking area and access point to the facility. A light rail line runs parallel to Mathilda Avenue and provides commuter access to the facility.

2.6.2.1 Services and Utilities

All services and utilities are provided by Lockheed Martin under the GOCO agreement.

2.6.3 Other Land Uses

2.6.3.1 Landscaping

Trees, shrubbery, and other landscaping are immediately adjacent to the building and in the parking lot (Refer to Photo 2-11).

Photo 2-11. An example of landscaping at Naval Program Management Office Strategic Systems Program Mountain View.

2.6.3.2 Installation Restoration Sites

There are no IR Sites present at NPMOSSP Mountain View.

2.6.3.3 Real Estate Outgrants

Lockheed Martin operates the property under a GOCO agreement with the Navy.

2.6.3.4 Public Access and Recreation

There is no public access to NPMOSSP Mountain View. Lockheed Martin manages the security for the entrance to the site. However, a visitor's center (Building 110) for permitted guests interprets the military and industrial activities that occur on the property. There are no recreational facilities.

2.6.4 Future Patterns and Plans

[No information]

2.6.5 Historic Navy Land Use

NPMOSSP Mountain View, contracted to Lockheed Martin Maritime Systems and Sensors Undersea Systems business unit, supports the Navy's Strategic Systems Programs (Lockheed Martin 2010). On 17 November 1955, Secretary of the Navy Charles Thomas directed the formation of a Special Project Office for the development of the Army-Navy Jupiter intermediate range ballistic missile system (Lockheed Martin 2010). The Navy terminated its involvement with the liquid fueled Jupiter missile in 1956 and began development of the Polaris solid fueled missile. Since the Special Project Office's inception, the Fleet Ballistic Missile team has produced six generations of submarine launched ballistic missiles: the Polaris (A1), Polaris (A2), Polaris (A3), Poseidon (C3), Trident I (C4), and Trident II (D5) missile. The Special Project Office evolved into today's Strategic Systems Programs organization, which is responsible for the strategic weapons system aboard the Fleet Ballistic Missile submarines that patrol the world's international waters. NPMOSSP Mountain View, in conjunction with NIROP Santa Cruz, has supported the Navy's Strategic Systems Programs efforts since its inception during the Eisenhower administration (Lockheed Martin 2010).

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3.0 Natural Resources Status

3.1 Overview

This chapter describes the current condition of natural resources of NSA Monterey, and is structured by the property on which these natural resources occur. Based on an analysis of the conditions presented here and in the previous chapter, management strategies are developed in Chapter 4 and Chapter 5.

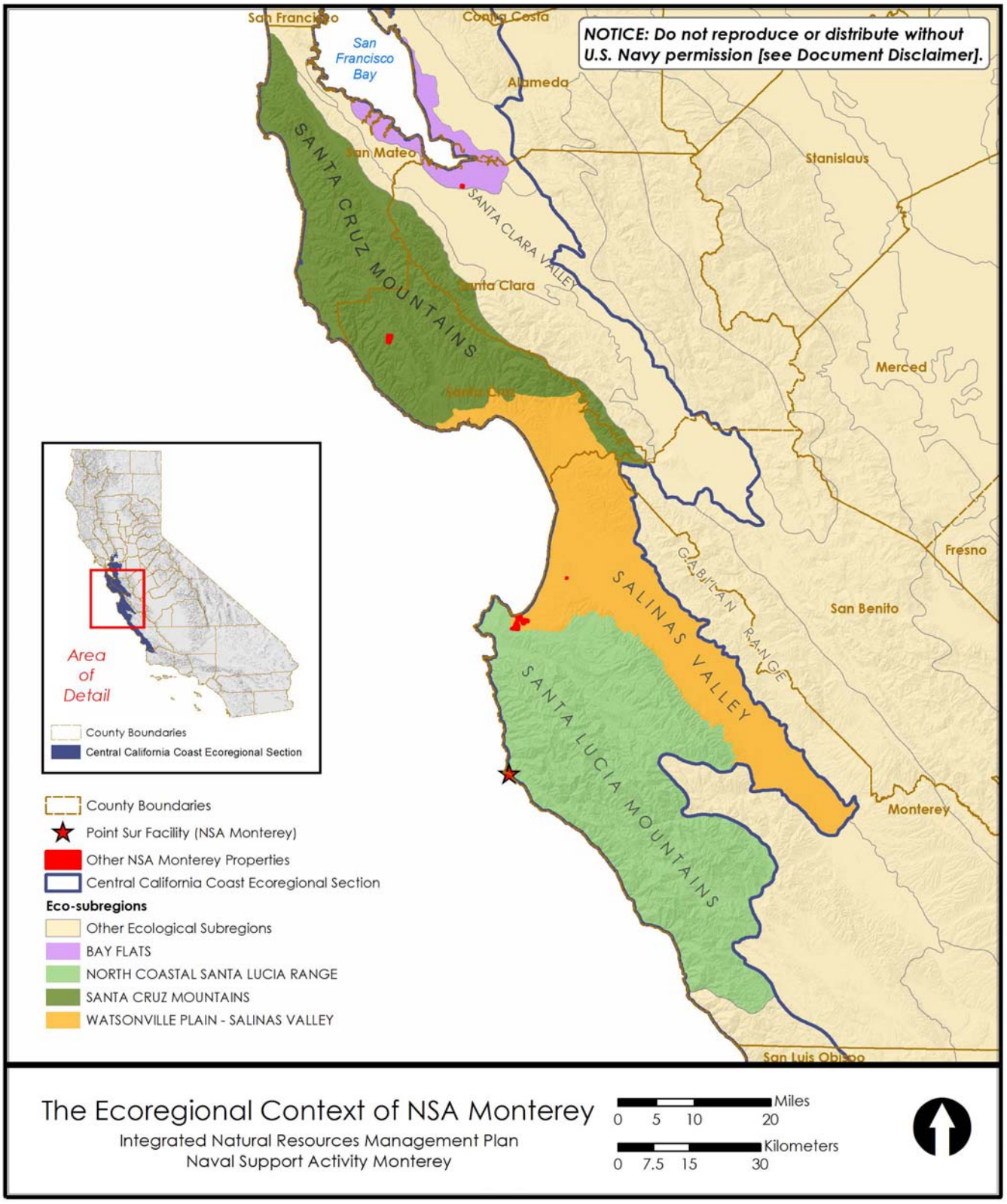
3.1.1 Ecoregional Setting

The properties that comprise NSA Monterey are all within the central California coast ecoregion (U.S. Forest Service [USFS] 1995), as depicted on Map 3-1.

Ranging from sea level to 3,800 feet, this region's mountains, hills, and plains are known for their striking scenery and mild Mediterranean climate. It is home to a wide variety of natural habitat series including: Monterey pine-cypress, coastal prairie (California oatgrass [*Danthonia californica*]), northern coastal scrub (coyote brush [*Baccharis pilularis*] and California blackberry [*Rubus ursinus*]), blue oak (*Quercus douglasii*), purple needlegrass (*Nassella pulchra*), coast live oak, chamise (*Adenostoma fasciculatum*) and ceanothus-manzanita chaparrals, valley oak (*Quercus lobata*), coast redwood, Douglas-fir (*Pseudotsuga menziesii*)/tanoak, California sagebrush (*Artemisia californica*), and coastal beach and dune. The central California coast is also home to abundant wildlife, in part due to its largely undeveloped and varied habitats, as well as an oceanic process known as coastal upwelling, and climatic patterns that create microclimates at the coast, mountain tops, and inland valleys.

Since the properties of NSA Monterey are widely spaced, and by and large have specific and exclusive biophysical features governing their respective ecosystems, they are presented separately in the individual property sections that follow later in this chapter.

Properties of NSA Monterey are presented separately in the property sections of this Chapter to accommodate their respective ecosystem features.



Map 3-1. Ecoregional context of Naval Support Activity Monterey.

3.1.2 Climate

NSA Monterey, situated along the central California coast and southern San Francisco Bay, enjoys a Mediterranean climate characterized by mild wet winters and warm dry summers. Marine fog in spring and summer is a unique characteristic of the region, and has significant impacts on local ecology. The origins of these phenomena are described below, followed by a short description of the local climates of the properties that comprise NSA Monterey. Finally, potential changes in the climate and associated ecological effects are discussed.

3.1.2.1 El Niño

Weather patterns related to El Niño or La Niña cycles can dramatically affect the amount of precipitation NSA Monterey receives in a given year. During an El Niño year, a change in wind patterns causes a warm pool of water to accumulate in the central Pacific, altering the amount and location of evaporation in the tropics and impacting storm tracks and severity. Typically, El Niño cycles occur every three to seven years and cause wetter than normal winters in the southwestern U.S. and dryer than normal conditions in Indonesia and northern Australia. La Niña cycles, conversely, are characterized by cooler than normal central Pacific sea surface temperatures and produce above-average precipitation over Indonesia and northern Australia and below-average precipitation in the southwestern U.S. Every cycle is unique, but in general the central California coast will see winter rainfall up to eight inches above average during El Niño years and two inches below normal during La Niña years.

3.1.2.2 North Pacific High

A major component of the climatic forces acting on the central coast of California is the North Pacific High. This high pressure system that spans much of the northern Pacific is the result of warm equatorial air ascending and moving poleward to a zone of subtropical subsidence where the air sinks and forms a high pressure system at sea level. As the spring progresses, this zone of high pressure moves northward and has a greater impact on the California coast.

Concurrently, the warming trends in spring create relatively low continental surface pressures as increasing solar radiation heats the land surface and the air above it rises. This pressure differential creates relatively stable onshore northwesterly winds, and the winds' intensity is proportional to the pressure difference between the North Pacific High and the low pressure centered in southern Nevada and California.

Upwelling fertilizes phytoplankton along the coast, peaking in spring and early summer.

This stable northwestern wind, coupled with the Coriolis force (an apparent force that deflects objects in motion in the northern hemisphere to the right), causes surface water to move offshore allowing colder, nutrient rich waters to rise to the surface. This process, known as upwelling, fertilizes the phytoplankton along the coast and helps feed one of the most diverse and productive marine ecosystems in the world. Upwelling generally peaks from March through July.

Upwelling contributes to sustained fog along the California coast.

Upwelling has an important climatic effect on the region. First, upwelling cools the air along the coastline close to the ocean's surface. As relatively warmer and moist winds generated by the North Pacific High encounter this region of cool air along the coast, moisture in the air condenses and forms dense marine fog. Moreover, as descending air from the North Pacific High encounters this region of cooler air along the coast, a temperature inversion results. These processes lead to the sustained fog commonly observed along the California coast, a climatic phenomenon to which many coastal terrestrial organisms are adapted.

3.1.3 Climate Change

Rare 20 years ago, links between global warming and changes in terrestrial and marine ecosystems are now commonplace (Intergovernmental Panel on Climate Change 2007; Barry 2008). Using the work of the Intergovernmental Panel on Climate Change and the United States Global Change Research Program, the increasing sophistication of climate change models is allowing managers to make reasonable inferences about potential changes in regional and local climates. Potential changes in global climate and ecosystems include (as summarized by Brown and Thorpe 2008):

- Warming will be greatest over land, and at high northern latitudes;
- Contraction of snow cover, increases in thaw depth over permafrost regions, and decreases in sea ice extent;
- Increase in frequency of hot extremes, heat waves, and heavy precipitation events;
- Increase in tropical cyclone intensity;
- Poleward shift in extra tropical storm tracks;
- Precipitation increases in high latitudes and decreases in dry regions in midlatitudes and tropics; and
- Regions (including western United States) will see decreases in water resource availability.

Changes in ecosystems are expected from global warming.

In the southwestern U.S. and California, the following changes are expected (Archer and Predick 2008): fewer frost days; warmer temperatures; greater water demand by plants, animals, and people; increased frequency of extreme weather events (heat waves, deeper droughts, and higher flood peaks); and warmer nights, reduced snowpack, and earlier spring snow melt sufficient to reduce water supply, lengthen the dry season, create conditions for drought, disease, and insect outbreaks, and increase the frequency and intensity of wildfires. Temperatures considered unusually high will occur more frequently. Because of the profound influence on the fire regime and hydrology, nonnative plants in arid lands might trump direct climate impacts on native vegetation. Lenihan et al. (2005) also surmised these impacts, predicting increased summer monsoons; increased fire weather, fuels, and wildfire frequency and intensity (aggravated by warmer springs and summers); decreased biodiversity; and decreased utility of multi-species conservation reserves without a significant redesign. Migration patterns of terrestrial and marine species will shift.

Tide gauge measurements and satellite altimetry suggest that sea level has risen worldwide during the last century (Intergovernmental Panel on Climate Change 2007).

Globally, sea level has risen approximately 4.8-8.8 inches (12-22 cm) over the last century (U.S. Environmental Protection Agency [USEPA] 2012). The co-occurrence of *high* high tides with extreme storm-forced sea levels magnifies local coastal impacts. The U.S. Geological Survey (USGS) is conducting a survey of all coastal USFWS Refuges to assess the impact of sea-level rise. Their model assumes that the long-term rate of sea level rise would continue to be about three millimeters/year (about six inches in 50 years). Increments this small can have profound impacts on wetland surfaces. The National Wildlife Federation considers a moderate scenario to be a five to 27 inch sea level rise in this century, with a mean sea level rise projection of 15 inches by 2100.

3.1.4 Physical Conditions

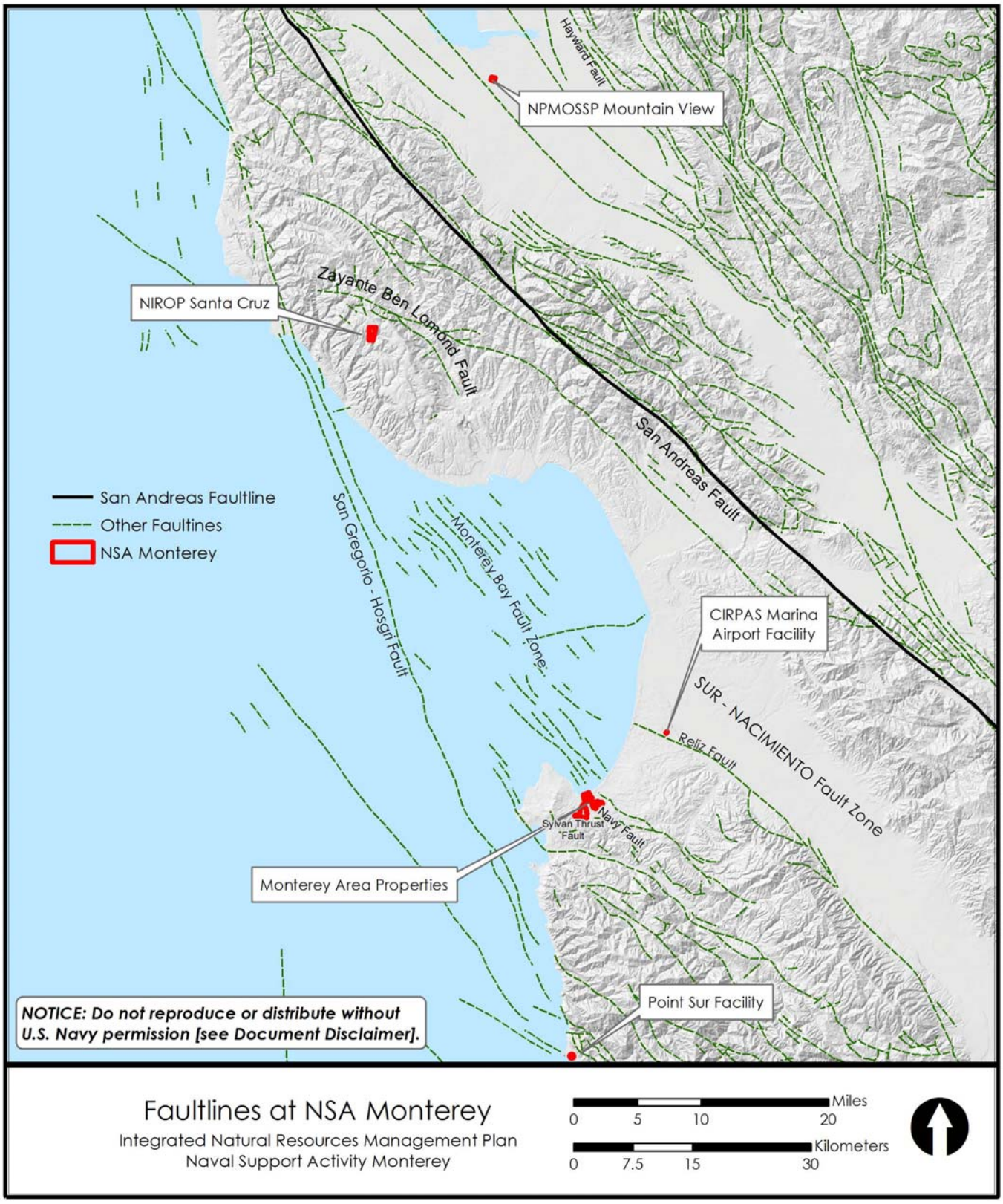
While the properties that comprise NSA Monterey all lie within the Coast Ranges physiographic province, each occupies a locale with a variety of geographic, geologic, and hydrologic features. These are described in the individual property sections that follow later in the chapter.

3.1.4.1 Seismicity

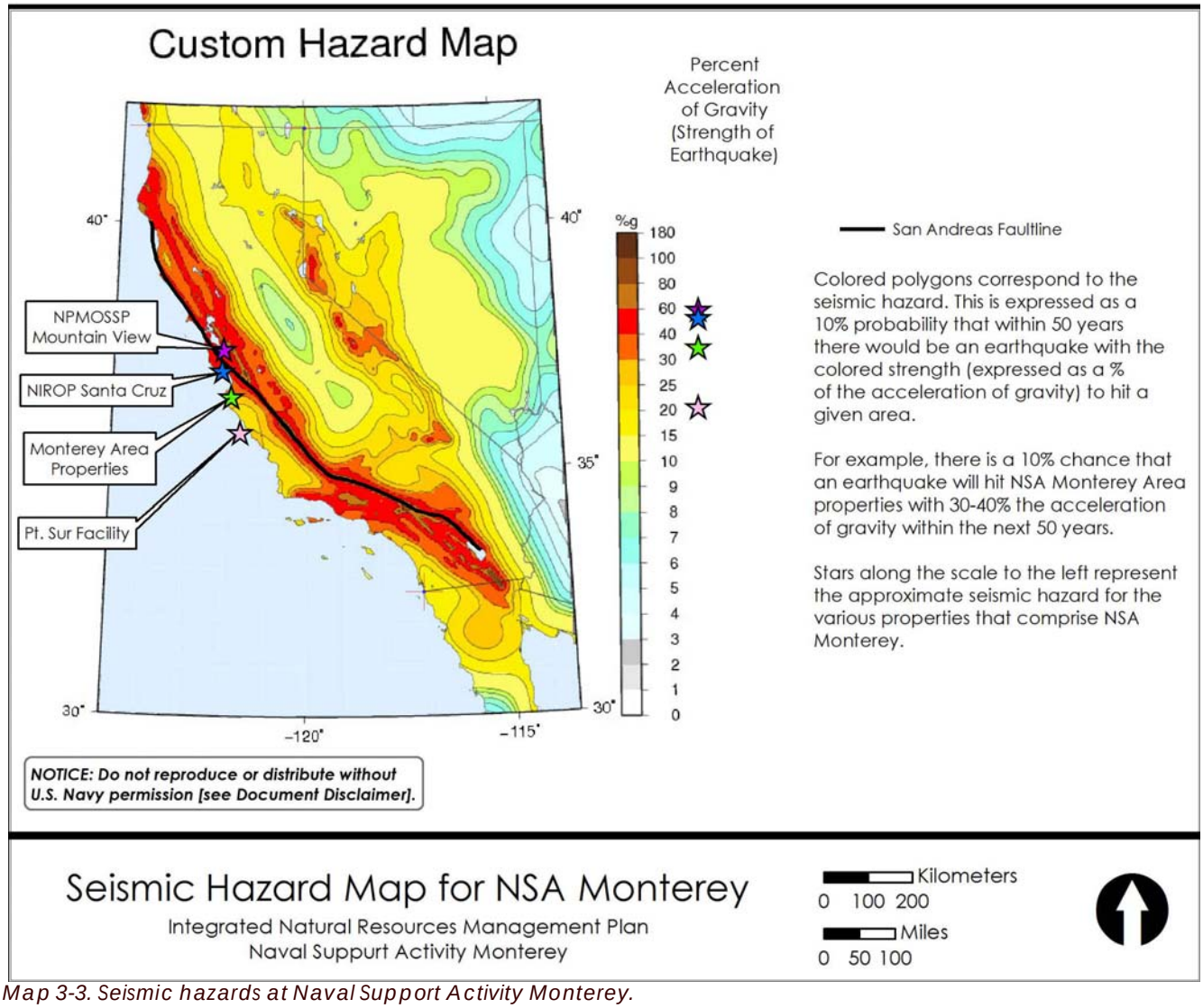
The central coast of California contains many geologic faults and is one of the most seismically active regions of the state (Refer to Map 3-2 and Map 3-3). The San Andreas and San Gregorio-Hosgri fault zones have the greatest seismic impact on the central coast in the Monterey region. Although located 25 miles to the northeast of the Monterey Bay Properties, the San Andreas Fault is capable of generating a major earthquake. The San Gregorio Fault, a complex system with a zone approximately 1.8 miles wide, is a subsidiary of the San Andreas system and extends along the coast just offshore from Half Moon Bay. The San Gregorio Fault is also capable of producing large earthquakes in the 7.2 to 7.9 range in the Santa Cruz Mountains (Doak et al. 1996). This fault connects to the Hosgri Fault system and runs through the Point Sur region. The Monterey Bay Fault is located within Monterey Bay and is considered seismically active. NPMOSSP Mountain View sits within a region of high liquefaction potential based on recent USGS modeling of ruptures along the San Andreas and Hayward faults (USGS 2009).

The USGS (2008) has estimated that there is about a ten percent probability that an earthquake (on the San Andreas Fault or elsewhere) would be large enough, in the next 50 years, to cause peak ground acceleration between 0.20 and 0.60 of the percentage of acceleration of gravity at NSA Monterey (Refer to Map 3-2).

See Map 3-2 for location of fault lines at NSA Monterey.



Map 3-2. Faultlines at Naval Support Activity Monterey.



Map 3-3. Seismic hazards at Naval Support Activity Monterey.

Additionally, the Navy Fault was discovered at the main Monterey Area Properties in 1882 and currently has no visible surface rupture. Movement may have occurred near the Navy Fault during the Holocene Age (11,000 years before present [BP]); however, researchers are not clear if the event was actually associated with movement along the San Gregorio-Palo Fault zone to the west. The exact location of the Navy Fault is undetermined. Another fault, the Sylvan Thrust Fault, is located between the terraces in the Monterey foothills at La Mesa Village. This fault was confirmed to be active in 1976 when several minor earthquakes occurred in the vicinity (Navy 2001).

3.1.4.2 Installation Restoration Sites

There are no IR sites at the Monterey Area Properties, NIROP Santa Cruz, CIRPAS Marina Airport Facility, NPMOSSP Mountain View, or Point Sur Facility. There is a single entry registered with the CDTSC for NIROP Santa Cruz (CDTSC 2010) and this is presented in Table 3-1. This entry states that NIROP Santa Cruz was voluntarily investigated between 2007

and 2008 in accordance with a consultative services agreement with the CDTSC. The results of this investigation indicated that no further investigation, assessment, or remediation was warranted at NIROP Santa Cruz (Cameron-Cole 2009). This case is now closed.

Table 3-1. Installation restoration sites at Naval Support Activity Monterey.

Name	Key Problem	Status	Projected Clean-up Date	CDTSC Case #
Sunnyvale NIROP, Santa Cruz Facility	Potential for effects on the aquifer for drinking water supply affected, indoor air, soil, surface water affected, soil vapor. Contaminants of concern include metals, waste oils, perchlorate, volatile organic compounds, polychlorinated biphenyls, and photo-processing chemicals.	No further action required as of 12/10/2009 Summary Report.	None required.	71000004, Site Code: 201665

3.1.5 The Ecosystem as a Functional Whole: Values, Functions, and Drivers of Change

The central California coast region is one of the world's most productive and biodiverse coastal environments. Its natural resources include old growth mixed conifer forests, endemic coastal pine forest, maritime chaparral, coastal prairie, sand dunes, and beach that buffer and bridge the terrestrial and marine systems, the nation's largest kelp forest, one of North America's largest underwater canyons, and the closest-to-shore deep ocean environment in the continental U.S.

The foundation of NSA Monterey's ecological values, both natural and socioeconomic, is its adjacency to the sea. The Mediterranean climate and this proximity to the Pacific Ocean result in moderation of drought and temperature extremes. The San Andreas Fault zone and spine of the relatively low-elevation Santa Cruz and Santa Lucia Mountains define a western slope that faces the ocean, with marine fog reaching to the ridgetops and fostering the growth of coastal forests. The fog spills partially over the top of the ridgelines onto the eastern mountain slopes and into the lowlands of San Francisco Bay to the northeast, where NPMOSSP Mountain View is located, and the Santa Clara and Salinas Valley agricultural and urban centers. The watersheds thus defined support multiple steep coastal streams that provide water for people, agriculture, and wildlife, then feed directly into the Pacific Ocean. Demarcating the two mountain ranges is the Salinas River with some of the nation's richest agricultural fields along its floodplain, able to support cool weather crops year round due to the maritime weather influence.

The native Ohlone (Costanoan) people moved seasonally up and down coastal watersheds to obtain a remarkably diversified diet: tanoak for acorns, nuts, seeds, roots, berries, young shoots of clover, black-tailed deer, Roosevelt elk, antelope, grizzly bears, mountain lions, dogs, wildcats, skunks, raccoons, rabbits, squirrels, woodrats, mice, moles, waterfowl, varieties of reptiles, some insects, and fish such as steelhead, salmon, sturgeon, and lampreys; and marine mammals

such as otters, sea lions, and whales. The Ohlone ensured their access to plant and animal foods in part by controlled burning each fall to promote the growth of favored plant species. The use of burning also opened up grazing areas for deer, elk, and antelope, and facilitated the gathering of acorns in the fall.

When Europeans arrived in the Monterey Bay, they found a sheltered harbor, access to productive coastal prairie for livestock grazing, and a vast marine ecosystem with unmatched productivity anchored by kelp forests, with the fur-bearing sea otter as its keystone species. The richness of natural resources allowed the location to become an important node in the fur trade. By the 1820s, Monterey was Mexico's sole port of entry for international trade. By the time hunting otters was banned, the number of otters remaining in Monterey Bay was down to about 50. By the early 1900s the kelp forest was gone because the otter's preferred food, sea urchins and abalone, proliferated and ate the kelp beds. Later, after California became a state of the U.S., canneries amassed the shoreline and the international harbor shipped fish and abalone, as immortalized in John Steinbeck's book “Cannery Row.” It became an ecological and water quality disaster that became a prelude to a remarkable story of conservation and recovery in the latter decades of the 20th century.

Like those who came before, the U.S. military recognized the intrinsic value of this unique location. U.S. forces assumed control of the Presidio in 1846 and used it to house infantry troops and for various training functions until 1917, when 15,809 acres were purchased across the Bay and named Fort Ord. Both Army bases were used as training bases for troops and specialists until 1994, when Fort Ord was closed. Today, the original Presidio of Monterey is home to the Defense Language Institute Foreign Language Center.

In 1942 the grounds of the opulent Hotel Del Monte, established in 1879, were taken over by the Navy for pre-flight pilot training. In 1951, the Navy purchased the hotel and grounds and made it the home of the nascent NPS.

Today, NSA Monterey maintains aspects of each of these past land uses. The Spanish architecture is reflected in the historic buildings. Modern landscaping includes remnants of the original hotel gardens including Del Monte Lake. The Point Sur coastal prairie is a relic of a ranching history that began with the Californios and the Spanish land grant system and continues to this day. Timber harvest, water development, and historic fire regimes continue to shape the NIROP Santa Cruz property.

Current core ecosystems include rare and endemic plant communities and species, such as: Monterey pine/bishop pine association, Monterey cypress forest, maritime chaparral, coastal sand dunes, riparian corridors, and coastal prairies.

Finally, a core ecosystem value is the area's internationally renowned natural beauty. Broad ridgeline vistas, panoramic shorelines, tree-lined corridors, sandy beaches, rocky cliffs, rolling prairie hills and steep mountains contrast with settlement architecture and landscapes. The sea otter (*Enhydra lutris*) is probably the most iconic symbol of the region along with endemic Monterey cypress and pine forests against the rugged coastline. They are recognized as a national treasure.

Core Drivers of Change for All Properties

Current and historic drivers of ecosystem change considered in this document include:

- Climate change and sea level rise. As discussed elsewhere in this INRMP, these effects are expected to be felt first for species and habitats at the margins of their distribution and population stability.
- Altered fire regime. Coastal forest types, maritime chaparral, and coastal prairies require fire to regenerate, yet fire suppression has been a key component of management for many decades.
- Invasive species. Invasive and non-native plant species such as French broom (*Genista monspessulana*) and other nonnatives are a problem on several properties. Both freshwater and marine aquatic invasives are also expected to be an emerging concern.
- Urban fringe and general development pressure on boundaries. County General Plan, City, and Local Coastal Plan land use restrictions ameliorate some of this threat, and local and regional conservation lands provide additional buffering for conservation of rare and endemic habitats and species. Offshore is the MBNMS, a federally protected marine area encompassing a shoreline length of 276 miles and 6,094 square miles of ocean. Large undeveloped properties include: the Lockheed Martin parcel surrounding NIROP; nearby state parks; University of California Santa Cruz and Cal Poly's Swanton Ranch lands; CSUMB near Marina; the El Sur Ranch and nearby land trust properties; Las Padres National Forest; Fort Hunter-Liggett; Vandenberg Air Force Base; and Camp Roberts.
- Fragments and broken corridors. Habitat fragmentation hinders ecological processes that require landscape connectivity, such as natural fire regimes, movement of wide-ranging species, and genetic exchange, and makes remaining natural lands more vulnerable to pollution and invasion by non-native plants and animals (Soule and Terbourgh 1999).
- Recreational pressures.

Mixed Conifer Forest

NIROP Santa Cruz is at the headwaters of the Scott Creek watershed, and its connection to the sea is evident from its fog-dependent forest, with sufficient remnant large trees to support the seabird, marbled murrelet (*Brachyramphus marmoratus*), in the nearby state parks. The coastal streams are relatively intact systems except for the hydroelectric dams. Coho salmon spawn naturally downstream in Scott Creek, making it the only major stream south of San Francisco where

this occurs. Serious aggradation is reported in the lower reaches of Scott Creek resulting in accelerated sedimentation that threatens to impair critical spawning habitat of the coho salmon and steelhead trout (NMFS 2012).

The riparian vegetation at NIROP Santa Cruz has a water quality filtering function. In valleys and moist ocean-facing slopes some of the southernmost coast redwoods grow, along with coast Douglas-fir, which is at the southern extent of its range (NMFS 2012). Very small and isolated stands of old-growth forest occur on Navy land but more notably at nearby state parks such as Big Basin, Henry Cowell Redwoods, and Portola Redwoods State Parks. Tanoak was extensively harvested in the local area during the late 1800s, when hide-tanning was a major industry in Santa Cruz.

In the forest ecosystem of NIROP Santa Cruz fire regime alteration is probably the most important driver of change. The result of natural fire is a diversity and abundance of microhabitats for wildlife.

Fire regime alteration is probably the most important driver of change in this forest system. Natural and human-caused fires have been an important force in shaping the mixed evergreen and redwood communities of the Santa Cruz Mountains. The combination of erratic shifting winds and broken, steep terrain of this area causes fires to burn with uneven intensity and direction. Natural fires, therefore, skip large expanses causing a patchy or mosaic vegetation pattern upon its regeneration. The result is an exceptional diversity and abundance of edges/ecotones and microhabitats for birds, mammals and herpetofauna. Vertebrates will immigrate into the burned patches from areas unburned to utilize both the new vegetation and the burned remnants of the prior vegetation.

Fire suppression leads to a reduction in mixed growth stages of forests and chaparral communities, thereby increasing overall homogeneity of vegetation and limiting wildlife diversity and abundance. All evidence indicates that complete suppression of fire disturbances can result in the reduction and in some cases extinction of plant and animal species (Taylor 1973). Suppression of fire results in accumulation of dead wood, called fuel load, resulting in fires that burn hotter and can result in mature trees being killed, reduced viability of released seeds, and damaged soils that lose their ability to hold water. The outcome of this combination of effects is an ecosystem that loses its ability to regenerate after the fire. A secondary concern of maintaining older, more dense stands of vegetation is the local depletion of water due to increased evapotranspiration (Turner 1986).

Although an accumulation of dead wood can be hazardous in fire prone areas such as NIROP Santa Cruz, a minimum density of snags and debris is necessary for wildlife. To maintain good habitat for species that are snag dependent, dead trees are retained when possible and buffer vegetation left around them. The NIROP Santa Cruz facility has a moderate to good supply of snags, or dead trees for birds to utilize. They are critical for many species and may explain the high diversity of snag dependent birds found in the area. At least a quarter of the species found at NIROP Santa Cruz are snag dependent, including the acorn woodpecker (*Melanerpes formicivorus*), American kestrel (*Falco sparverius*), and Pacific-slope flycatcher (*Empidonax difficilis*), among others.

Monterey Pine Forest

The Monterey pine forest is one of a few maritime closed-cone pine-cypress forests along the California coast–such as Torrey pine (*Pinus torreyana*) and bishop pine (*Pinus muricata*). These pines are characterized by short life span (less than 100 years), and all contain serotinous cones (Barbour 2007). In most species of pine, cones mature, open, and drop their seed each year in the fall. With the closed-cone pines, however, cones remain sealed with resin and attached to the branches, sometimes for several or more years. Monterey pine cones may open after a few years, but remain on the tree. These serotinous trees are typically in fire-prone, seasonally dry, and nutritionally poor habitats, often with a Mediterranean climate (Barbour 2007). A consequence of serotiny is that the seed bank is in the canopy rather than the soil—the opening of cones is triggered by unusually high temperatures in the canopy. Viewed as an adaptation to fire, the heat from fires causes the resin seal to melt. The cones open, and the released seed finds a seed bed appropriately prepared by fire. Chipping or scarification can also be used to release the seeds for germination.

Fire regime change, diseases such as pitch pine canker, and land use development pressure are all important drivers of change in this community. While conservation planning is generally in place, the Monterey pine forest's location overlaps the most desirable locations for human occupation.

Maritime Chaparral

Maritime chaparral contains endemic California lilac and manzanita species, as well as the endangered Yadon's rein orchid (*Piperia yadonii*). After a long period free of burning these shrubs can be overtaken by coffeeberry (*Rhamnus californica*), coyote brush, and poison-oak (*Toxicodendron diversilobum*) scrub (Ford and Hayes 2007). Altered fire regime is, therefore, a management problem for this community. In addition, the fragmented status of the community on Navy property makes it vulnerable to loss.

Beach and Dune

Dunes occupy flat areas exposed to prevailing, onshore winds that have a sand source from river or ocean currents (Cooper 1967). They can generally be subdivided into habitat subgroups such as: beach, nearshore, foredunes, backdunes, and dune swales/hollows (including sometimes seasonally wet depressions) that support vegetation distinct from adjacent, more xeric dune ridges. The Monterey Bay peninsula is unique in that it is the only Holocene dune system south of Mendocino County to support forest (McBride and Stone 1976). Dune habitats bridge the marine-terrestrial connection, and buffer the wave action and winds of the coast with more stable inland communities. They are characterized by rapid rates of vegetation change, endemic plants and pollinators, and species adapted to sand burial and other disturbance. They may have a future function in buffering inland areas from sea level rise.

The Navy's approximately 55 acres of dunes are a relatively healthy habitat example, but they have had an intense history of alteration and continue to face ecological pressures. Portions were built on the burned rubble of the Del Monte Hotel. Other areas were covered with topsoil and shaped into landforms resembling dunes, then planted with ice plant (Cowan 1996). Buildings, roads, and parking areas were graded and compacted, some of which are still in use.

Sometime in the 1980s, Smith's blue butterfly was extirpated from this group of properties as the habitat continued to deteriorate (R. Arnold, pers. com. 2010). In 1994 the Monterey Regional Water Pollution Control Agency closed a portion of the Monterey Treatment Plant within the dunes and turned it over to the Navy. Monterey Regional Water Pollution Control Agency still operates a lift station on the property. Non-native invasive plants are an ongoing threat that the Navy routinely manages to address. Despite this, the remaining dunes had been left undisturbed and contain remnant examples of prime dune habitat with the federally endangered Monterey gilia and Monterey spineflower.

A major restoration effort funded by the Navy for over $300,000 was completed in 1994 using seed collected from the site, as well as introduction of missing native species from nearby dune areas (Cowan 1996). Seacliff buckwheat (*Eriogonum parvifolium*) and coast buckwheat (*E. latifolium*) (food plants of Smith's blue butterfly), which had grown at widely scattered locations throughout all of this dune system but was never very abundant, were planted among other natives. The City of Monterey also completed restoration work at Del Monte Dunes Beach (north of the treatment facility). Collectively, these restoration projects re-established numerous buckwheats at these sites, but no Smith's blue butterfly appears to have recolonized there.

A primary threat to dunes is their urban and residential interface that makes them a target for recreation and development. The City of Monterey has approved a re-subdivision of nearby Del Monte Shores and Del Monte Villas to a smaller number of homes on larger lot sizes, plus public open space and habitat areas. Butterflies occurring north of the dune and beach hotel face an obstacle and bottleneck from Highway 1 and local streets to successfully navigate to recolonize these properties where it formerly occurred. Clearing invasives is also important for maintaining dune function. Finally, accelerated coastal erosion due to sea level rise is a major concern.

Coastal Prairie and Elements of Northern Scrub

Pastoral lands are one of the elements that made Monterey attractive to European settlers. The Navy easement holder at the Point Sur Facility, El Sur Ranch, supports livestock grazing today (although excluded from the Navy easement). In the past the El Sur Ranch supported beef cattle and a dairy that sold cheese for the Monterey market. In the 1920s some farming began along the coastal plain, including artichokes, peas, alfalfa, barley, corn, potatoes, and carrots.

Coastal prairie and coastal scrub exist in a continuum of herbaceous to dense woody shrub cover (Ford and Hayes 2007). The native, mesic coastal prairie is mostly missing from the Navy easement, the native perennial bunchgrasses having been replaced by the sod-forming native of the east African plain, kikuyu grass. Relict native bulb species remain, and elements of coastal scrub shrubs. Shrubs invade grasslands in the absence of grazing and fire (Ford and Hayes 2007). Fires on the El Sur Ranch and vicinity occurred in 1977, 1986, 1997, 1999, 2000, 2006, 2007, 2008 and 2009. Kikuyu grass is relatively immune to invasion by shrubs, but it is a strong fire follower. In the reverse manner, coastal scrub will resist invasion by kikuyu grass except post-fire, where this grass resprouts quickly and spreads. This behavior made it desirable for erosion control and is the reason it was first brought to the U.S. to stabilize the banks of ditches.

While scrub has expanded or matured, habitat quality has declined for special status plants and animals dependent on the open grassland and mid-seral scrub (Ford and Hayes 2007). For this and other reasons the conservation value of coastal prairie has begun to be recognized. The CNPS has identified at least 13 species of concern for the Santa Cruz and Monterey coastal grasslands. The Coastal Commission and some counties have identified it as a sensitive habitat. The federally threatened California red-legged frog occupies aquatic enclaves that are sometimes partially maintained by grazing. A conservation easement granted in 1997 resulted in the preservation of 3,252 acres of the 7,000-acre El Sur Ranch. The owners also deeded 15 acres of the ranch to the California Department of Parks and Recreation in 1972 near the mouth of the Big Sur River. Invasive non-native grasses such as kikuyu grass, velvet grass (*Holcus lanatus*), Harding grass (*Phalaris aquatica*), tall fescue (*Festuca arundinacea*), and Bermuda grass are the prevalent vegetation.

3.1.6 Plant, Fish and Wildlife Populations

3.1.6.1 Plants

The list of observed plant species is included in Appendix E. This list is a compilation of past surveys reported in previous INRMPs for NPS Monterey (Navy 2001) and NIROP Santa Cruz (Doak et al. 1996), the Del Monte Ocean Outfall Survey (Kreiberg 1999), and newer studies such as AgriChemical & Supply surveys (2009 and 2011) and work by Garcia and Associates (GANDA 2011). The current plant list identifies 485 unique taxa across all NSA Monterey properties (Appendix E). Total native species identified are 361, compared to 112 non-native species and 12 undetermined.[1] Appendix E also contains the 1991 tree inventory conducted at the Main Grounds by HortScience Inc., which identifies 104 different species.

1. The individual observed could only be identified to genus level. Some species of these genera are native and some are non-native.

Special Status Plants

Table 3-2 lists special status plants that may inhabit NSA Monterey based on California Natural Diversity Database (CNDDB) records. Eleven species are confirmed as currently present at NSA Monterey (GANDA 2011; Doak et al. 1996; Navy 2001a; Kreiberg 1999; Agri-Chemical & Supply 2009), though the dynamics of some individual populations may contribute to their current absence in some specific locations. One additional species, Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), is included in this list even though it has not been observed at its previously identified La Mesa Village location since 1993, nor elsewhere on NSA Monterey. Three special status species are federally listed: Monterey spineflower (*Chorizanthe pungens* var. *pungens*) is federally threatened; Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*) is federally endangered and state threatened; and Yadon's rein orchid is federally endangered. The known federally listed plant species occur only at the Monterey Area Properties; there are no known federally listed species at NIROP Santa Cruz, CIRPAS Marina Airport Facility, the Point Sur Facility, or NPMOSSP Mountain View. The remaining species are included in the CNPS List 1B.[2]

3.1.6.2 Invasive Plant Species

The California Invasive Plant Council (Cal-IPC) maintains lists that emphasize nonnative plants that are considered threats to wildlands and native ecosystems. The U.S. Department of Agriculture (USDA) noxious weed program emphasizes weeds that are threats to agriculture, including grazed rangeland.

Table 3-3 lists invasive weeds on NSA Monterey lands. Fifty-eight species found at NSA Monterey are on the Cal-IPC list. Species rated High invaders include: (i) five species at the Monterey Area Properties - pampas grass (*Cortaderia jubata*), French broom, English ivy, iceplant (*Carpobrotus edulis*), and German ivy (*Senecio mikanoides*); (ii) six species at the Dune/Research Area - European beachgrass (*Ammophilia arenaria*), ice plant, yellow starthistle (*Centaurea solstitialis*), red brome (*Bromus madritensis* ssp. *rubens*), French broom, and pampas grass; and (iii) four species at NIROP Santa Cruz - red brome, cheatgrass (*Bromus tectorum*), pampas grass, and French broom. Kikuyu grass is found at the Point Sur Facility and is on the USDA federal noxious weed list. Invasive plant and animal species are an important stressor on wildlife in this region, just as they are in other regions throughout the state (California Bay-Delta Authority 2000; Cal-IPC 2006; CDFG 2005; Goals Project 1999; Hickey et al. 2003; Jurek 1994; Lewis et al. 1993; Riparian Habitat Joint Venture 2004).

2. The CNPS List 1B identifies plants that are rare, threatened, and endangered in California and elsewhere.

Table 3-2. Special status plants occurring or potentially occurring at Naval Support Activity Monterey .

Scientific Name	Common Name	Status	Presence	Habitat	Known or Possible Locations		
					Monterey Area Properties	Point Sur Facility	NIROP Santa Cruz
Agrostis hooveri	Hoover's bent grass	-/-/1B	C	Dry sandy soils, open chaparral and oak woodland.			NIROP Santa Cruz
Allium hickmanii	Hickman's onion	-/-/1B	P	Coastal prairie, chaparral, northern coastal scrub, coastal sage scrub, closed-cone pine forest, valley grassland.	Possible		
Amsinckia lunaris	bent-flowered fiddleneck	-/-/1B	P	Coastal bluff scrub, cismontane woodland, valley and foothill grassland.			Possible
Arctostaphylos andersonii	Santa Cruz manzanita, Anderson's manzanita	-/-/1B	C	Dry hilltops, commonly associated with madrone, mixed oak and madrone-Douglas fir communities - in openings and at edges.			NIROP Santa Cruz
Arctostaphylos edmundsii	Little Sur manzanita	-/-/1B	P	Found in sandy coastal areas such as northern coastal bluff scrub. Also found in chaparral.		Possible	
Arctostaphylos glutinosa	Schreiber's manzanita	-/-/1B	P	Chaparral (diatomaceous shale), closed-cone pine forest.			Potentially at NIROP Santa Cruz - currently on dry hillsides on Lockheed property
Arctostaphylos hookeri ssp. hookeri	Hooker's manzanita	-/SE/1B	C	Closed-cone coniferous forest, chaparral, cismontane woodland, and sandy coastal scrub.	One individual in La Mesa Village (1993 only)		
Arctostaphylos montereyensis	Toro manzanita	-/-/1B	P	Chaparral, foothill woodland, northern coastal scrub (sandy).	Possible		
Arctostaphylos ohloneana[1]	Ohlone manzanita	-/-/1B	P	Closed-cone coniferous forest, coastal scrub (siliceous shale).			Potentially at NIROP Santa Cruz - occupies a small range in the "Lockheed Chalks" area of northwest Santa Cruz County
Arctostaphylos pajaroensis	pajaro manzanita	-/-/1B	P	Chaparral (sandy).	Possible		Possible
Arctostaphylos pumila	sandmat manzanita	-/-/1B	C	At NSA Monterey, primarily remnant central maritime chaparral. Can also be found in closed-cone coniferous forest, cismontane woodland, coastal dunes, and coastal scrub (sandy, openings).	Lab/Recreation Area, Annex (up to 2009), La Mesa Village (2009 only), Dune/Research Area		
Arctostaphylos regismontana	Kings Mountain manzanita	-/-/1B	P	Broadleafed upland forest, chaparral, North Coast coniferous forest (granitic or sandstone).			Possible
Arctostaphylos silvicola	Bonny Doon manzanita	-/-/1B	P	Chaparral, yellow pine forest (inland marine sands), and closed-cone pine forest.			Potentially at NIROP Santa Cruz - currently on dry hillsides on Lockheed property

Table 3-2. Special status plants occurring or potentially occurring at Naval Support Activity Monterey (Continued).

Scientific Name	Common Name	Status	Presence	Habitat	Known or Possible Locations		
					Monterey Area Properties	Point Sur Facility	NIROP Santa Cruz
Astragalus tener var. titi	coastal dunes milk-vetch	FE/SE/1B	P	Coastal bluff scrub, coastal dunes, coastal prairie (mesic), and often vernally mesic areas.	Possible		
Calyptridium parryi var. hesseae	Santa Cruz Mountains pussypaws	-/-/1B	P	Chaparral, foothill woodland (sandy or gravelly, openings).			Possible. Found in Santa Cruz Mountains
Castilleja ambigua ssp. insalutata	pink johnny-nip	-/-/1B	P	Coastal prairie, coastal scrub	Possible		
Centromadia parryi ssp. congdonii	Congdon's tarplant	-/-/1B	P	Valley and foothill grassland (alkaline).	Possible		
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	FE/-/1B	P	Lower montane coniferous forest (maritime ponderosa pine sandhills).			Possible - found in the Santa Cruz Mountains, generally between Scotts Valley and Ben Lomond
Chorizanthe pungens var. pungens	Monterey spineflower	FT/-/1B	C	Remnant central maritime chaparral, cismontane woodland, coastal dunes, coastal scrub, valley and foothill grassland (sandy).	Annex (not since 1993), Dune/Research Area		
Chorizanthe robusta var. robusta[2]	robust spineflower	FE/-/1B	P	Found in coastal dunes and openings. Associated communities include coastal strand, foothill woodland, northern coastal scrub (sandy or gravelly). Initially collected and reported in 1999 at the Abbotts Lagoon trailhead area of the Point Reyes National Seashore.	Possible		Possible
Cirsium occidentale var. compactum	compact cobwebby thistle	-/-/1B	P	Found in coastal dunes habitats. Associated communities include coastal strand, coastal prairies, chaparral, northern coastal scrub, coastal sage scrub.		Possible	
Clarkia jolonensis	jolon clarkia	-/-/1B	P	Habitats include chaparral, foothill woodland, coastal scrub and riparian woodland.	Possible	Possible	
Collinsia multicolor	San Francisco collinsia	-/-/1B	P	Northern coastal scrub (sometimes serpentinite), closed-cone pine forest.	Possible		
Cordylanthus rigidus ssp. littoralis	Seaside bird's-beak	-/SE/1B	P	Habitats include coastal dunes, maritime chaparral, foothill woodland, northern coastal scrub, coastal sage scrub (sandy, often disturbed sites).	Possible		
Delphinium californicum ssp. interius	Hospital Canyon larkspur	-/-/1B	P	Openings in chaparral and cismontane woodland (mesic).	Possible		
Delphinium hutchinsoniae	Hutchinson's larkspur	-/-/1B	P	Coastal prairie, chaparral, mixed evergreen forest, northern coastal scrub.	Possible	Possible	
Ericameria fasciculata	Eastwood's goldenbush	-/-/1B	P	Coastal dunes, chaparral, closed-cone pine forest, northern coastal scrub (sandy, openings).	Possible		

Table 3-2. Special status plants occurring or potentially occurring at Naval Support Activity Monterey (Continued).

Scientific Name	Common Name	Status	Presence	Habitat	Known or Possible Locations		
					Monterey Area Properties	Point Sur Facility	NIROP Santa Cruz
Eriogonum parviflorum	Seacliff buckwheat	None - host plant to the Smith's Blue Butterfly (Euphilotes enoptes smithi) FE	C	Coastal dunes.	Dune/Research Area		
Erysimum ammophilum	blooming coast wallflower, sand-loving wallflower	-/-/1B	C	At NSA Monterey: Coastal dunes. Less than 50 meters elevation. Can also be found in maritime chaparral and coastal scrub (sandy, openings).	Dune/Research Area		
Erysimum menziesii ssp. menziesii	Menzies' wallflower	FE/SE/1B	P	Coastal dunes.	Possible		
Erysimum teretifolium	Santa Cruz wallflower	FE/SE/1B	P	Chaparral, yellow pine forest (inland marine sands).			Possible
Fritillaria liliacea	fragrant fritillary	-/-/1B	P	Coastal prairie, valley and foothill grassland (often serpentinite), northern coastal scrub, wetland-riparian. Equally likely to occur in wetlands or non-wetlands.	Possible	Possible	
Gilia tenuiflora ssp. arenaria	Monterey gilia (sand gilia)	FE/ST/1B	C	At NSA Monterey: Coastal sand dunes. Less than 30 meters elevation. Can also be found in maritime chaparral, cismontane woodland, and coastal scrub (sandy, openings).	Dune/Research Area		
Hesperevax sparsiflora var. breviflora	short-leaved evax	-/-/1B	P	Sandy coastal bluff scrub, coastal dunes.			Possible
Hesperocyparis abramsiana (syn. Callitropsis abramsiana, Cupressus abramsiana)	Santa Cruz cypress	FE/SE/1B	P	Closed-cone pine forest, chaparral, lower montane coniferous forest (sandstone or granitic).			Possible
Hesperocyparis goveniana ssp. goveniana (syn. Callitropsis goveniana, Cupressus goveniana)	Gowen cypress	FT/-/1B	P	Closed-cone pine forest, maritime chaparral.	Possible		
Hesperocyparis macrocarpa (syn. Callitropsis macrocarpa, Cupressus macrocarpa)	Monterey cypress	-/-/1B	C	Closed-cone pine/cypress forests. Less than 30 meters elevation.	Main Grounds, Dune/Research Area (planted)		
Horkelia cuneata ssp. sericea	Kellogg's horkelia	-/-/1B	P	Northern coastal scrub (sandy or gravelly, openings), coastal sage scrub, maritime chaparral, closed-cone pine forest.	Possible		Possible
Horkelia marinensis	Point Reyes horkelia	-/-/1B	P	Coastal dunes, coastal strand, coastal prairie, northern coastal scrub (sandy).			Possible
Juglans hindsii	Northern California black walnut	-/-/1B	C	Riparian forest, riparian woodland.			2010 surveys - planted

Table 3-2. Special status plants occurring or potentially occurring at Naval Support Activity Monterey (Continued).

Scientific Name	Common Name	Status	Presence	Habitat	Known or Possible Locations		
					Monterey Area Properties	Point Sur Facility	NIROP Santa Cruz
Lasthenia conjugens	Contra Costa goldfields	FE/-/1B	P	Cismontane woodland, alkaline playas, valley and foothill grassland and vernal pools (mesic).	Possible		
Layia carnosa	beach layia	FE/SE/1B	P	Coastal dunes and sandy coastal scrub.	Possible		
Lupinus tidestromii	Tidestrom's lupine	FE/SE/1B	P	Habitat: coastal dunes. Communities: coastal strand.	Possible		
Malacothamnus arcuatus	arcuate bush-mallow	-/-/1B	P	Chaparral, cismontane woodland.			Possible
Malacothamnus palmeri (syn. M. palmeri var. lucianus)	Arroyo Seco bush-mallow	-/-/1B	P	Chaparral meadows and seeps, cismontane woodland.		Possible	
Malacothamnus palmeri var. involucratus[3]	Carmel Valley bush-mallow	-/-/1B	P	Chaparral, foothill woodland, coastal scrub.	Possible		
Malacothamnus palmeri var. palmeri[4]	Santa Lucia bush-mallow	-/-/1B	P	Chaparral (rocky).	Possible		
Malacothrix saxatilis var. arachnoidea	Carmel Valley cliff aster, cliff desertdandelion	-/-/1B	P	Chaparral (rocky), coastal scrub.	Possible		
Microseris paludosa	marsh scorzonella, marsh silverpuffs	-/-/1B	P	Northern coastal scrub, closed-cone pine forest, cismontane woodland, valley and foothill grassland.	Possible		Possible
Monolopia gracilens	woodland woollythreads	-/-/1B	P	Openings in broadleafed upland forest, chaparral and North Coast coniferous forest. Also found in cismontane woodland and serpentine valley and foothill grassland.	Possible		Possible
Orthotrichum kellmanii	Kellman's bristle moss	-/-/1B	P	Chaparral, cismontane woodland (sandstone, carbonate).			Possible
Penstemon rattanii var. kleei	Santa Cruz Mountains beardtongue	-/-/1B	P	Chaparral, yellow pine forest, north coastal coniferous forest.			Possible
Pentachaeta bellidiflora	white-rayed pentachaeta	FE/SE/1B	P	Cismontane woodland, valley and foothill grassland (often serpentinite).			Possible
Pinus radiata	Monterey pine	-/-/1B	C	Closed-cone pine forest, oak woodland. Less than 1200 meters elevation.	Main Grounds (landscaping), La Mesa Village (along perimeter), Dune/Research Area (western end of dune system)		2010 surveys - planted
Piperia candida	white-flowered rein orchid, peral orchid	-/-/1B	C	Broadleafed upland forest, lower montane coniferous forest and North Coast coniferous forest (sometimes serpentinite).			Observed during Tierra Data Inc. 2011 Wetland Surveys
Piperia yadonii	Yadon's rein orchid	FE/-/1B	C	Generally sandy soil or sandstone in coastal shrubland and maritime chaparral, Monterey pine forest. Less than 150 meters elevation.	La Mesa Village, Lab/Recreation Area, Annex		

Table 3-2. Special status plants occurring or potentially occurring at Naval Support Activity Monterey (Continued).

Scientific Name	Common Name	Status	Presence	Habitat	Known or Possible Locations		
					Monterey Area Properties	Point Sur Facility	NIROP Santa Cruz
Plagiobothrys chorisianus var. chorisianus	Choris' popcorn-flower	-/-/1B	P	Chaparral, coastal prairie and mesic coastal scrub.			Possible
Plagiobothrys diffusus	San Francisco popcorn-flower	-/SE/1B	P	Coastal prairie and valley and foothill grassland.			Possible
Potentilla hickmanii	Hickman's cinquefoil	FE/SE/1B	P	Found in meadows, freshwater marsh and coastal areas. It usually occurs in wetlands, but occasionally is found in non-wetlands. Associated communities include northern coastal bluff scrub, closed-cone pine forest, freshwater wetlands (marshes and swamps), wetland-riparian (vernally mesic).	Possible		
Rosa pinetorum	pine rose	-/-/1B	P	Yellow pine forest, red fir forest, 2000-6500 ft.	Possible		Possible
Sanicula maritima	adobe sanicle	-/Rare/1B	P	Chaparral, coastal prairie, meadows and seeps, and valley and foothill grassland (clay, serpentinite).		Possible	
Stebbinsoseris decipiens (syn. Microseris decipiens)	Santa Cruz microseris	-/-/1B	P	Coastal prairie, chaparral, mixed evergreen forest, closed-cone pine forest, northern coastal scrub, valley and foothill grassland (open areas, sometimes serpentinite).	Possible		Possible
Trifolium buckwestiorum	Santa Cruz clover	-/-/1B	P	Along edges in coastal prairie (gravelly) and mixed evergreen forest.	Possible		Possible
Trifolium polyodon[5]	Pacific Grove clover	-/Rare/1B	P	Meadows and seeps, coastal prairie, closed-cone pine forest, valley and foothill grassland (mesic), and wetland-riparian. Usually occurs in wetlands, but occasionally found in non-wetlands.	Possible		
Trifolium trichocalyx	Monterey clover	FE/SE/1B	P	Closed-cone pine forest (sandy, openings, burned areas).	Possible		

Note: Nomenclature corresponds to the Jepson Manual 1993, unless otherwise noted.

Sources: Shuford and Gardali 2008; USFWS 2008; CNDDB 2010; CNPS 2010; GANDA 2011; Doak et al. 1996; Navy 2001; Kreiberg 1999, AgriChemical & Supply Inc. 2009. All possible plants are those with CNDDB recorded sightings within the vicinity of NSA Monterey. TDI 2011.

Codes
Federal Status: FE = Endangered; FT = Threatened; PT = Proposed threatened; CL = Candidate for listing; SC = Species of Concern
State/CDFW Status: ST = Threatened; CSC = California species of special concern
CNPS List: 1B = identifies plants rare, threatened, or endangered in California and elsewhere
Present: P = Possible; C = Confirmed

[1] = *Arctostaphylos ohloneana* was accepted in March 2008 as a taxon native to California to be recognized in the 2nd edition Jepson Manual. It was not recorded previously.

[2] = *Chorizanthe robusta* var. *robusta* was accepted in February 2005 as a taxon to be recognized in the 2nd edition Jepson Manual. It was not recorded previously.

[3] = *Malacothamnus palmeri* var. *involucratus* was previously recorded in the 1st edition Jepson Manual as a synonym for *Malacothamnus palmeri*. It was accepted in January 2010 as a distinct taxon native to California to be recognized in the 2nd edition Jepson Manual.

[4] = *Malacothamnus palmeri* var. *palmeri* was accepted in January 2010 as a taxon native to California to be recognized in the 2nd edition Jepson Manual. It was not recorded previously.

[5] = *Trifolium polyodon* was previously recorded in the 1st edition Jepson Manual as a synonym for *Trifolium variegatum* phase 4. It was accepted March 2010 as a distinct taxon to be recognized in the 2nd edition Jepson Manual.

Table 3-3. Noxious or invasive weeds at Naval Support Activity Monterey .

Scientific Name	Common Name	MG	LMV	Lab/Rec Annex	Dunes	CDFA Status	Cal-IPC Status
Monterey Area Properties							
*Acacia longifolia**	Sydney golden wattle				X	-	-
Acacia melanoxylon	blackwood acacia				X	-	L
Ammophila arenaria	European beachgrass				X	-	H
Avena barbata	slender wild oat		Undetermined			-	M
Avena fatua	wild oat		Undetermined			-	M
Brassica sp.*	mustard				X	-	-
Briza maxima	rattlesnake grass		X			-	L
Bromus diandrus	ripgut grass				X	-	M
Bromus hordeaceus	soft chess				X	-	L
Bromus madritensis ssp. *rubens*	red brome				X	-	H
Cakile maritima	sea rocket				X	-	L
Carduus pycnocephalus	Italian thistle				X	C	M
Carpobrotus chilensis	sea fig				X	-	M
Carpobrotus edulis	ice plant, hottentot fig				X	-	H
Carpobrotus sp.	sea fig, ice plant	X			X	-	M
Centaurea melitensis	Maltese starthistle				X	-	M
Centaurea solstitialis	yellow starthistle				X	C	H
Cirsium vulgare	bull thistle				X	-	M
Conium maculatum	poison hemlock		X		X	-	M
Cortaderia jubata	pampas grass		CIRPAS Facility		X	-	H
Cynara cardunculus	artichoke thistle		Undetermined			B	M
Cynodon dactylon	Bermuda grass	X				C	M
Ehrharta erecta	panic veldtgrass				X	-	M
Erodium cicutarium	redstem filaree, redstem stork's bill				X	-	L
Eucalyptus globulus	Tasmanian blue gum eucalyptus	X			X	-	M
Festuca arundinacea	tall fescue				X	-	M
Genista monspessulana	French broom		X	X	X	C	H
Geranium dissectum	wild geranium, cutleaf geranium				X	-	M
Hedera helix	English ivy	X				-	H
Hirschfeldia incana	summer mustard, shortpod mustard, Mediterranean hoary mustard				X	-	M
Hordeum murinum ssp. *leporinum*	foxtail barley, hare barley				X	-	M
Hypochaeris glabra	smooth cat's ear				X	-	L
Hypochaeris radicata	hairy catsear, rough cat's ear				X	-	M
*Iris douglasiana***	Douglas' iris	X			X	C	-
Lobularia maritima	sweet alyssum				X	-	L
Lolium multiflorum	Italian ryegrass				X	-	M
*Lupinus arboreus***	yellow bush lupine, coast bush lupine	X			X	-	L
Lythrum hyssopifolia (syn. *L. hyssopifolium*)	hyssop loosestrife	X	X			-	M
Medicago polymorpha (syn. *M. hispida*)	California burclover				X	-	L
Myoporum laetum	lollypop tree, ngaio tree				X	-	M
Oxalis pes-caprae	Bermuda buttercup				X	-	M
Pennisetum clandestinum	kikuyu grass				X	C	L
Poa pratensis	Kentucky bluegrass	X				-	L
Polypogon monspeliensis	annual beard grass, rabbits foot grass				X	-	L
Raphanus sativus	wild radish				X	-	L
Rumex acetosella	sheep sorrel				X	-	M
Senecio glomeratus (syn. *Erechtites glomeratus*)	New Zealand fireweed, cutleaf burnweed				X	-	M
Senecio mikanioides (syn. *Delairea odorata*)	German ivy		X			-	H
Senecio minimus (syn. *Erechtites minimus*)	Australian fireweed, coastal burnweed				X		M

Table 3-3. Noxious or invasive weeds at Naval Support Activity Monterey (Continued).

Scientific Name	Common Name	MG	LMV	Lab/Rec	Annex	Dunes	CDFA Status	Cal-IPC Status
Silybum marianum	milk thistle					X	-	L
Vinca major	periwinkle	X					-	M
Vulpia myuros	rattail fescue					X	-	M
Point Sur								
Pennisetum clandestinum	kikuyu grass						C	L
NIROP Santa Cruz								
Briza maxima	rattlesnake grass, big quaking grass						-	L
Bromus diandrus	ripgut grass, ripgut brome						-	M
Bromus hordeaceus	soft chess, soft brome						-	L
Bromus madritensis ssp. *rubens*	red brome						-	H
Bromus tectorum	cheatgrass						-	H
Carduus pycnocephalus	Italian thistle						C	M
Centaurea melitensis	tocalote, Maltese starthistle						-	M
Cirsium vulgare	bull thistle						-	M
Convolvulus arvensis	field bindweed, orchard morningglory						C	-
Cortaderia jubata	purple pampas grass						-	H
Cynosurus echinatus	hedgehog dogtail grass						-	M
*Cyperus esculentus***	nut grass						B	-
Erodium cicutarium	redstem filaree, redstem stork's bill						-	L
Eucalyptus globulus	Tasmanian blue gum						-	M
Festuca arundinacea	tall fescue						-	M
Genista monspessulana	French broom						C	H
Geranium dissectum	cutleaf geranium						-	M
Holcus lanatus	common velvetgrass						-	M
Hordeum murinum	mouse barley						-	M
Hordeum murinum ssp. *leporinum*	hare barley						-	M
Hypochaeris glabra	smooth cat's ear						-	L
*Iris douglasiana***	Douglas' iris						C	-
Lolium multiflorum	Italian ryegrass						-	M
*Lupinus arboreus***	yellow bush lupine						-	L
Phalaris aquatica (syn. *P. tuberosa*)	harding grass						-	M
Polypogon monspeliensis	annual beard grass, rabbits footgrass						-	L
Rumex acetosella	sheep sorrel						-	M
Torilis arvensis	spreading hedgeparsley						-	M-Alert
Trifolium hirtum	rose clover						-	M
Verbascum thapsus	common mullein						-	L
Vulpia myuros	rattail fescue						-	M

Note: Nomenclature corresponds to the Jepson Manual 1993 unless otherwise noted.

* = Species are not included in CDFA and Cal-IPC lists, but have been targeted for weed control at Monterey Bay properties of NSA Monterey.

** = Species are native to California, but classified by the CDFA as a weed.

Source: Cal-IPC 2006; CDFA 2010; GANDA 2011; Doak et al. 1996; Navy 2001; Kreiberg 1999; Agrichem & Supply 2009. TDI 2010a. TDI 2011.

MG = Main Grounds; LMV = La Mesa Village; Lab/Rec = Laboratory/Recreation Area; Annex = Annex Area; Dunes = Dune/Research Area.

California Department of Food and Agriculture (CDFA 2010) Noxious Weed status:

List A - Weed species for which CDFA policies call for eradication, containment or entry refusal.
List B - Widespread species that are difficult to contain; CDFA allows county Agricultural Commissioners to decide whether to target them for eradication or containment in their jurisdictions.
List C - Weeds that are so widespread that CDFA does not endorse state or county-funded eradication or containment efforts except in nurseries or seed lots.

Cal-IPC (2006) status:

High - Severe ecological impacts. Moderate to high dispersal rates. Widespread distribution.
Moderate - Substantial ecological impacts. Moderate to high dispersal rates. Limited to widespread distribution. Establishment depends on ecological disturbance.
Limited - Minor ecological impacts. Low to moderate dispersal rates. Limited distribution, but may be locally persistent and problematic.

3.1.6.3 Wildlife

Species lists presented for reptiles, amphibians, birds and mammals are based on surveys conducted on NSA Monterey during the last 15 years and are presented in Appendix E (GANDA 2011; Doak et al. 1996; Navy 2001; Kreiberg 1999; AgriChemical & Supply 2009). Other than targeted surveys for the Smith's blue butterfly at the Monterey Area Properties, no baseline survey has been conducted for invertebrates at any of the NSA Monterey properties. Critical Habitat for the California red-legged frog encompasses both the Point Sur and NIROP properties. This Critical Habitat was designated in 2010[3] (USFWS 2010). Based on focused surveys by GANDA (2012), California red-legged frog is known to occur on the Point Sur Facility property, but not NIROP Santa Cruz. No other federally listed wildlife species are known to occur on the NSA Monterey properties based on comprehensive surveys by GANDA (2011) and previous surveys.

Terrestrial and Freshwater Invertebrates

No overall baseline survey has been conducted for invertebrates at NSA Monterey. Invertebrate surveys were conducted recently (GANDA 2011) in select locations: at the Dune/Research Area and NIROP Santa Cruz for terrestrial invertebrates and at the Main Grounds and Dune/Research Area for freshwater aquatic invertebrates.

Invertebrates are important for both maintaining self-sustaining plant communities and for insectivorous birds and bats. Other than for select species, larger pollinator communities at NSA Monterey have not been surveyed. Changes in numbers and diversity of insects and other invertebrates at NSA Monterey could influence changes in native and rare plant communities[4] and bird and bat species use of the various properties for foraging and potentially influence migrations.

Reptiles and Amphibians

There are a total of 11 reptiles and eight amphibians that have been observed in various surveys at the NSA Monterey properties (Appendix E). Of particular note are the California species of special concern California legless lizard (*Anniella pulchra*) and California newt (*Taricha torosa torosa*).

Critical Habitat for the California red-legged frog entirely overlaps the Point Sur Facility and the NIROP Santa Cruz property; it comes within 1.2 kilometers of La Mesa Village as well. During the most recent surveys (GANDA 2012) two adults of the federally threatened California red-legged frog were observed on the Point Sur Facility. This species has not been documented on NIROP Santa Cruz, or other NSA Monterey properties.

3. Federal Register Vol. 75, No. 51 Wednesday, March 17, 2010.
4. In particular, see Appendix F species profiles for Monterey spineflower and Yadon's rein orchid.

Birds

In the following sections the nomenclature used for bird species is consistent with the American Ornithological Union, except that bird names are not capitalized (to be consistent with naming conventions for other species groups in this INRMP).

There are 92 distinct bird species present across NSA Monterey properties (Appendix E).[5] They include a range of landbirds, shorebirds, seabirds and waterfowl that utilize the various habitats on each of the NSA Monterey properties, including riparian and wetland habitats as well as native and remnant forests and shrubs. Many of these are migratory birds, the management of which are discussed in Section 4.4.4: Birds.

No federally-listed species are known to occur at any of the NSA Monterey properties. Species of concern include the California fully protected brown pelican (*Pelecanus occidentalis*), Nuttall's woodpecker (*Picoides nuttalli*), and oak titmouse (*Baeolophus inornatus*)—USFWS Birds of Conservation Concern—and the short-eared owl (*Asio flammeus*) and yellow warbler (*Dendroica pretechia*)–both California Bird Species of Special Concern.

Terrestrial Mammals

There are 44 distinct species of terrestrial mammals present across the NSA Monterey properties.[6] Of particular interest are three California Species of Special Concern: the Monterey ornate shrew (*Sorex ornatus salarius*), Monterey dusky-footed woodrat[7] (*Neotoma fuscipes luciana*), and Townsend's big-eared bat (*Corynorhinus townsendii*). There are no federally-listed terrestrial mammals known to occur at any of the NSA Monterey properties.

Marine Life

Marine life surveys have included plants and algae, invertebrates and occasional sightings of offshore mammals (harbor seal [*Phoca vitulina*] at Point Sur Facility and California sea lion [*Zalophus californianus*] at the Dune/Research Area).

3.1.7 Special Status Species

Table 3-2 and Table 3-4 list the status and locations of the 20 sensitive species that have been documented at NSA Monterey. Of those, four are federally listed: Monterey spineflower is federally threatened; Monterey gilia is federally endangered and state listed threatened; Yadon's rein orchid is federally endangered; and Smith's blue butterfly is federally endangered. The western snowy plover (*Charadrius nivosus nivosus*) has not been documented as occurring on NSA Monterey property. A small portion on the eastern edge of the

5. Some of the properties contain the same species. Thus, species counts on individual properties do not add up to total species count across properties.
6. Some of the properties contain the same species. Thus, species counts on individual properties do not add up to total species count across properties.
7. This species was observed by researchers from U.C. Santa Cruz in 1996 as reported in Doak et al. (1996). However this species was not observed in 2011 during general flora and fauna surveys by GANDA (2011).

Dune/Research Area was proposed as Critical Habitat in 2011 (USFWS 2011) but was exempted. The brown pelican was recently delisted and is a California fully protected species. The remaining species are either federal or California species of concern, or included in the CNPS's List 1B. The marbled murrelet is a potentially occurring species at NSA Monterey, with Critical Habitat designated within five miles of NIROP Santa Cruz. The federally threatened California red-legged frog occurs at the Point Sur Facility (See also Appendix F).

3.2 Monterey Area Properties

3.2.1 Ecoregional Setting

While the group of properties in the Monterey Area (herein defined as Main Grounds, Laboratory/Recreation Area, Annex, La Mesa Village, and the CIRPAS Marina Airport Facility) are located within the Watsonville–Salinas Valley eco-subregion (Refer to Map 3-1), their proximity to the coast distances their affiliation with the largely drier and warmer agricultural region of the Salinas Valley to the east and southeast. Dune and coastal strand habitats exist immediately east of the beaches, while coastal scrub, chaparral, Monterey pine, and live oak woodland communities occur inland. The Monterey Bay area has its own locally endemic tree species: the Monterey cypress and Monterey pine. Important as wildlife corridors, riparian communities are associated with banks of the Salinas River and various creeks and canyons (U.S. Army Corps of Engineers [USACE] 1993).

Where still undeveloped for agriculture or urbanization, coastal dunes make up a prominent geologic and floristic feature of this eco-subregion. Dune soils generally increase in elevation, age, and soil profile development from the coast inland. Special status species occur within the dune habitat, a unique environment characterized by low fertility, wind-blown substrate, low water-holding capacity, and coastal fog (USACE 1992).

Coastal erosion along Monterey Bay has been occurring for several thousand years as a natural response to sea level rise after the last ice age (USACE 1993), and its rate is expected to increase with global climate change and associated sea level rise (Philip Williams and Associates 2009).

3.2.2 Local Climate

Although the Pacific Ocean's cold water and prevailing westerly and northwesterly winds have a strong influence toward producing summer fog, the Monterey Area Properties are in a protected location on the bay, and fog is less frequent than in other coastal locations such as Point Sur. Temperatures seldom exceed 85° Fahrenheit (F) and frost and freezing is uncommon (Figure 3-1); however, storms with extreme winds occasionally occur. Annual precipitation averages 19.3 inches (Figure 3-2), with the heaviest rainfall occurring during December and January (Figure 3-3). Summers at the Monterey Area Properties are dry (Table 3-5).

Table 3-4. Special status species occurring or potentially occurring at Naval Support Activity Monterey.

Common Name	Scientific Name	Status Fed/State	Presence	Habitat	Known or Possible Locations		
					Monterey Area Properties	Point Sur Facility	NIROP Santa Cruz
Invertebrates							
Smith's blue butterfly	*Euphilotes enoptes smithi*	FE/-	P	Found only on or nearhost plants: dune buckwheat (*Eriogonum parvifolium*) and coast buckwheat (*E. latifolium*). In coastal dunes.	Possible - within historic range of species, but not found during most recent surveys.	Possible	
Zayante band-winged grasshopper	*Trimerotropis infantilis*	FE/-	P				Possible
Fishes							
freshwater sculpins	*Cottus* sp.	-/ST, SSC or FP (species dependent)	P				In Scott Creek drainage (into which Boyer Creek and Mill Creek drain)
coho salmon - central California coast ESU[1]	*Oncorhynchus kisutch*	FE/SE	P				In Scott Creek drainage - southernmost of few remaining creeks in Central CA with anadromous fish run. This run considered for listing as endangered by CDFW.
steelhead - south/central CA coast DPS[2]	*Oncorhynchus mykiss irideus*	FT/SSC	P		Possible	Possible	
steelhead - central CA coast DPS[3]	*Oncorhynchus mykiss irideus*	FT/-	P				Possible
tidewater goby	*Eucyclogobius newberryi*	FE/SSC	P		Possible		
Reptiles							
California legless lizard[4]	*Anniella pulchra*	-/SSC	C	In Monterey Bay area. Moist warm loose soil with plant cover. Sparsely vegetated areas of beach dunes, chaparral, sandy washes and stream terraces. Suitable habitat often indicated by leaf litter under trees, bushes in sunny areas and dunes stabilized with bush lupine and mock heather.	Dune Research Area - black color variant		
			P	From southern edge of San Joaquin Rover to northwestern Baja California. Moist warm loose soil with plant cover. Sparsely vegetated areas of beach dunes, chaparral, sandy washes and stream terraces. Suitable habitat often indicated by leaf litter under trees, bushes in sunny areas and dunes stabilized with bush lupine and mock heather.			Possible - chaparral, mixed evergreen and riparian woodland habitats - silvery color variant

Table 3-4. Special status species occurring or potentially occurring at Naval Support Activity Monterey.

Common Name	Scientific Name	Status Fed/State	Presence	Habitat	Known or Possible Locations		
					Monterey Area Properties	Point Sur Facility	NIROP Santa Cruz
coast horned lizard	*Phrynosoma blainvillii*	-/SSC	P	Open areas of sandy soil and low vegetation in valleys, foothills and semiarid mountains from sea level to 8,000 ft. Grasslands, coniferous forests, woodlands and chaparral with open areas and patches of loose soil. Often found in lowlands along sandy washes with scattered shrubs and along dirt roads, and near ant hills.	Possible		Possible - chaparral.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	FE/SE	P	Utilizes a wide variety of habitats, preferring grasslands or wetlands near ponds, marshes and sloughs. May overwinter in upland areas away from water.			Possible
two-striped garter snake	*Thamnophis hammondii*	-/SSC	P	Generally found around pools, creeks, cattle tanks, and other water sources, often in rocky areas, in oak woodland, chaparral, brushland and coniferous forest.	Possible		
western pond turtle	*Emys marmorata*	-/SSC	P	Ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches, with abundant vegetation and either rocky or muddy bottoms, in woodland, forest and grassland. In streams, prefers pools to shallower areas. Logs, rocks, cattail mats, and exposed banks required for basking. May enter brackish water and even seawater.	Possible	Possible	Possible - riparian woodland.
Amphibians							
California newt, coast range newt	*Taricha torosa torosa*	-/SSC*	C	Wet forests, oak forests, chaparral, and rolling grasslands.	Main Grounds		From December to May uses riparian areas for breeding
California red-legged frog	*Rana draytonii*	FT/SSC	P	Ponds in humid forests, woodlands, grasslands and streamsides with plant cover. Breeding habitat is in permanent or ephemeral water sources. From sea level to 5,000 ft.	Possible	Present	Possible - riparian woodland, Trinity Lake.
California tiger salamander	*Ambystoma californiense*	FT/ST	P	Frequents grasslands, oak savanna, and edges of mixed woodland and lower elevation coniferous forest.	Possible		Possible - riparian woodland.

Table 3-4. Special status species occurring or potentially occurring at Naval Support Activity Monterey.

Common Name	Scientific Name	Status Fed/State	Presence	Habitat	Known or Possible Locations		
					Monterey Area Properties	Point Sur Facility	NIROP Santa Cruz
foothill yellow-legged frog	*Rana boylii*	-/SSC	P	Streams and rivers with rocky substrate and open, sunny banks. In forests, chaparral and woodlands. Sometimes found in isolated pools, vegetated backwaters and deep, shaded spring-fed pools. Sea level to 6,700 ft.	Had previously been recorded at Del Monte Lake. Currently, no suitable habitat for this species.		Possible - riparian woodland, Trinity Lake.
Birds							
Allen's hummingbird	*Selasphorus sasin*	SC/-	P		Most likely	Possible	Possible
ashy storm-petrel	*Oceanodroma homochroa*	-/SSC	P	Off-shore species mostly.		Breeds in limited numbers just north of Point Sur on offshore rocks.	
black swift	*Cypseloides niger*	-/SSC	P		Possible	Possible	Possible - expected habitat of chaparral and grasslands
burrowing owl	*Athene cunicularia*	-/SSC	P		Possible forager	Possible forager	
California brown pelican	*Pelecanus occidentalis californicus*	DL**/CFP	C		Offshore Dune/Research Area	Point Sur	
Lawrence's goldfinch	Spinus lawrencei	SC/-	P				Expected habitat off mixed evergreen
loggerhead shrike	*Lanius ludovicianus*	SC/SSC	P			Possible - not breeding	Possible - expected habitat of mixed evergreen
long-eared owl	*Asio otus*	-/SSC	P				Possible- expected habitat of riparian woodland
marbled murrelet	*Brachyramphus marmoratus*	FT/SE	P		Occurs occasionally in the near-shore waters off the coast of Monterey Bay.	Occurs occasionally in the near-shore waters off the coast of Point Sur.	Critical habitat (breeding) very close to NIROP property boundary: Big Basin State Park, Henry Cowell Redwoods State Park, Fall Creek Unit.
Northern harrier	*Circus cyaneus*	-/SSC	P		Possible forager	Possible forager	Possible forager - expected habitat of fresh and saltwater marsh
Nuttall's woodpecker	*Picoides nuttallii*	SC/-	C		La Mesa Village		
			P				Probable - expected habitat of mixed evergreen
oak titmouse	*Baeolophus inornatus*	SC/-	C		Main Grounds and La Mesa Village		
			P				Probable - expected habitat of mixed evergreen
olive-sided flycatcher	*Contopus cooperi*	SC/SSC	P				Definite potential - expected habitat of mixed evergreen
peregrine falcon	*Falco peregrinus anatum*	SC/CFP (DL)	P		Possible forager	Possible forager	Possible forager - expected habitat of fresh and saltwater marsh
short-eared owl	*Asio flammeus*	-/SSC	C				X

Table 3-4. Special status species occurring or potentially occurring at Naval Support Activity Monterey.

Common Name	Scientific Name	Status Fed/State	Presence	Habitat	Known or Possible Locations		
					Monterey Area Properties	Point Sur Facility	NIROP Santa Cruz
tricolored blackbird	*Agelaius tricolor*	-/SSC	P		Possible, though not probable		
tufted puffin	*Fratercula cirrhata*	-/SSC	P	Off-shore species mostly.		Breeds in limited numbers just north of Point Sur on offshore rocks.	
Vaux's swift	*Chaetura vauxi*	-/SSC	P				Possible nester in redwood groves; other grassland habitat use
Western snowy plover	*Charadrius alexandrinus nivosus*	FT/SSC	P	Beach species.	Possible	Possible	
white-tailed kite	*Elanus leucurus*	-/CFP	P			Possible forager - no breeding	Possible - expected habitat of grasslands, mixed evergreen
yellow warbler	*Dendroica petechia*	-/SSC	C				X
Mammals							
American badger	*Taxidea taxus*	-/SSC	P	At Santa Cruz - mixed evergreen, riparian woodland.	Possible	Possible	Possible
Monterey dusky-footed woodrat	*Neotoma macrotis luciana* (syn. *N. fuscipes luciana*)	-/SSC	C		Possible		Observed in 1996 at NIROP Santa Cruz (Doak et al. 1996). Not observed by GANDA (2011).
Monterey ornate shrew	*Sorex ornatus salarius*	-/SSC	P	At Santa Cruz - fresh and saltwater marsh (ornate shrew).	Ornate shrew found by GANDA in La Mesa Village (to be confirmed if Monterey ornate shrew).		Possible
pallid bat	*Antrozous pallidus*	-/SSC	P	At Santa Cruz - mixed evergreen.			Possible
salt-marsh wandering shrew	*Sorex vagrans halicoetes*	-/SSC	P	At Santa Cruz - fresh and saltwater marsh.			Possible
San Francisco dusky-footed woodrat	*Neotoma fuscipes annectens*	-/SSC	P				Possible
Southern sea otter	*Enhydra lutris nereis*	FT/CFP	P		Possible	Possible - sea otter preserve north of Pt. Sur.	
Townsend's big-eared bat	*Corynorhinus townsendii*	-/SSC	C			Point Sur	NIROP Santa Cruz
western mastiff bat	*Eumops perotis californicus*	-/SSC	P				Possible
western red bat	*Lasiurus blossevilli*	-/SSC	P				Possible

*This species of special concern designation is for populations only in the Monterey County south.

**The California brown pelican (*Pelecanus occidentalis californicus*) was delisted from the Federal endangered list on December 17, 2009 and from the State endangered list on June 3, 2009.

[1]The federal listing is limited to naturally spawning populations in streams between Punta Gorda, Humboldt Co. and the San Lorenzo River, Santa Cruz Co. The state listing is limited to Coho south of Punta Gorda, Humboldt Co.

2The federal listing includes all runs in coastal basins from the Pajaro River south to, but not including, the Santa Maria River. The DFG "Species of Special Concern" designation refers to southern steelhead trout.

[3]The federal listing includes all runs in coastal basins from the Russian River in Sonoma County, south to Soquel Creek in Santa Cruz County, inclusive. It includes the San Francisco and San Pablo Bay basins, but excludes the Sacramento-San Joaquin River basins.

[4]It was determined that the black legless lizard (*Anniella pulchra nigra*) and silvery legless lizard (*Anniella pulchra pulchra*) are actually color variants of the same species: California legless lizard. They are not subspecies.

Sources: Shuford and Gardali 2008; CDFG 2011; USFWS 2008; CNDDB 2010; CNPS 2010; GANDA 2011; Doak et al. 1996; Navy 2001; Kreiberg 1999; AgriChemical & Supply Inc. 2009

Codes

Federal Status: FE = Endangered; FT = Threatened; DL = Delisted; SC = Species of Concern

State/CDFW Status: SE = Endangered; ST = Threatened; SSC = California Species of Special Concern; CFP = California Fully Protected

CNPS List: 1B = identifies plants rare, threatened, or endangered in California and elsewhere

Present: P = Possible; C = Confirmed

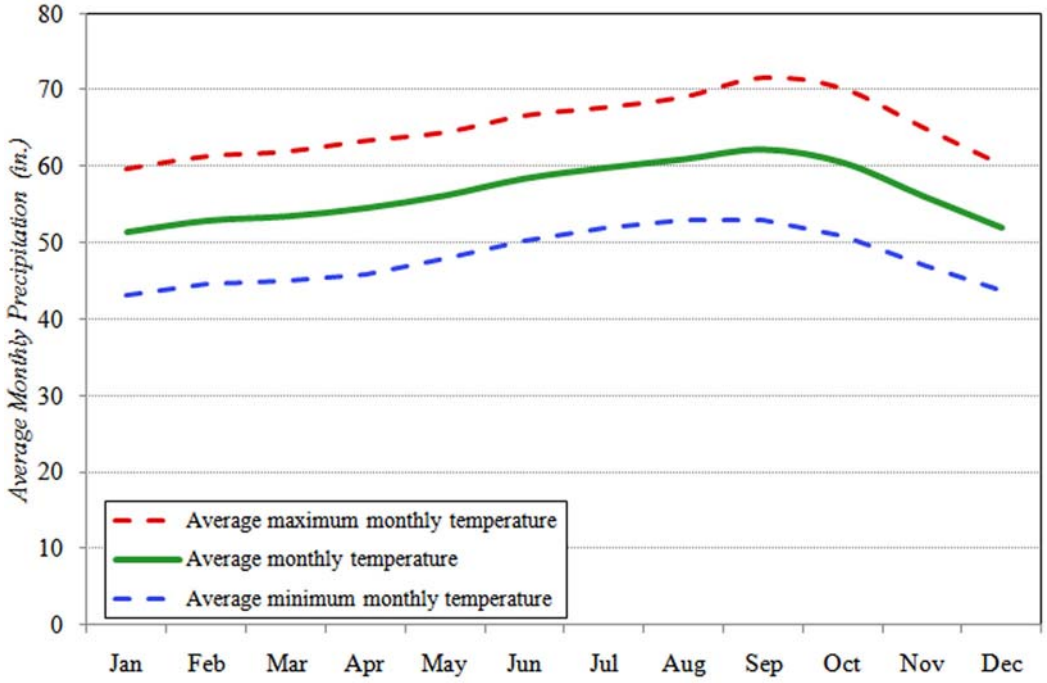


Figure 3-1. Average monthly temperature regime at Naval Support Activity Monterey (Data source: Western Regional Climate Center, Monterey weather station).

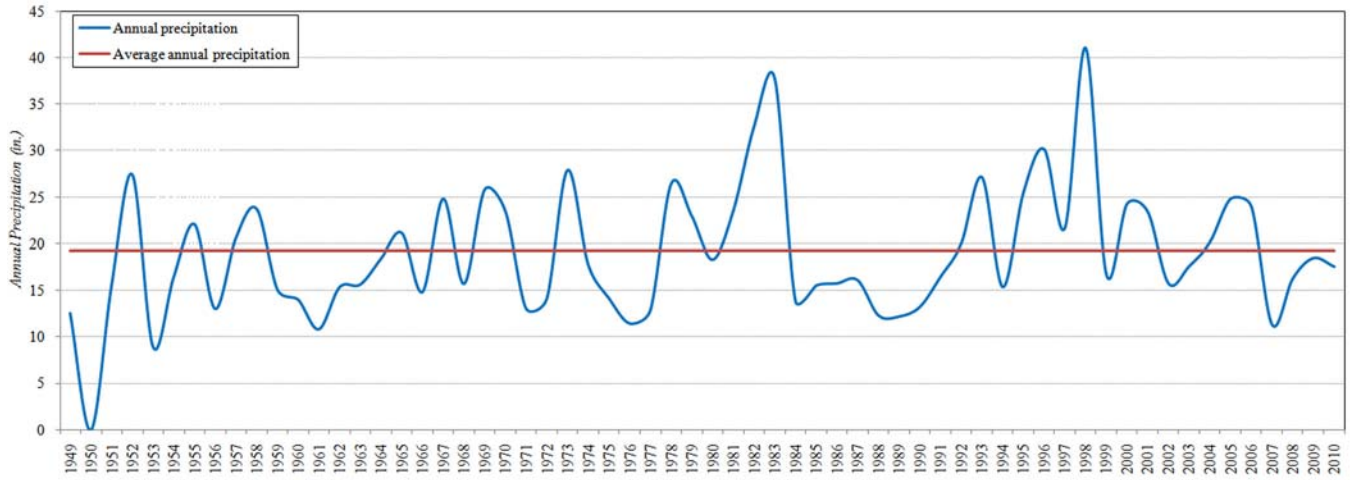


Figure 3-2. Annual precipitation at Naval Support Activity Monterey from 1949-2010 (partial data only for 2010) (Data source: Western Regional Climate Center, Monterey weather station).

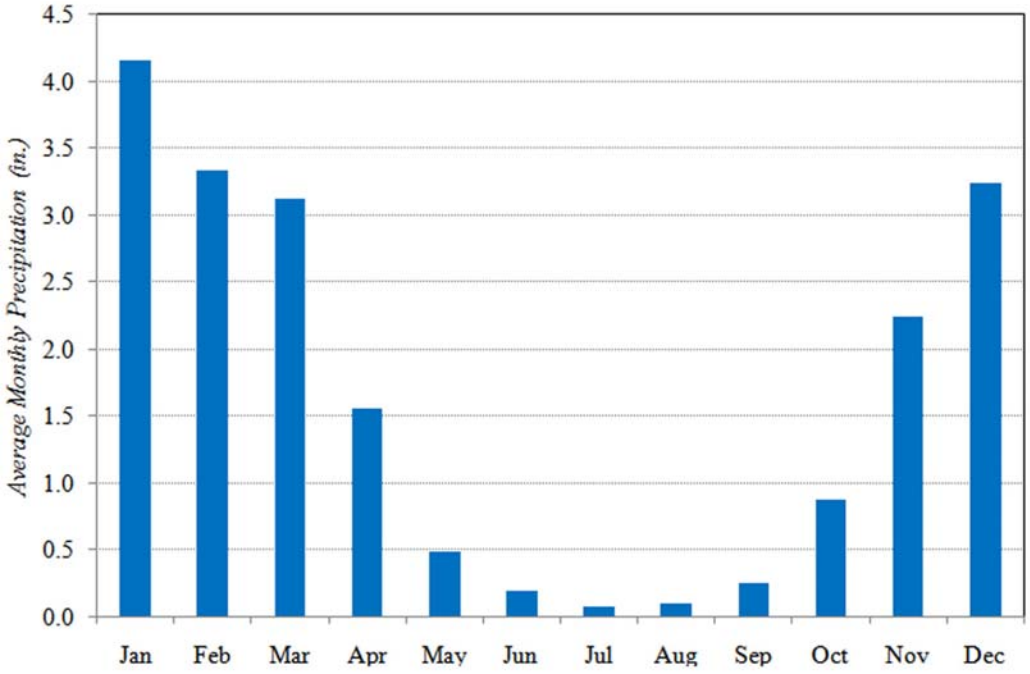


Figure 3-3. Average monthly rainfall patterns at Naval Support Activity Monterey (Data source: Western Regional Climate Center, Monterey weather station).

Table 3-5. Comparison of weather conditions at the five property locations of Naval Support Activity Monterey. The properties are listed from north to south and data are based on Western Regional Climate Center weather stations located within 4-8 miles of each property.

Property Name	WRCC Weather Station	Average Max/Min Temperature: January (°F)	Average Max-Min Temperature: August (°F)	Average Annual Rainfall (in.)
Monterey Bay Properties	Monterey	59.9/43.3	69.0/52.9	19.3
CIRPAS/Marina Airport	Salinas 2 E	62.5/40.5	72.9/54.6	14.6
Point Sur Facility	Big Sur State Park	60.3/43.2	77.4/50.0	40.8
NIROP Santa Cruz	Ben Lomond 4	61.6/37.0	85.6/50.4	49.0
NPMOSSP Sunnyvale	Palo Alto	57.3/38.5	78.5/54.8	15.2

The preceding text and figures apply to the NSA Monterey properties near Monterey Bay. The CIRPAS Marina Airport Facility has similar climatic regime, with slightly greater range in temperatures and slightly lower rainfall (Figure 3-4 and Figure 3-5). The other three properties that comprise NSA Monterey differ most notably in rainfall and are discussed below (Figure 3-5). Table 3-5 summarizes the basic climate conditions at each property (Data source: Western Regional Climate Center [2010]; www.wrcc.dri.edu).

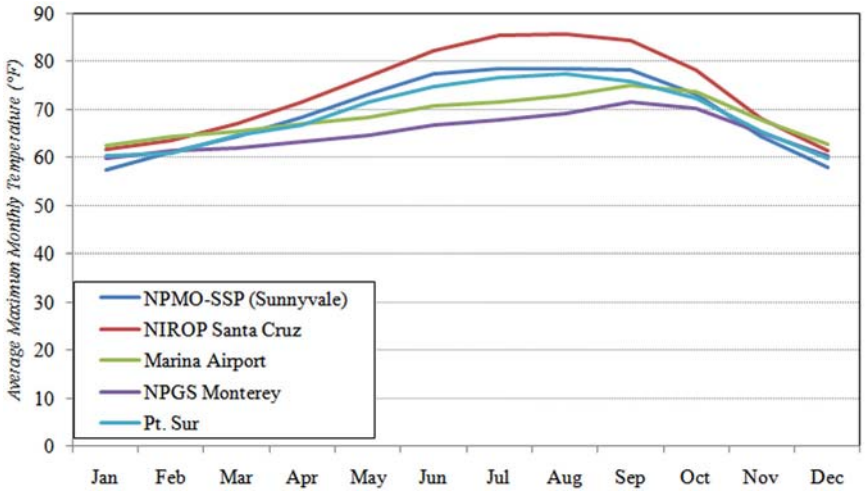


Figure 3-4. Average monthly maximum temperatures for the five properties of Naval Support Activity Monterey (Data source: Western Regional Climate Center).

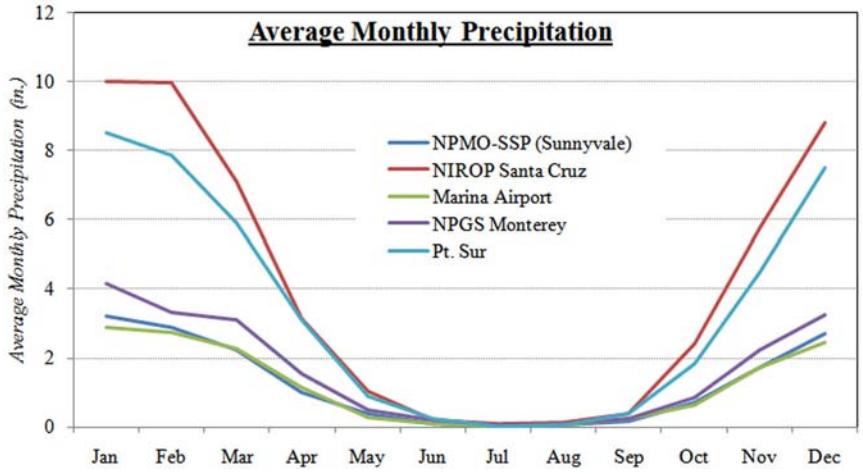


Figure 3-5. Average monthly precipitation for the five properties of Naval Support Activity Monterey (Data source: Western Regional Climate Center).

3.2.3 Physical Conditions

3.2.3.1 Dominant Geographic Features

The Monterey Area Properties lie within the intermountain area between the southern Santa Lucia Range and the Sierra de Salinas, both of which are part of the California Coast Ranges. The topography is mostly moderate south- and west-facing slopes. It varies from flat to gently rolling hills in the northern portion to steeply rising hills in the southern portion.

Elevations range from zero to two feet above mean sea level along the coast in the Dune/Research Area to 164 feet above mean sea level in the southern portion of La Mesa Village. Slopes range from 0 to 50 percent and can present a major limitation to development. Landslides, natural or seismically induced, are not anticipated here.

The Marine Municipal Airport, where the CIRPAS Marina Airport Facility is located, is at 135 feet elevation and the topography ranges from fairly flat to steep bluffs, gently sloping toward the Salinas River.

3.2.3.2 Underlying Geology

The surface geology of the Monterey Area Properties is depicted in Map 3-4. These deposits are primarily sandstone, dune sand, and alluvium. The CIRPAS Marina Airport Facility is underlain entirely by Eolian deposits (Pleistocene and Holocene-1.8 million years to present) and older dune deposits.

Basement rocks for this geographical region include the Sur Series metamorphics, Santa Lucia quartz diorite, and fractured and sheared rocks of the Franciscan formation. The underlying bedrock consists of Mesozoic Age (250-65 million years BP) granodiorite and metamorphic rock of the late Cretaceous Age Sur Series (100-65 million years BP). The area is generally characterized as predominantly level marine terraces that are slightly elevated above the ocean floor.

3.2.3.3 Surface Water Resources

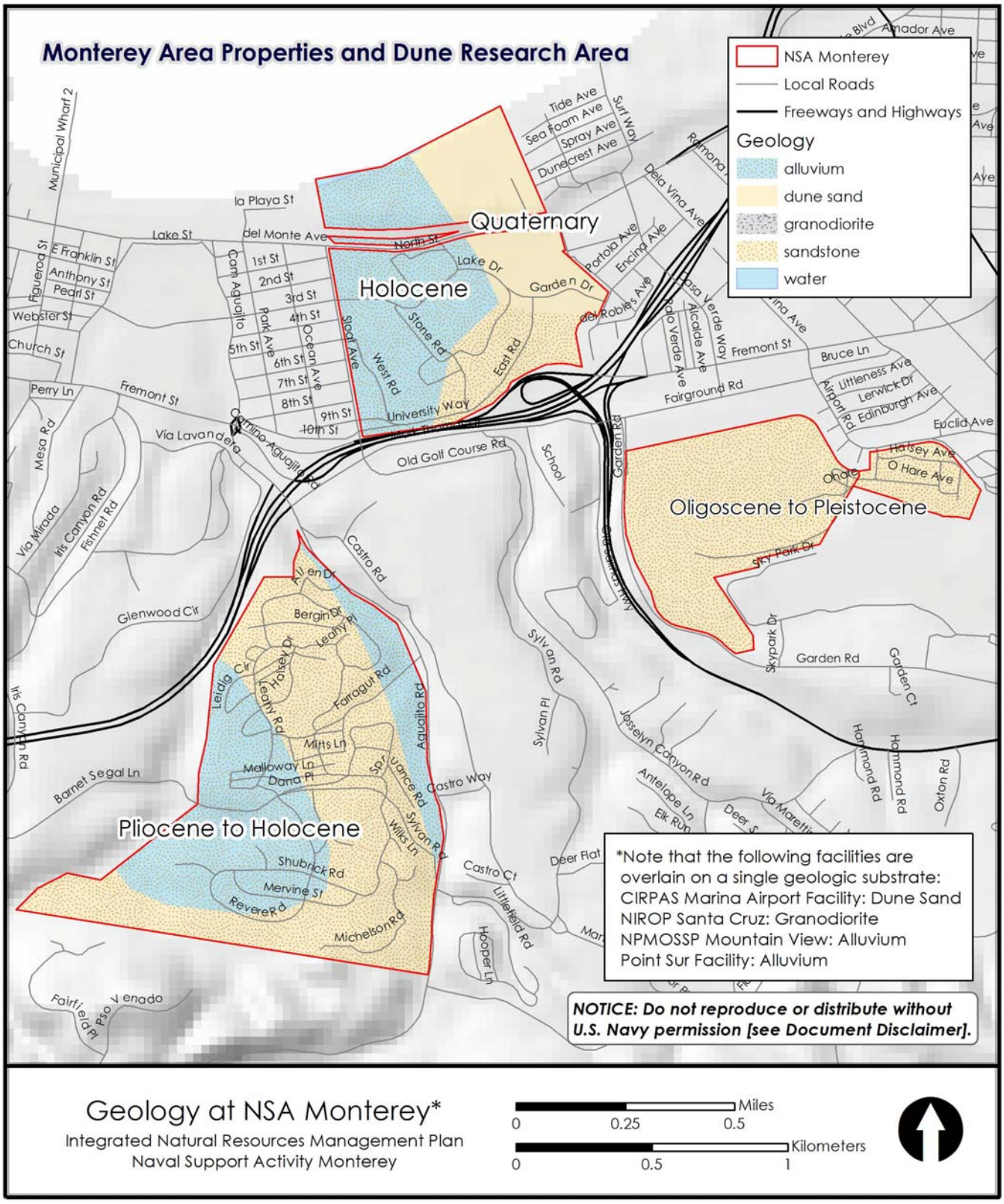
The Monterey Area Properties are located in the Salinas hydrologic unit and straddle the Seaside and Monterey Peninsula subunits (Map 3-5). Water runoff from the Main Grounds, Laboratory/Recreation Area, and Annex drains into a corridor along Highway 68 to Del Monte Lake. Drainage from La Mesa Village enters a corridor along Highway 1 and continues to El Estero Lake. Water runoff from the Dune/Research Area flows directly into the Pacific Ocean.

The CIRPAS Marina Airport Facility is within the Indian Head Beach sub-unit, also within the Salinas hydrologic unit. Run-off from this facility is channeled into the lines that service the Marina Airport.

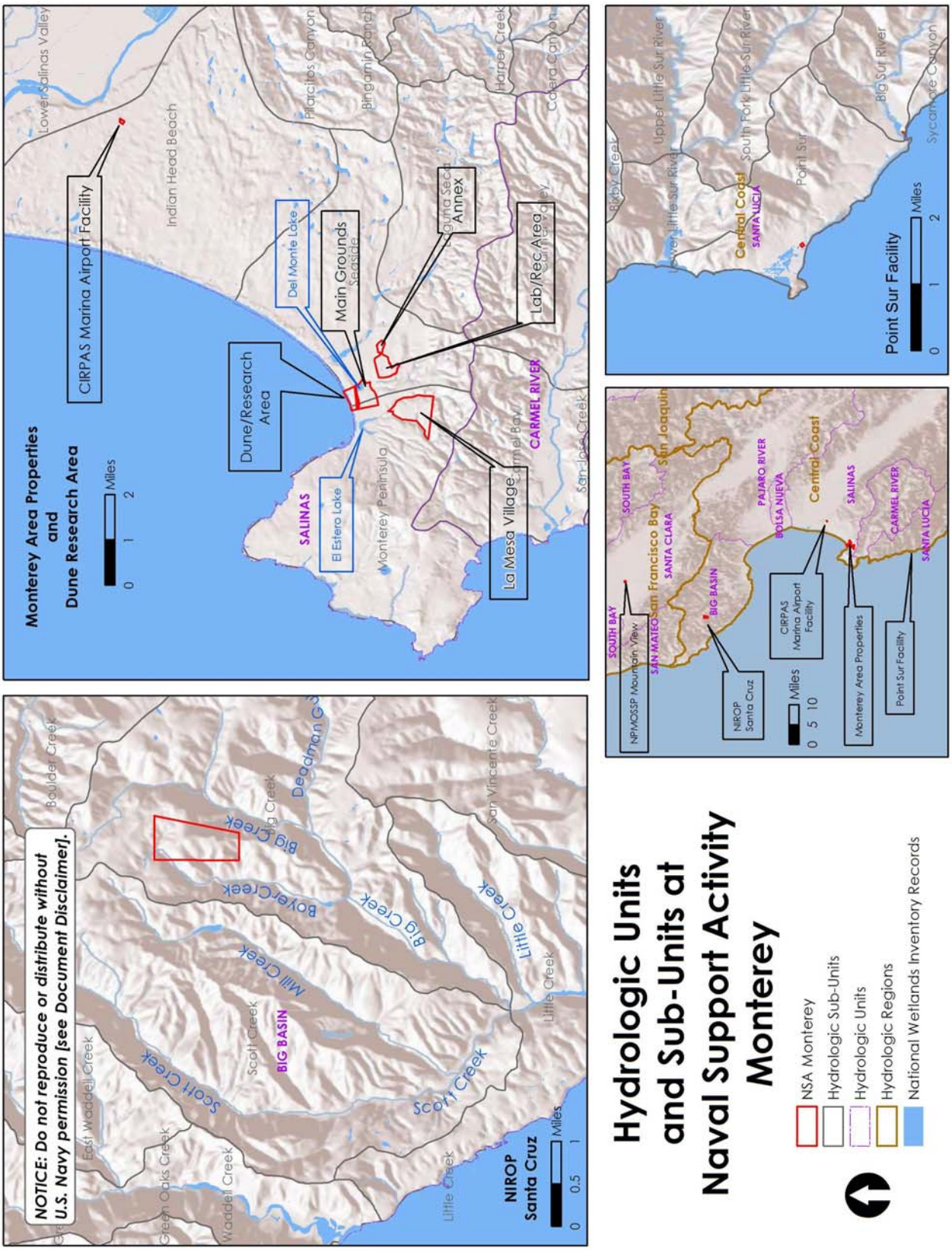
FEMA Flood Hazards

Flood hazards are depicted on Map 3-6 as taken from the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for NSA Monterey. Floodplain impacts typically occur when the topography is substantially modified by placement or removal of materials within the floodplain. Record-keeping on most streams within the central coast area show that the 100-year floodplains delineated by FEMA do not depict 'true' 100 year floodplains (California Department of Water Resources 2009). Moreover, the failure to demarcate floodplains within the context of climate change and sea level rise could very well underestimate the area inundated by severe 100-year storms (California Department of Water Resources 2009).

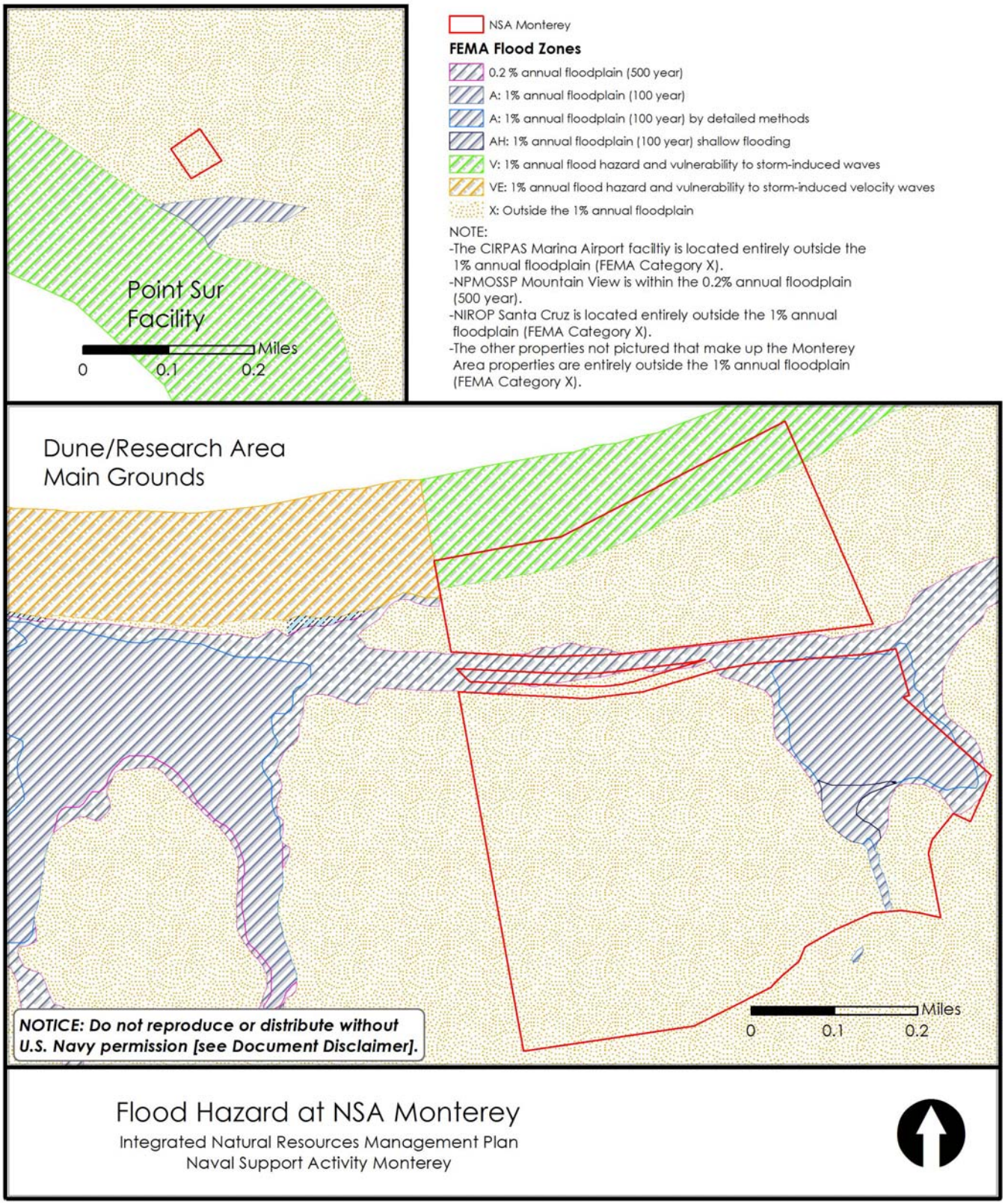
Portions of Del Monte Lake and its source stream are within a 100-year and 500-year floodplain. The CIRPAS Marina Airport Facility (not shown) is outside the 100-year floodplain.



Map 3-4. Geology at Naval Support Activity Monterey.



Map 3-5. Hydrologic units and sub-units at Naval Support Activity Monterey.



Map 3-6. Flood hazard at Naval Support Activity Monterey.

3.2.3.4 Water Quality

Del Monte Lake shows sediment buildup, nutrient material build up (eutrophication), water quality concerns, and vegetative encroachment. There are no known water quality issues at the CIRPAS Marina Airport Facility.

3.2.3.5 Soils and Soil Condition

Soils for the Monterey Area Properties are listed below and depicted on Map 3-7 (Soil Conservation Service [SCS] 1972). The Natural Resources Conservation Service (NRCS) soil descriptions are provided in Appendix G. The CIRPAS Marina Airport Facility is underlain entirely by Baywood sand, two to 15 percent slopes (SCS 1972) and is not depicted on Map 3-7.

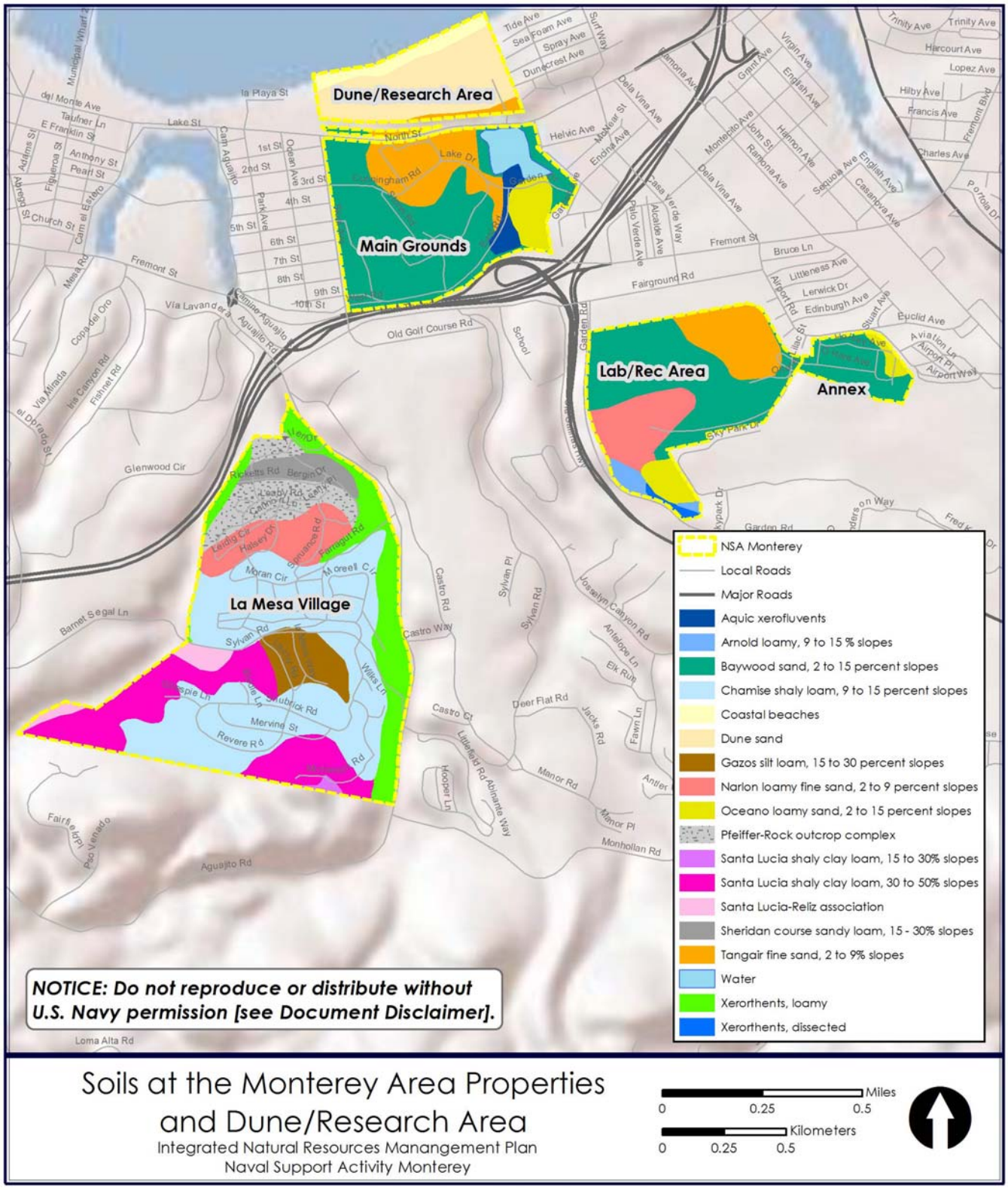
- Aquic Xerofluvents
- Arnold Loamy Sand, 9 to 15 Percent Slopes
- Baywood Sand, 2 to 15 Percent Slopes
- Chamise Sandy Loam
- Gazos Silt Loam, 15 to 30 Percent Slopes
- Narlon Loamy Fine Sand, 2 to 9 Percent Slopes
- Oceano Loamy Sand, 2 to 15 Percent Slopes
- Pfieffer-Rock Outcrop Complex
- Santa Lucia Shaly Clay Loam, 15 to 50 Percent Slopes
- Santa Lucia-Reliz Association
- Sheridan Coarse Sandy Loam, 15 to 30 Percent Slopes
- Tangair Fine Sand, 2 to 9 Percent Slopes
- Xerothents, Loamy

3.2.4 Vegetation Communities and Habitats

Four different vegetation communities and covers occur at the various Monterey Area Properties: landscaping, coast live oak/Monterey pine, central maritime chaparral, and riparian. Each vegetation community and its distribution is discussed in this section, except for Dune scrub, which is discussed in Section 3.3.4. Table 3-6 identifies which communities occur at each of the five Monterey Area Properties. Wildlife is discussed in Table 3-7 since, for the majority of the properties, it is the combination of the vegetation communities at each location that creates valuable habitat for wildlife. Vegetation and invasive cover identified by GANDA (2011) is depicted in Map 3-8.

Landscaping

Landscaping is a common feature at the Monterey Area Properties, including the Main Grounds, the Laboratory/Recreation Area, La Mesa Village, and CIRPAS Marina Airport Facility.



Map 3-7. Soils occurring on the Monterey Area Properties.

Table 3-6. Vegetation communities present at Naval Postgraduate School Monterey Complex, Monterey Bay.

		Remnant Native Vegetation		
Property	Landscaping	Coast live oak/Monterey pine	Central Maritime Chaparral	Riparian/Wetland
Main Grounds	The dominant cover, including historical gardens.	Occurs in narrow groves.		Del Monte Lake and its edges (transition zone).
Laboratory/ Recreation Area	The golf course. RV park also has some landscaped trees.	The RV park has a small oak grove and pine forest. The golf course has three stands of Monterey pine near its southern end.	The golf course has small areas of native vegetation on the non-irrigated perimeter; includes ceanothus, manzanita and Yadon's rein orchid.	Some small freshwater ponds.
Annex Area		Individual/scattered coast live oaks are not a significant vegetation community here, but have supported a small number of Yadon's rein orchid in the past (1993).	Occurs in a narrow strip along the southern boundary adjacent to the Monterey Peninsula Airport. Includes some rare species.	
La Mesa Village	Residential areas include lawns, shrubs and regional trees.	Steep slopes are covered with mixed stands of Monterey pine and coast live oak. Exposed open areas are mostly coast live oak. Monterey pines form dense, pure stands in several areas along the perimeter. Supports both invasive and rare species in understory.		Riparian zones bordering local drainages support dense thickets of shrubs, forbs and grasses. Also willow riparian along Aguajito Road and a small area of marsh vegetation.
Marina Airport Hangar	A very small area in the parking lot and beside the building.			

Source: GANDA 2011; Navy 2001; Kreiberg 1999; AgriChemical & Supply 2009; TDI 2010a; TDI 2010b.

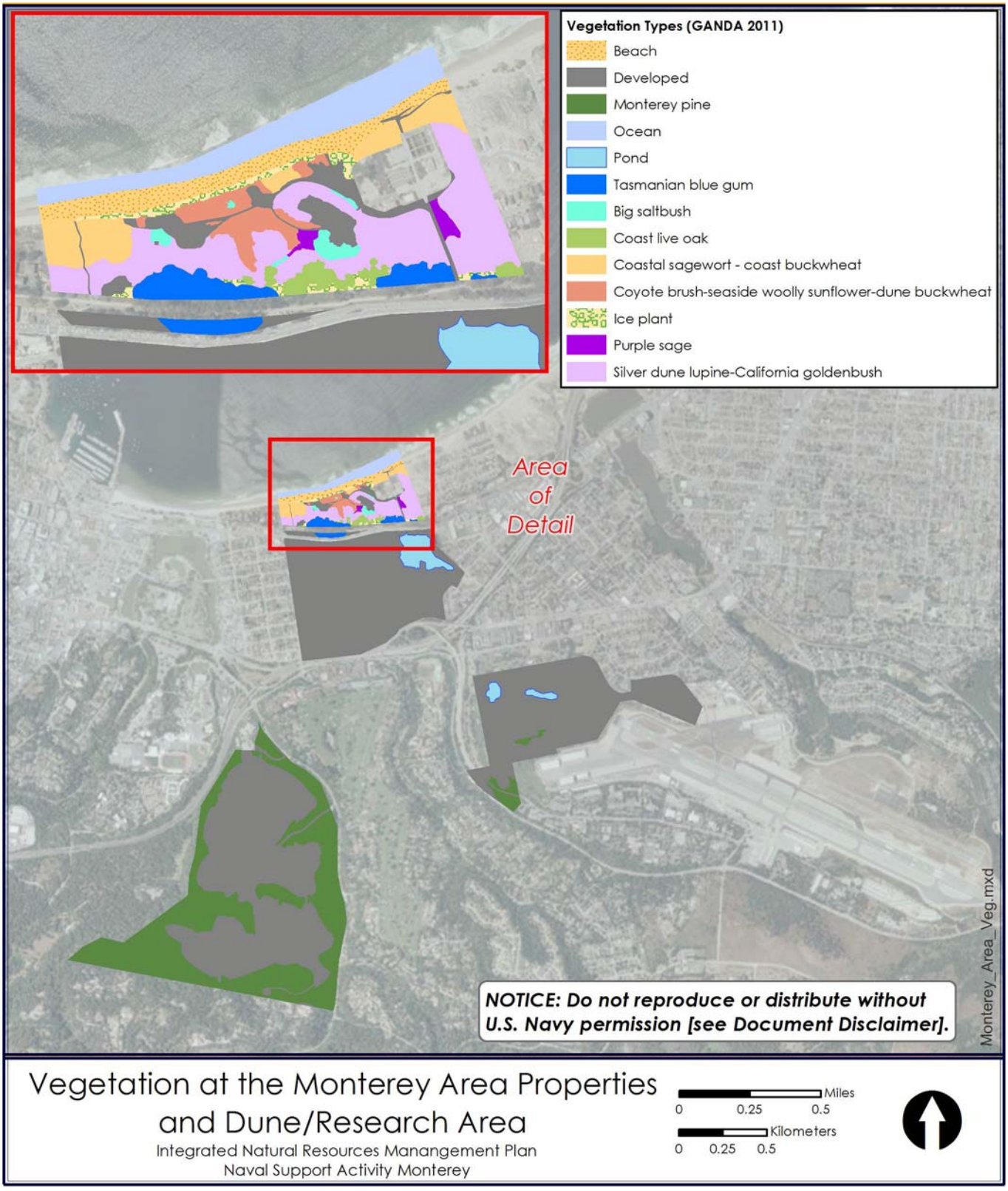
Table 3-7. Importance of Naval Postgraduate School Monterey Complex vegetation communities to wildlife.

Property	Vegetation Communities Present				Importance to Wildlife
	L	O/P	Ch	R/W	
Main Grounds	X	X		X	The groves of oak/pine along with riparian and transition areas are the most important for wildlife on the Main Grounds. Species observed in the oak woodlands include owls, acorn woodpeckers (*Melanerpes formicivorus*), mountain quail (*Oreotryx pictus*), western grey squirrels (*Sciurus griseus*), hoary bats (*Lasiurus cinereus*), big brown bats (*Eptesicus fuscus*), gray fox (*Urocyon cinereoargenteus*), weasels (*Mustela* sp.), western spotted skunks (*Spilogale gracilis*), and mule deer (*Odocoileus*). Suitable roosting and foraging habitat for resident bat species occurs throughout the Main Grounds: anthropogenic features including buildings with Spanish tile roofing materials, crevices and cave-like spaces in buildings, and the large culverts in the freshwater marsh inlet associated with Del Monte Lake; natural features including foliage, crevices under exfoliating bark, broken branch ends, bole cavities of mature trees, and abandoned swallow nests. Bats roosting in trees on Del Monte Lake are likely big brown bat or silver-haired bat (*Lasionycteris noctivagans*). Additional bats observed include Mexican free-tail bat (*Tadarida brasiliensis*), and California or Yuma myotis (*Myotis* sp.). Del Monte Lake and its associated wetlands enhance wildlife diversity attracting a variety of waterbirds, including double-crested cormorants (*Phalacrocorax auritus*), black-crowned night herons (*Nycticorax nycticorax*), ducks, geese and terns. The transition zones between oak woodlands and riparian/wetland areas provide habitat for other avian species such as tree swallows (*Tachycineta bicolor*), horned owls (*Bubo virginianus*), and redwing blackbirds (*Agelaius phoeniceus*). Amphibian species include yellow-legged frog (*Rana boylii*) and California newt (*Taricha torosa*). Also observed in this area are western garter snake (*Thamnophis elegans*), raccoon (*Procyon lotor*), cottontail rabbit (*Sylvilagus audubonii*), opossum (*Didelphis virginiana*). Del Monte Lake has become a favored habitat of Canadian geese (*Branta canadensis*) and their off-spring that are cross-bred with domestic geese (*Anser anser domesticus*).
Laboratory/Recreation Area	X	X	X	X	Freshwater ponds, landscaped trees and small oak grove/pine forest together provide valuable wildlife habitat. Though, bird species here have been reported as low.
Annex Area		X	X		Very little habitat for wildlife.
La Mesa Village	X	X		X	There are more remnant natural vegetation habitats here than at the Main Grounds, Laboratory/Recreation and Annex areas, and which are valuable for wildlife. The large continuous tract of remnant forest and its understory provide important habitat for forest-dwelling birds. The mosaic of oak/pine forest, riparian and landscaped areas also support several large and small mammals: California mouse (*Peromyscus californicus*), California vole (*Microtus californicus*), western gray squirrel (*Sciurus griseus*), raccoon, gray fox, western spotted skunk and mule deer. The California Species of Concern Monterey ornate shrew (*Sorex ornatus salarius*) and the Monterey dusky-footed woodrat (*Neotoma fuscipes luciana*) were identified here in 2010 surveys.
Marina Airport Hangar	X				No habitat for wildlife.

Codes:

L = Landscaping, O/P = Coast live oak/Monterey pine, Ch = Central Maritime Chaparral, R/W = Riparian/Wetland

Source: GANDA 2011; Navy 2001; Kreiberg 1999; AgriChemical & Supply 2009; TDI 2010a; TDI 2010b.



Map 3-8. Vegetation at the Monterey Area Properties and the Dune/Research Area.

At the Main Grounds vegetation predominantly consists of well-maintained landscaped lawns of introduced grasses: Kentucky blue grass, Bermuda grass, and mature native and non-native trees. Groundcover includes periwinkle, ice plant, Carmel creeper, creeping St. Johns wort, and English ivy (NAVFAC WESTDIV 1993). However, its most well-known landscaping is the historical gardens, which include a wide variety of native and non-native species, many of horticultural significance. The introduced species have fared well under local climatic conditions (Matheny and Clark 1991). The plantings included approximately 1,200 trees. The ten most common species are: coast live oak, Monterey pine, Monterey cypress, blackwood acacia, blue gum eucalyptus, silver wattle, eucalyptus, redwood, Sydney golden acacia, and Chinese holly.

At the Laboratory/Recreation Area, the golf course is landscaped with associated course monoculture of grass and related shrub and tree plantings. The RV park in this area has some landscaped trees as well.

Typical of suburbia, residential areas of La Mesa Village include lawns, shrubs, and regional trees.

Finally, the CIRPAS Marina Airport Facility has no natural vegetation. There are only small landscaped areas that surround the parking lot and building.

Coast Live Oak/Monterey Pine

The coast live oak and Monterey pine community is one of the few remnant natural vegetation coverages remaining at the Monterey Area Properties. It occurs in varying assemblages on the Main Grounds, in the Laboratory/Recreation Area, in La Mesa Village, and very sparsely in the Annex.

At the Main Grounds, the native coast live oak is the most abundant tree species, occurring in narrow belts or groves with Monterey pine and Monterey cypress. At the Laboratory/Recreation Area there are three stands of Monterey pine located near the southern end of the Golf Course and there is a small oak grove and a pine forest in the RV park that provides habitat for wildlife in combination with the landscaped trees and freshwater ponds. This vegetation community is most abundant at La Mesa Village where there are more remnant natural vegetation habitats than at the Main Grounds, Laboratory/Recreation Area, and the Annex. Steep slopes within La Mesa Village are covered with mixed stands of Monterey pine and coast live oak, while in several places along the perimeter there are dense, pure stands of Monterey pines. Exposed, open areas in La Mesa Village are occupied by coast live oak.

In La Mesa Village, this community exhibits by a dense understory of poison-oak, California blackberry, coffeeberry, and other shrub species, including French broom and rattlesnake grass (*Briza* sp.), which has altered vegetative portions of the understory along the forest's edge. The large continuous tract of remnant forest and its understory provide important habitat, especially for forest-dwelling birds.

The densely developed Annex contains some individual, scattered coast live oaks.

In all three areas, this vegetation community has supported one or more populations of Yadon's rein orchid: three populations in La Mesa Village, two large and some small satellite populations in the Laboratory/Recreation Area, and a very small number of individuals in the Annex.

The coast live oak and Monterey pine vegetation community constitutes the most important wildlife habitat on the Main Grounds. Wildlife species observed in the oak woodlands here include owls, acorn woodpeckers, mountain quail (*Oreotryx pictus*), western grey squirrels (*Sciurus griseus*), hoary bats (*Lasiurus cinereus*), foxes (*Urocyon* sp.), weasels (*Mustela* sp.), western spotted skunks (*Spilogale gracilis*), and mule deer (*Odocoileus hemionus*).

Central Maritime Chaparral

Remnant central maritime chaparral occurs at the Annex. The maritime chaparral community is present on sandy substrates in level or rolling terrain within six to twelve miles (ten to 20 kilometers) of the coast (Terrestrial Vegetation of California, Third Edition) and generally supports chamise, California lilac, and manzanita. It was most likely more widespread in this area before extensive development restricted it to its current locations. At the Annex, this community appears as a narrow strip along the southern boundary adjacent to the Monterey Peninsula Airport. Twenty-one species of remnant central maritime chaparral are supported including the common plants chamise, California lilac, and manzanitas, including sandmat manzanita (*Arctostaphylos pumila*) (Greening Associates 1999). This remnant strip has also contained small populations of Yadon's rein orchid (2009) and Monterey spineflower (1993). Across the airport fence from the Annex, ED staff observed the Monterey spineflower in 2011 and 2009 (V. Taber, pers. com. 2011).

Riparian/Wetland

Riparian and wetland vegetation occurs primarily on the Main Grounds. Areas that support water features or riparian vegetation at the Laboratory/Recreation Area and La Mesa Village are relatively small, but in combination with other vegetation communities they provide important wildlife habitat (Refer to Table 3-7).

On the Main Grounds, the edges of Del Monte Lake support a homogeneous emergent wetland vegetation: cattails (*Typha latifolia*), California bulrush (*Scirpus californicus*), other macrophytes with scattered willows (*Salix* sp.) and California blackberries (Sycamore Environmental Consultants, Inc. 1999). Interspersed with the wetland vegetation, the predominantly grassy banks along the lake's relatively uniform shoreline are overlain by a discontinuous canopy of native and nonnative deciduous and evergreen trees. The catchment basin (a relatively narrow channel impounded at its downstream, northwest end by a cement dam-spillway) has steep banks lined with bushes and grass with an overstory of deciduous trees along its east bank. Wetted margins on either side are dominated by bulrushes and cattails. Duckweed (*Lemna* spp.) is also common on the water's surface, particularly along the vegetated margins.

The Laboratory/Recreation Area has some freshwater ponds at the golf course. In La Mesa Village, riparian zones bordering local drainages support dense thickets of shrubs, forbs, and grasses, including some willows along Aguajito Road.

The riparian corridors and wetlands at the Monterey Area Properties, in particular the emergent wetland fringe of cattails and tule at Del Monte Lake, provide habitat and travel corridors for many wildlife species. The lake itself is a valuable biological resource, especially for waterfowl. There are two domestic geese on the lake, and there has been one case of interbreeding between domestic and Canada geese (*Branta canadensis*).

3.2.5 Wetlands and Other Regulated Habitats

Using the 1987 USACE manual and the arid west guidance, Tierra Data (TDI) (2011) conducted a wetland assessment for NSA Monterey. This study observed approximately 11.2 acres of jurisdictional unvegetated waters of the U.S., and 2.05 acres of vegetated wetland waters of the U.S. occurring on the Monterey Area Properties. Wetland areas for the Monterey Area Properties are shown on Map 3-9.

At Del Monte Lake GANDA (2011) reported filamentous algae were abundant in the water column of Del Monte Lake. Benthic habitats were laden with detritus and filamentous algae. Water temperatures in the lake were relatively high (over 23° Celsius during the day), with relatively high conductivity and dissolved oxygen levels. It is likely that the high dissolved oxygen concentration and saturation are attributable to high rates of photosynthesis by filamentous algae abundant throughout the lake (GANDA 2011).

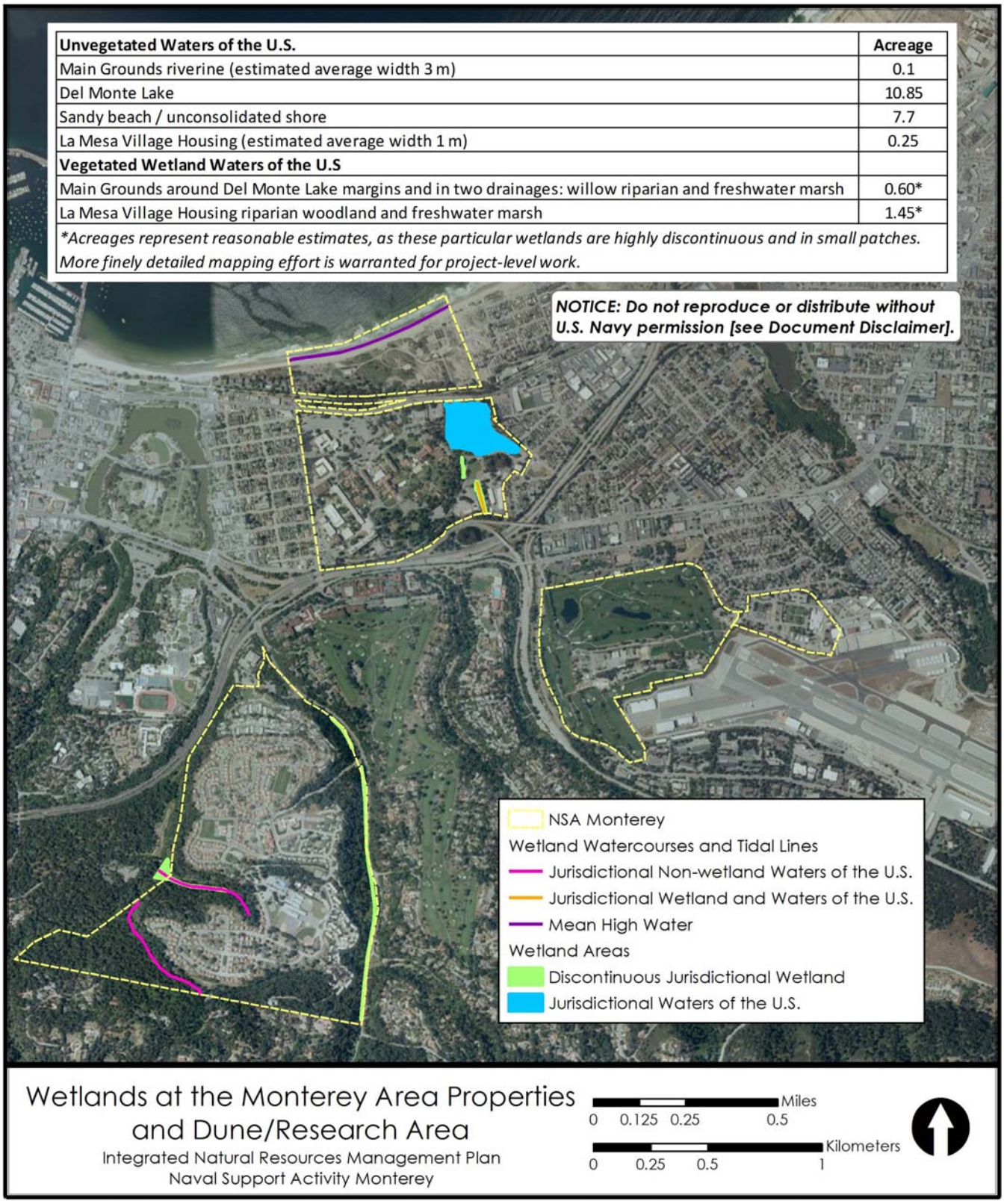
Bottom substrate in the Main Grounds catchment basin channel is comprised of a deep, soft layer of detritus. It is likely that the low dissolved oxygen concentration and saturation observed at the time of the most recent surveys (GANDA 2011) is attributable to high rates of respiration by filamentous algae present in the water column and attached to various substrates. Dissolved oxygen levels likely rise as algal photosynthesis increases during daylight hours, then drop off again sharply at night as respiration occurs (GANDA 2011).

3.2.6 Plant, Fish and Wildlife Populations

3.2.6.1 Plants

The Monterey Area Properties contain 194 distinct plant taxa. Of these, 174 species are native, 19 are non-native, and one is undetermined.[8] Refer to Appendix E for a complete species list.

8. The individual observed could only be identified to genus level. Some species of these genera are native and some are non-native.



Map 3-9. Wetlands at the Monterey Area Properties.

Special Status Plants

Special status plant species that occur on the Monterey Area Properties are:

- Sandmat manzanita (CNPS List 1b) at the Lab/Recreation Area (up to 2009) and La Mesa Village (2009 only)
- Monterey spineflower (Federally Threatened) at the Annex (not since 1993)
- Monterey cypress (CNPS List 1b) at the Main Grounds
- Monterey pine (CNPS List 1b) at the Main Grounds and La Mesa Village
- Yadon's rein orchid (Federally Threatened) at the La Mesa Village, Lab/Recreation Area, and Annex

Hooker's manzanita (State Endangered, CNPS List 1b), although included in Table 3-2, has not been observed at its previously identified La Mesa Village location since 1993, nor elsewhere on NSA Monterey.

The most recent rare plant surveys conducted at the Monterey Area Properties (TDI 2010b) focused on Yadon's rein orchid in the Laboratory/Recreation Area and La Mesa Village. While Yadon's rein orchid and Monterey spineflower have been found in the Annex in the past, surveys were not conducted there in 2010. The highest concentration of rare plants was found at La Mesa Village. Table 3-8 summarizes population numbers of these species gathered from surveys over the last 18 years for Yadon's rein orchid at the Monterey Area Properties and for the Monterey spineflower at both the Monterey Area Properties and the Dune/Research Area combined. Findings from the most recent surveys suggest that Monterey spineflower and Yadon's rein orchid here are stable, but continue to be vulnerable to human associated disturbance (TDI 2010b). More information on these species is presented in Appendix F.

Table 3-2 lists rare and endemic plants that could potentially occur at the Monterey Area Properties (based on CNDDB records).

3.2.6.2 Invasive Non-Native Plants

At the Monterey Area Properties weeds often occur in proximity to and compete with federally listed plant species, including Monterey spineflower and Yadon's rein orchid.

There are five species rated High invaders on the Cal-IPC list: pampas grass, French broom, iceplant, English ivy, and German ivy. Species of management concern here include French broom, ice plant, and pampas grass.

Table 3-8. Rare plant surveys at Monterey Area Properties and the Dune/Research Area .

Year	Number of Individuals
Monterey Spineflower (*Chorizanthe pungens* var. *pungens*)	
1992	1,600 estimated count
1998	Over 100,000 estimated
2003	2,485 counted
2004	12,584 estimated count
2005	8,977 estimated count
2007	6,225 estimated count
2008	6,500 estimated count
2009: total	13,667 counted
2009: permanent belt transects	1,461 counted
2010: permanent belt transects	1,728 counted (projected 30,000/ha)
2010: 4 wandering quadrat transects	294 counted (projected 53,100/ha)
Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*)	
1992	1,950 counted
1998	Over 10,000 estimated
2003	3,468 counted
2004	3,768 counted
2005	7,729 estimated count
2006	8,506 estimated count
2007	5,500 estimated count
2008	5,000 estimated count
2009: total	86,102 counted
2009: permanent belt transects	8,555 counted
2010: permanent belt transects	6,683 counted (projected 125,000/ha)
2010: 2 wandering quadrat transects	555 counted (projected 138,700/ha)
Yadon's rein orchid (*Piperia yadonii*)	
1993	382 counted
1999	1073 counted
2003	2,636+ estimated count
2004	2,030+ estimated count
2005	2,073+ estimated count
2006	802 estimated count
2007	750 estimated count
2008	450 estimated count
2009	5,824 counted
2010	2,671 counted

Sources: AgriChemical & Supply 2009; TDI 2010b.
Surveys for Yadon's rein orchid: Uribe and Associates 1993; Greening Associates 1999; Bruce Cowan 2003-2006; AgriChemical & Supply 2007a; TDI 2010b.
Surveys for Monterey gilia and Monterey spineflower: Joey Dorrell 1992, 2007, 2008; Bruce Cowan 1998, 2003-2006 unpublished data; AgriChemical & Supply 2007a; TDI 2010b.
Monterey spineflower and Monterey gilia survey methods: prior to 2010 a belt transect method was used to estimate plants in the Dune Research Area. In 2010, in addition to the belt transect, the wandering quarter distance measure transect method was used. Plant densities were estimated for both methods in 2010.
Yadon's rein orchid survey methods: total counts were collected using survey grids, with visual counts for those plants not accessible on foot.
Note: Even with late rains in the spring/summer of 2010, the difference in timing of surveys between 2009 (March/April) and 2010 (July) may have influenced survey counts.

3.2.6.2.1 French Broom (CDFA List C, Cal-IPC "High" Invader)

At the Monterey Area Properties, French broom has been found in La Mesa Village at the periphery of student family housing area and along the recreational trail. At the former, it has altered vegetative portions of the understory along the forest's edge (Navy 2001). In both locations, it is located near a known population of Yadon's rein orchid. In addition, it has been the focus of weed control efforts in the Laboratory/Recreation Area (AgriChemical & Supply 2007b and 2010).

In general, the threat of French broom to outcompete the rare (and other native) plants on the Monterey Bay properties is high. More information on this species is found in Appendix F.

3.2.6.2.2 Ice Plant (Cal-IPC "High" Invader)

Ice plant is found in the Laboratory/Recreation Area, on the Main Grounds of the Monterey Area Properties, and on the CIRPAS Marina Airport Facility in planting beds that surround the parking lot. In the Laboratory/Recreation Area, ice plant is found near a known population of Yadon's rein orchid. On the Main Grounds, patches of ice plant occur often and are controlled by hand removal when of manageable size. More information on this species is found in Appendix F.

3.2.6.2.3 Pampas Grass (Cal-IPC "High" Invader)

Pampas grass is found near the CIRPAS Marina Airport Facility. More information on this species is found in Appendix F.

3.2.6.3 Wildlife

Terrestrial and Freshwater Invertebrates

The most recent surveys (GANDA 2011) documented freshwater aquatic invertebrates at Del Monte Lake and the Main Grounds catchment basin channel, identified to their Order. The aquatic invertebrate community at Del Monte Lake was dominated by crayfish (Order Decapoda), scuds (Order Amphipoda), snails (Order Gastropoda), and aquatic insects, including damselflies (Order Odonata), waterboatmen and backswimmers (Order Hemiptera), beetles (Order Coleoptera), and midges (Order Diptera) (Appendix E). At the Main Grounds catchment basin channel, the aquatic invertebrate community was dominated by scuds, waterboatmen and backswimmers, and beetles.

No baseline survey has been conducted for terrestrial invertebrates across the Monterey Area Properties. However, incidental sightings have noted the presence of bark beetles (unknown sp.) and the black widow spider (*Latrodectus* sp.).

Fishes - Freshwater

Recent surveys (GANDA 2011) confirmed that non-native fish species predominate in Del Monte Lake on the Main Grounds. Species identified include black bullhead (*Ameiurus melas*), bluegill sunfish, largemouth bass, and western mosquitofish (*Gambusia affinis*) (Appendix E). Bluegill sunfish dominated. Schools of mosquitofish and a few juvenile bass were

present in the shallower lake margins along the northwest shoreline during the last survey (GANDA 2011). Mosquitofish were also collected from the Main Grounds catchment basin channel on the Main Grounds.

Reptiles and Amphibians

There are a total of seven species of reptiles and amphibians that have been documented at the Monterey Area Properties in surveys over the last 12 years, including the arboreal salamander (*Aneidis lugubris*), California newt, coast garter snake (*Thamnophis elegans terrestris*), foothill yellow-legged frog (*Rana boylii*), Gabilan Mountains slender salamander (*Batrachoseps gavilanensis*), Monterey ensatina (*Ensatina eschscholtzii eschscholtzii*), and Pacific treefrog (*Pseudacris regilla*) (Appendix E).

Focused herpetofauna surveys were not conducted recently, though incidental sightings in 2010 noted the presence of Gabilan Mountains slender salamander and Pacific treefrog. Although the foothill yellow-legged frog was noted in the NPS INRMP (Navy 2001) as present at the Main Grounds, current conditions of the catchment basin, Del Monte Lake and associated aquatic habitat at the Main Grounds do not provide suitable habitat for this species.

While the federally threatened California red-legged frog has not been observed at the Monterey Area Properties, its designated Critical Habitat comes within 1.2 kilometers of La Mesa Village (USFWS Critical Habitat Portal Online Mapper http://criticalhabitat.fws.gov/).

Birds

The Monterey Area Properties have recorded 55 migratory bird species (Appendix E). Of particular note are USFWS Birds of Conservation Concern: Nuttall's woodpecker, observed at La Mesa Village and oak titmouse observed at the Main Grounds and La Mesa Village.

At the Laboratory/Recreation Area a diversity of birds, including raptors, waterfowl, sparrows, and hummingbirds were observed, which is indicative of the different habitats there (GANDA 2011).

At La Mesa Village, the bird diversity included sparrows, raptors, owls, and hummingbirds. The large continuous tract of undisturbed forest there provides valuable habitat for forest-dwelling birds.

At the Main Grounds, birds included waterfowl, raptors, sparrows, and warblers and are representative of the wetland, developed, and landscaped habitats that occur there. The double-crested cormorant (*Phalacrocorax auritus*)[9] is known to roost during the winter at Del Monte Lake (V. Taber. pers. com. 2011).

Terrestrial Mammals

There are 23 mammal species at the Monterey Area Properties (Appendix E). Of interest is the California species of special concern Monterey ornate shrew observed at La Mesa Village.

9. The double-crested cormorant was previously identified as a California Species of Special Concern by both the NPS Monterey INRMP (Navy 2001) and the most recent survey report (GANDA 2011). However, it is no longer listed by the CDFW as a Bird Species of Special Concern (www.dfg.ca.gov/wildlife/nongame/ssc/birds.html).

In the most recent surveys (GANDA 2011), brush mouse (*Peromyscus boylii*) and deer mouse (*P. maniculatus*) were the most common species captured at La Mesa Village.

No mammals were observed or captured in the Laboratory/Recreation Area (GANDA 2011).

At the Main Grounds, large mammals were most frequently observed during the most recent surveys, including mule deer, raccoon and fox squirrel. No small mammals were captured (GANDA 2011). Results of bat surveys conducted at the Main Grounds (GANDA 2011) yielded a greater diversity of species than was noted in the NPS Monterey INRMP (Navy 2001), which only listed the hoary bat. A habitat assessment there indicated that suitable roosting and foraging habitat likely occurs throughout the Main Grounds: anthropogenic features include buildings with Spanish tile roofing materials, crevices and cave-like spaces in buildings, and the large culverts in the freshwater marsh inlet associated with Del Monte Lake; natural features include foliage, crevices under exfoliating bark, broken branch ends, bole cavities of mature trees, and abandoned swallow nests. There are also bats roosting in the trees on a small island in Del Monte Lake, which are likely brown bats (*Eptesicus fuscus*) or silver-haired bats (*Lasionycteris noctivagans*). The Mexican free-tailed bat (*Tadarida brasiliensis*) most likely roosts in the Spanish tile roofs (GANDA 2011).

3.2.7 Feral Animals

There are few feral animals on NSA Monterey, due primarily to aggressive management programs. Feral cats, a serious issue in the past, are humanely trapped and transported to the Society for the Prevention of Cruelty to Animals as soon as they appear to be permanent residents. Raccoons are common on the Monterey peninsula, and can be found on NSA Monterey. Peafowl are long-standing residents on the NSA Main Grounds but were not present during the historically relevant period for the Hotel Del Monte.

3.2.8 Special Status Species

3.2.8.1 Monterey Spineflower (Federal-Listed Threatened)

Monterey Spineflower
(Chorizanthe pungens var. pungens)

While 140 plants were recorded within the Annex during the 1993 surveys, none have been observed there since (Navy 2001; Kreiberg 1999). This population covered a two square-meter patch of open sand at a fence corner. The disappearance of this population was attributed to encroachment by sandmat manzanita.

No Monterey spineflower has been observed at the CIRPAS Marina Airport Facility; however, designated Critical Habitat for this species is located approximately 80 meters from it (USFWS Critical Habitat Portal Online Mapper http://criticalhabitat.fws.gov/). More information on this species is provided in Appendix F.

3.2.8.2 Yadon's Rein Orchid (Federal-Listed Endangered)

The three known populations of Yadon's rein orchid at the Monterey Area Properties are in La Mesa Village, the Laboratory/Recreation Area, and the Annex. The total population in 2010 included 2,671 plants, a decrease from 5,824 in 2009. In general, the high population in 2009 was most likely due to the amount and timing of rainfall, which peaked in February of that year.

Yadon's Rein Orchid
(Piperia yadonii)
Photo credit: NSA Monterey

Refer to Appendix F for details on the species biology of these special status species.

La Mesa Village

There are three sub-populations in La Mesa Village: (i) by the entrance along Farragut road, (ii) along the recreational trail, and (iii) north of the school in the wooded area between the road and the school building. In the first two, both French broom and rattlesnake grass are also present (TDI 2010a). Rattlesnake grass dominates the area of the third group, though Yadon's rein orchid does not seem to be harmed by it, instead it appears to thrive under its cover. The native condition under which the orchid typically develops is in the needle duff under Monterey pine; it is also know to develop in the shade of ice plant (TDI 2010a). In all three, the orchid was recorded at its highest population levels in 2009 with a total number of 488 (AgriChemical & Supply 2009); it is supported by mixed stands of Monterey pine and coast live oak. Population numbers decreased in all three subpopulations in 2010 to a total number of 394.

Laboratory/Recreation Area

There are two large groups (Group 2 and Group 7) and a number of satellite groups located here (AgriChemical & Supply 2009). In many locations, individuals are found in heavy concentrations of pine needles as well as ice plant. Of the thirteen groups surveyed in 2009, six had not been recorded previously (Groups 1, 5, 6, 8, 11, and 13) and three recorded in previous years appeared to have disappeared completely (Groups 3, 9, and 12). This disappearance coincides with the removal of Monterey pines in the area. A major decrease of pine may be occurring in general here. In 2010, orchids were only observed at four groups (Groups 2, 4, 6 and 7). From 2009 to 2010, the total population here decreased from 5,300 to 2,287.

Annex

Two small groups of the orchid have been recorded here previously. Their small numbers fluctuate from year to year (AgriChemical & Supply 2009). Both groups occur in coast live oak (not Monterey pine) and banana slugs were reported to prey on them. Orchids were not surveyed here in 2010 as none were reported present (TDI 2010b). In 2009 only three individual plants were detected (AgriChemical & Supply 2009).

3.3 Dune/Research Area

3.3.1 Ecoregional Setting

See Monterey Area Properties, Section 3.2.1.

3.3.2 Local Climate

See Monterey Area Properties, Section 3.2.2.

3.3.3 Physical Conditions

3.3.3.1 Dominant Geographic Features

See Monterey Area Properties, Section 3.2.3.1.

3.3.3.2 Underlying Geology

See Monterey Area Properties, Section 3.2.3.2.

3.3.3.3 Surface Water Resources

See Monterey Area Properties, Section 3.2.3.3.

FEMA Flood Hazards

A small portion along the southern edge of the Dune/Research Area is within the 500-year flood plain. The northern edge of the Dune/Research Area is susceptible to 100-year storm induced waves and surge.

3.3.3.4 Water Quality

See Monterey Area Properties, Section 3.2.3.4.

3.3.3.5 Soils and Soil Condition

The NRCS soils for the Dune/Research Area are depicted on Map 3-7 (SCS 1972). Refer to Appendix G for the NRCS description of these soils.

3.3.4 Vegetation Communities and Habitats

Dune Scrub

Recent vegetation mapping at the Dune/Research Area (GANDA 2011) identified six main plant associations: coastal sagewort (*Artemesia pycnocephala*)-coast buckwheat; big saltbush (*Atriplex lentiformis*); coyote brush-seaside woolly sunflower (*Eriophyllum stoechadifoium*)-dune buckwheat (*Eriogonum deserticola*); silver dune lupine (*Lupinus chamissonis*)-California goldenbush (*Ericameria ericoides*); coast live oak; and purple sage (*Salvia leucophylla*). These

associations are depicted in Map 3-8. Two semi-natural stands of non-native ice plant and blue gum eucalyptus ere also identified. The predominant vegetation type was silver dune lupine-California goldenbush, within which Monterey spineflower and coast wallflower (*Erysimum ammophilum*) were found. Monterey spineflower is federally threatened and coast wallflower is on CNPS List 1B.2.

High value coastal dunes including representative species of central dune scrub are found exclusively in the Dune/Research Area. Within the vegetation associations described above, assemblages of plants on the dunes differ slightly among the foredune, mid-dune and backdune areas, sometimes dependent upon the dune stability or other physical influences.

In the foredune area, coastal sagewort dominates and is accompanied by beach-bur (*Ambrosia chamissonis*), coyote brush, seaside woolly sunflower, beach evening primrose (*Camissonia cheiranthifolia*), and beach saltbush (*Atriplex leucophylla*). Both host plants for Smith's blue butterfly—coast buckwheat and seacliff buckwheat—are also present here, along with beach morning glory (*Calystegia soldanella*) which is naturally colonizing the foredunes.

The mid-dune and backdune areas are dominated by the silver dune lupine-California goldenbush association. However, in the backdune area, similar species to the foredune area are also present along with sandmat manzanita, California goldenbush, seacliff buckwheat, silver dune lupine, and branching phacelia (*Phacelia ramosissima*), all of which are successfully reproducing. On the other hand, shade from eucalyptus, coast live oak, and other trees on the inland facing slope of the dunes have eliminated all but a few remnants of the original native plant cover. Portions of this site have also been extensively altered by past grading and placement of fill (AgriChemical & Supply 2009). In both the foredune and backdune areas, the non-native invasive ice plant has also become established. On the western end of the dune system, a clustered overstory of mature Monterey pine has an understory of sparse, dune-adapted vegetation.

Many of the native species present are a product of dune rehabilitation and revegetation efforts. Of the 170 taxa/species present here during the Greening Associates survey (1999), approximately 60 were considered native to the area. Those natives that were planted, while stabilizing the dunes, are established among populations of sensitive species and now occupy space that is potential habitat for Monterey gilia and Monterey spineflower (TDI 2010b). There is also some Pacific dune grass (*Leymus mollis*) that was planted during restoration that has now dropped from the top of the dunes down to the beach, due to erosion.

Dune Scrub Restoration

A major restoration effort was undertaken at the dunes after the freeze of 1990 killed acres of non-native ice plant (Cowan 1996). This prompted the Navy and the City of Monterey to fund the cooperative NPS Dune Restoration Project to restore native plants to disturbed areas. By April 1994, approximately 88,000 plants and 50 different species were planted, restoring roughly 30 of the 40 acres owned by the Navy.

Prior to this project, the dunes had undergone numerous alterations that impeded plant growth, including sand mining, foot traffic, housing developments, and landfills. Landfills have also facilitated the spread of invasive species, as the mixed soil types are particularly attractive to weeds (Cowan 1996). At the time of the restoration project only about 20 percent of the dunes were considered natural. Much of the landfill areas were compacted to build roads, parking lots, and buildings; however, in other portions, native sand was mixed with foreign soil in an attempt to restore the natural dune habitat (Cowan 1995).

Various methods of ice plant control were implemented for the restoration project, and a few native species were introduced to the site, including coastal sagewort, seaside woolly sunflower, and coast buckwheat (Cowan 1995). Furthermore, seeds of many native species were collected from the area and planted, including pink sand verbena (*Abronia umbellata*), beach evening primrose, beach knotweed (*Polygonum paronychia*), California aster (*Lessingia filaginifolia*), beach-bur, silver dune lupine, California goldenbush, seacliff buckwheat, coast wallflower, California poppy (*Eschscholzia californica*), sand dune bluegrass (*Poa douglasii*), Monterey pine, Monterey cypress, yellow sand verbena (*Abronia latifolia*), and coast live oak. California hairgrass (*Deschampsia cespitosa* ssp. *holciformis*) was also planted, but has not been listed on recent surveys (Cowan 1995, 1996).

Wildlife Habitat

Seabirds and shorebirds use the adjacent waters of the bay and are of greater diversity than other birds. The dunes also harbor some small mammals, amphibians and reptiles: pinyon mice (*Peromyscus truei*), harvest mice (*Reithrodontomys megalotis*), brush rabbits (*Sylvilagus bachmani*), Botta's pocket gophers (*Thomomys bottae*), western fence lizards (*Sceloporus occidentalis*), Monterey ensatina, Pacific slender salamanders (*Batrachoseps pacificus*), and Pacific treefrogs.

The Dune/Research Area has suitable habitat for the Smith's blue butterfly and western snowy plover. However, recent surveys conducted by the installation have not indicated the presence of either species. For the Smith's blue butterfly, this includes its two host plants present on the dunes (coast buckwheat and seacliff buckwheat). Western snowy plovers require beaches with sparse or no vegetation and with tide wrack (USFWS 2011).

The California legless lizard, a California species of concern, has been confirmed present at the dunes.[10] In addition, though the blue gum eucalyptus that was planted and now flourishes in the backdune area is considered a “moderate” invader by Cal-IPC, it has become habitat for the monarch butterfly (*Danaus plexippus*).

10. This species was formerly considered to include two subspecies: silvery legless lizard (*A. pulchra pulchra*) and black legless lizard (*A. pulchra nigra*). However, more recent research has indicated that these subspecies are simply different color variations of a single species (California herps.com 2010).

3.3.5 Wetlands and Other Regulated Habitats

Using the 1987 USACE manual and the arid west guidance, TDI (2011) conducted a wetland assessment for NSA Monterey. This study observed approximately 7.07 acres of jurisdictional unvegetated waters of the U.S occurring at the Dune/Research Area. These waters were entirely sandy beach/unconsolidated shore. Wetland areas for the Dune/Research Area is shown on Map 3-9.

3.3.6 Plant, Fish and Wildlife Populations

3.3.6.1 Plants

The Dune/Research Area contains 187 distinct taxa (Appendix E). Of these, 105 are native, 79 are non-native and 3 are undetermined.[11]

Special Status Plants

Special status plant species that occur on the Dune/Research Area are:

- Sandmat manzanita
- Monterey spineflower
- Blooming coast wallflower
- Monterey gilia (sand gilia)
- Monterey cypress (planted)
- Monterey pine (western end of dune system)

Monterey gilia is located in the back dunes and Monterey spineflower, sandmat manzanita and coast wallflower in the mid- and back dunes. Substantial numbers of Monterey ceanothus (*Ceanothus cuneatus* var. *rigidus*) and sandmat manzanita in low-lying areas near the road-side are a result of recent plantings (AgriChemical & Supply 2009).

The most recent rare plant surveys conducted in the Dune/Research Area (TDI 2010b) focused on Monterey gilia and Monterey spineflower. Among the Monterey Area Properties, the Dune/Research Area was found to have the highest concentrations of rare plants. Table 3-8 summarizes population numbers of these two species gathered from surveys over the last 18 years for Monterey gilia at the Dune/Research Area and for Monterey spineflower at both the Dune/Research Area and other Monterey Area Properties combined. Findings from the most recent surveys suggest that these species are stable, but continue to be vulnerable to human associated disturbance (TDI 2010b). More information on these species is presented in Appendix F.

Table 3-2 lists rare and endemic plants that could occur at the Dune/Research Area (based on CNDDB records).

11. The individual observed could only be identified to genus level. Some species of these genera are native and some are non-native.

3.3.6.2 Invasive Non-native Plants

At the Dune/Research Area, weeds often occur in proximity to and compete with federally listed plant species, including Monterey gilia and Monterey spineflower.

Non-native plants have become established at the edge of service roads and at the bases of the dunes in high concentrations. Though the dunes have been targeted for invasive weed control, the non-native ice plant within 50 meters of the seaward edge of the dunes provides stability for the dunes (TDI 2010a). Additional invasive species that are present here include ice plant along the fence of the water treatment facility (TDI 2010a), ripgut grass (*Bromus diandrus*), lollypop tree (*Myoporum laetum*), and tall fescue. Those species rated High invaders by Cal-IPC include: European beachgrass, ice plant, yellow starthistle, red brome, French broom, and pampas grass. In particular, the most recent surveys (GANDA 2011) identified ice plant as a prominent vegetative cover in both the foredune and backdune areas.

Invasive and weed species documented at the time of the 1990 restoration project included ice plant, European beachgrass, ripgut grass, poison-hemlock (*Conium maculatum*), pampas grass, milk thistle (*Silybum marianum*), wild radish (*Raphanus sativus*), mustard (*Brassica* sp.), California burclover (*Medicago polymorpha*), yellow starthistle, cutleaf plantain (*Plantago coronopus*), sweetclover (*Melitotus* sp.), common sow thistle (*Sonchus oleraceus*), acacia (*Acacia* sp.), and eucalyptus. Foxtail barley (*Hordeum murinum* ssp. *leporinum*), curly dock (*Rumex crispera*), rabbits foot grass (*Polypogon monspeliensis*), and horseweed (*Conyza bonariensis*) were also documented during this project, but have not been listed on recent surveys (Cowan 1995, 1996).While the blue gum eucalyptus that was planted and now flourishes in the backdune area is considered a moderate invader by Cal-IPC, it has become habitat for the monarch butterfly and should not be removed.

3.3.6.2.1 French Broom (CDFA List C, Cal-IPC "High" Invader)

French broom has been found in the Dune/Research Area (AgriChemical & Supply 2009).

In general, the threat of French broom to outcompete the rare (and other native) plants at the Dune/Research Area is high. More information on this species is provided in Appendix F.

3.3.6.2.2 Ice Plant (Cal-IPC "High" Invader)

Ice plant is found in the Dune/Research Area and was targeted with removal during weed control efforts in 2010 (TDI 2010a), though it does provide stability for the dunes within 50 meters of the dunes' seaward edge. In this area, it is also found adjacent to the fence of the water treatment facility. More information on this species is provided in Appendix F.

3.3.6.2.3 European Beachgrass (Cal-IPC "High" Invader)

- European beachgrass is identified as invading the backdune area of the Dune/Research Area (NAVFAC Southwest 2009; Navy 2001). It is a focus of annual weed control measures but continues to invade from adjacent dune areas not owned by the Navy. More information on this species is provided in Appendix F.

3.3.6.2.4 Tall Fescue (Cal-IPC "Moderate" Invader)

At the Dune/Research Area, tall fescue occurs in the backdune area. More information on this species is provided in Appendix F.

3.3.6.3 Wildlife

The latest surveys at the Dune/Research Area (GANDA 2011) included avian, small mammal, large mammal, herpetofauna and terrestrial invertebrate surveys, including specific surveys for the Smith's blue butterfly.

Terrestrial and Freshwater Invertebrates

The most recent surveys included a baseline invertebrate survey (GANDA 2011) identifying 22 distinct Orders of invertebrates at the Dune/Research Area (Appendix E). In addition, two families (Amphididae, Formicidae), one sub-family (Stenopalmatinae), and two species were identified—dune beetle (*Coelus ciliates*) and monarch butterfly (GANDA 2011). The diversity of terrestrial invertebrates observed included several types of bees, wasps, ladybird beetles, land snails and Jerusalem crickets. Previous incidental sightings have noted the presence of Tilden's blue butterfly (*Euphilotes enoptes tildeni*).

Freshwater aquatic invertebrates observed at the Dune/Research Area include six Orders.

The federally endangered Smith's blue butterfly has occurred at the Dune/Research Area in the past (late 1970s), but was not observed during recent surveys (GANDA 2011). However, Smith's blue butterfly habitat does occur in the coastal dunes: seacliff buckwheat and coast buckwheat. More information on this species is presented in the special status species section and Appendix F.

Reptiles and Amphibians

A total of seven species of reptiles and amphibians have been observed at the Dune/Research Area (Appendix E). They include California legless lizard, Gabilan Mountains slender salamander, Monterey ensatina, San Francisco alligator lizard (*Elgaria coerulea coerulea*), Pacific tree frog, California alligator lizard (*Elgaria multicarinata multicarinata*), and western fence lizard. The California legless lizard is a California species of concern and was observed in the Dune/Research Area in surveys in 1999 (Kreiberg) and 2010 (GANDA 2011). This species was formerly considered to include two subspecies: silvery legless lizard (*Anniella pulchra pulchra*) and black legless lizard (*A. p. nigra*). However, more recent research has indicated that these subspecies are simply

different color variations of a single species (California herps.com 2010). In addition to the California legless lizard, incidental observations of California alligator lizard, San Francisco alligator lizard, western fence lizard, and Gabilan Mountains slender salamander occurred during the most recent surveys (GANDA 2011).

Birds

A total of 36 species of birds have been observed at the Dune/Research Area (including offshore) in surveys over the last 12 years (Appendix E; Navy 2001; GANDA 2011). Previous surveys suggested that there was a greater diversity of seabirds and shorebirds than landbirds (Navy 2001); however, the most recent survey indicated a greater diversity of landbirds, including some raptors, and birds common to developed areas (GANDA 2011). Of note is the California fully protected brown pelican observed offshore during the most recent surveys (GANDA 2011).

Terrestrial Mammals

Twelve small mammals have been observed at the Dune/Research Area based on surveys over the last 12 years (Appendix E; Navy 2001; GANDA 2011). Species include western harvest mouse, raccoon (*Procyon lotor*), pinyon mouse, opossum (*Didelphis virginiana*), house mouse (*Mus musculus*), ground squirrel (*Spermophylus beecheyi*), fox squirrel (*Sciurus niger*), deer mouse, California vole (*Microtus californicus*), brush rabbit, brush mouse, and Botta's pocket gopher. During the most recent small mammal trapping surveys, brush mouse, California vole, and ground squirrel were captured multiple times suggesting that they are common in the Dune/Research Area. Species listed in the previous INRMP but not observed recently include pinyon mouse, western harvest mouse, and brush rabbit.

Marine Life

Although the sandy beach area long the Dune/Research Area was surveyed recently (GANDA 2011), no marine species were observed within this habitat or in the shallow marine zone. Incidental observations of California sea lions were made, but they were well beyond the Navy property line in the deeper portions of Monterey Bay (GANDA 2011).

3.3.7 Feral Animals

There are no known feral animals on this property.

3.3.8 Special Status Species

3.3.8.1 Monterey Spineflower (Federal-Listed Threatened)

Monterey spineflower is currently found in the mid-dune, backdune, and western areas of the Dune/Research Area at NSA Monterey in Monterey Bay. In this location, it co-occurs with Monterey gilia in the back dunes, while it is also found closer to the ocean in the mid-dunes. It occurs on both moving and stable sand, occupying a broader range of

microhabitats, thus being found over a broader area than Monterey gilia. As a result of non-native species eradication programs in the dunes area, the spineflower has been able to recolonize newly available dune openings, though its population still fluctuates (Kreiberg 1999). Previous data show that population levels were very consistent between 2005 and 2008. One very high population count was recorded in 1998 when over 100,000 individuals were estimated. The lowest population count occurred in 1992 when only 1,600 plants were recorded.

In 2009, its total population in the dune area was 13,667 individuals (AgriChemical & Supply 2009). Fifteen belt transects were established that year and yielded a count of 1,461 individuals. In 2010 individual counts using the same belt transects reported 1,728 individuals with a projected density of 30,000 plants per hectare. Four wandering quadrat transects also employed that year which contained 294 plants and projected 53,100 plants per hectare (TDI 2010b). The population here is reported as healthy with a stable distribution (AgriChemical & Supply 2009). More information on this species is provided in Appendix F.

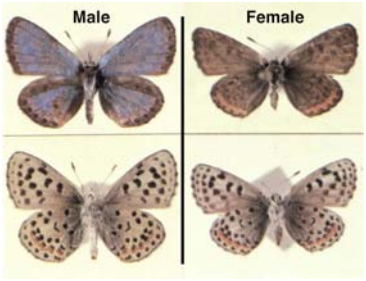
3.3.8.2 Monterey Gilia (Federal-Listed Endangered, State-Listed Threatened)

Monterey gilia occurs in the backdune portion of the eastern section of the Dune/Research Area. Population data from 1992 to 2008 range from 1,950 individuals in 1992 to an estimate of 10,000 individuals in 1998, with most years recording between 3,000 and 8,000 plants (AgriChemical & Supply 2009). Increases during this time period have been attributed to eliminating ice plant and ripgut grass along with relevant increases in rainfall. The highest recorded population reached 86,102 individuals in 2009, clearly an exceptional year probably due to the timing and amount of rainfall. This is also reflected in counts from the fifteen permanent belt transects established that year, reporting 8,555 individuals. Using the same belt transects, the 2010 population included 6,683 individuals with a projected density of 125,000 plants per hectare. Two wandering quadrat transects also used that year which contained 555 plants and projected 138,700 plants per hectare (TDI 2010b). The population here is reported as stable and healthy (AgriChemical & Supply 2009). More information on this species is provided in Appendix F.

Monterey Gilia
(Gilia tenuiflora* ssp. *arenaria)
Photo credit:

3.3.8.3 Smith's Blue Butterfly (Federal-Listed Endangered)

The Smith's blue butterfly does not currently inhabit the Dune/Research Area, despite the presence of suitable habitat. Smith's blue butterflies were observed at the Dune/Research Area by Richard Arnold on four of six site visits during 1977 to 1982. At that time, its habitat was in poor condition and its buckwheat host plants were not common. They could also be found on the dunes behind homes at Del Monte Beach and at Roberts Lake Park. However, they were noted as absent at the Dune/Research Area in 1983 and 1986, during which time the butterfly's habitat had continued to deteriorate (R. Arnold, pers. com. 2010). Smith's blue butterflies were not observed in any portion of the dunes in surveys conducted in 1999 by Patti Kreiberg and Richard Arnold (Kreiberg 1999). Even with restored areas at Dunes



Smith's Blue Butterfly
(Euphilotes enoptes smithi)
Photo credit: Dr. Richard Arnold

State Park, Del Monte Dunes Beach, and the Dune/Research Area supporting abundant populations of the species' host plants, Smith's blue butterfly has not been found in the Dune/Research Area since the early 1980s. Moreover, Smith's blue butterflies have not been detected recently between Sand City and Carmel Highlands indicating that this gap in its range is expanding (USFWS 2006a). The closest population of Smith's blue butterfly is located north of a beach resort in southern Sand City, where Highway 1 and local streets effectively eliminate the butterfly's ability for possible southward expansion (R. Arnold, pers. com. 2010). The primary threat to the butterfly in the Monterey Bay area has historically been habitat loss due to development. While the species has not been documented at the Dune/Research Area in many years, it could remain present in extended diapause in the litter beneath its host plant, dune buckwheat (R. Arnold, pers. com. 2010). More information on this species is provided in Appendix F.

3.3.8.4 Western Snowy Plover (Federal-listed Threatened)

Western Snowy Plover
(Charadrius alexandrinus nivosus)
Photo credit: Mike Baird

The western snowy plover has not been documented as occurring on NSA Monterey property. A small portion on the eastern edge of the Dune/Research Area was proposed as Critical Habitat in 2011 (USFWS 2011) but was exempted. Based on a 2012 survey for the species, no suitable habitat for the species exists on NSA Monterey property.

3.4 Point Sur Facility

3.4.1 Ecoregional Setting

The one-acre Point Sur Facility is located at the base of the northwestern end of the Santa Lucia Range, which is a prominent geographic feature within the North Coastal Santa Lucia eco-subregion (USFS 1995) as depicted on Map 3-1. The Santa Lucia Mountains stretch for about 100 miles following the orientation of the coastline, and form the steepest coastal slope in the contiguous United States.

Just west of the Facility, the 361-foot high rock headland and associated lighthouse forms the predominating landmark at Point Sur. The outcrop is connected to the mainland by a sandy beach, sand dunes, and marine terrace, all extremely rare features of this region (CSP Central Service Center [CSPCSC] 2004). Ocean spray and persistent fog during the spring and summer are key micro-climatic forces that characterize this property's ecosystem.

3.4.2 Local Climate

Due to the unique physiographic arrangement of Point Sur, its climate is distinctive in terms of precipitation and wind. Wind speeds are greater on exposed locations like Point Sur, and the steep terrain of the Santa

Lucia range immediately east of Point Sur produces localized extremes in rainfall (Table 3-5). While the average annual rainfall in Monterey has hovered around 19 inches, immediately south of the Facility, Pfieffer-Big Sur state park has averaged 40.8 inches. Due to the prevailing north-westerlies, the areas north of the point are usually more foggy and windy than those to the immediate south (Henson and Usner 1993).

3.4.3 Physical Conditions

3.4.3.1 Dominant Geographic Features

The sub-acre Point Sur Facility lies upon a small gently sloping shelf directly above the intertidal zone at Point Sur at just under 40 feet elevation. Point Sur itself, about 0.5 miles to the west, rises 314 feet above sea level. The Santa Lucia Range dominates the landscape immediately to the east, with Little River Hill just 1.2 miles away rising to 1,214 feet above sea level. Peaks within the Santa Lucia Range top 3,500 feet within five miles of the facility.

3.4.3.2 Underlying Geology

From Point Sur south to the mouth of the Big Sur River, a broad marine terrace forms an extensive flatland. Wave action and localized uplift during early to late Pleistocene cut the shoreline to its present configuration (CSPCSC 2004). This relatively flat terrace is dominated by an assemblage of rocks known as the Franciscan Formation (Henson and Usner 1993). This formation is composed of medium to coarse grained brown litho-feldspathic sandstone or greywacke, micro-greywacke, chert, metavolcanic rocks, as well as green and blue schist, conglomerates, and silica carbonates (CSPCSC 2004).

The surface geology at the Point Sur Facility is entirely alluvium. This alluvium was created by the rivers and runoff that also formed the nearby beaches and dunes. The dune field was far more extensive before dune stabilization in the 1960s changed patterns of sand deposition. The geomorphic character of the dune field continues to change (CSPCSC 2004).

3.4.3.3 Surface Water Resources

As depicted on Map 3-5, Point Sur is located within the Point Sur Hydrologic Sub-Unit and the Santa Lucia Hydrologic Unit. This hydrologic unit includes the streams on the western side of the Santa Lucia Mountain Range. Although the Point Sur area does not contain a major drainage system, a few unnamed drainages cross the coastal terrace (CSPCSC 2004).

The Point Sur Facility is bordered by coastal wetlands to the west. This parcel also contains freshwater seeps, which are areas with seasonal or perennial soil saturation caused by groundwater (CSPCSC 2004). A freshwater spring was historically located at the spring site, and upcoming wetland delineations will determine its present condition.

FEMA Flood Hazards

While the Point Sur Facility is just outside the 100-year floodplain, the wetland to the south and the area immediately along the coast both show 100-year susceptibility.

3.4.3.4 Water Quality

Due to the small size of the property and the low impact of its operations, there is believed to be little to no water quality concerns at the Point Sur Facility. There are currently no water systems or septic systems that would impact surrounding water resources.

There is a drainage swale on the property that is wet much of the year and supports the Pacific tree frog.

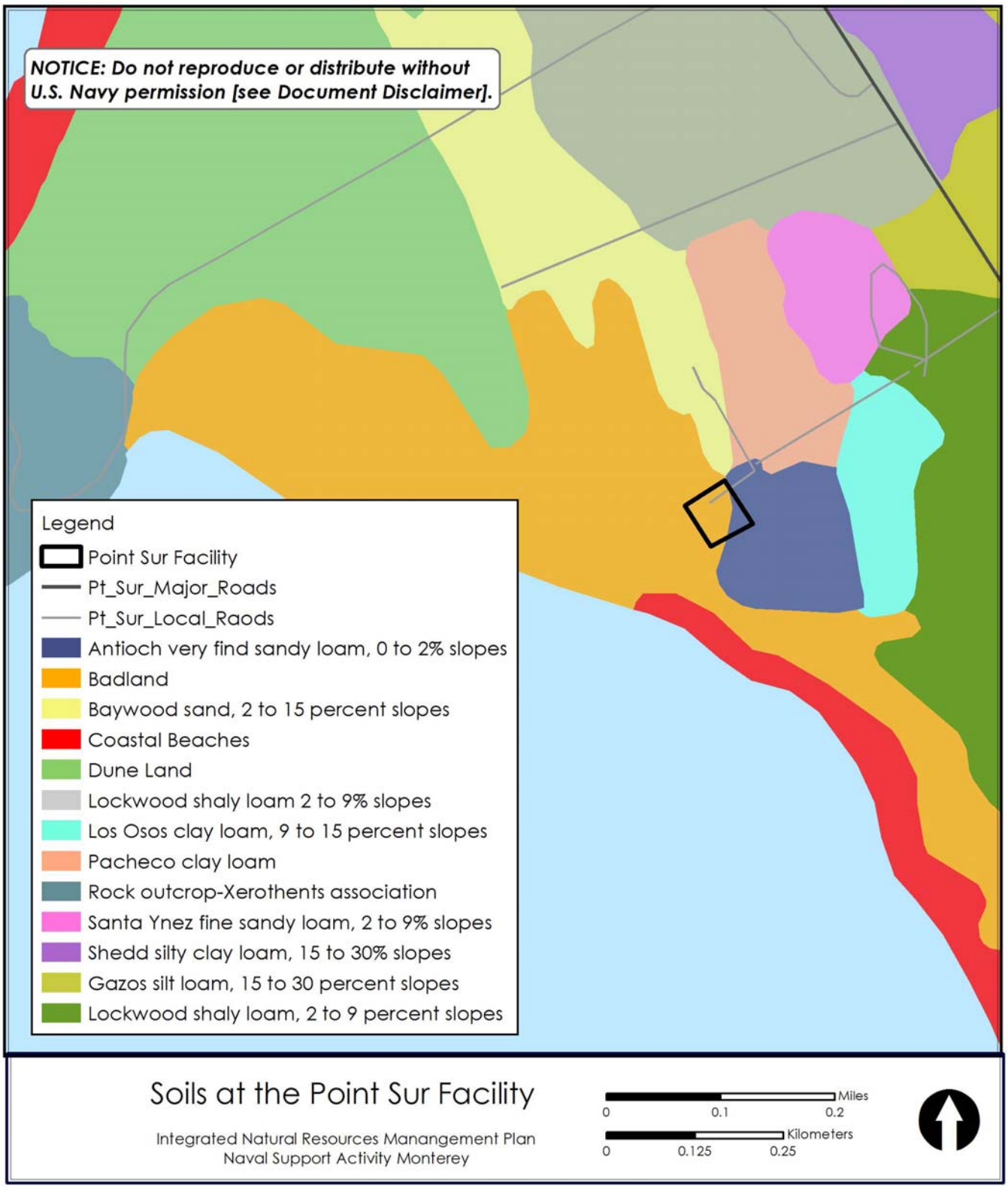
3.4.3.5 Soils and Soil Condition

Due its small size, nearly the entire property at the Point Sur Facility sits within the Badland as depicted on Map 3-10. However a corner of the property may have Antioch silty clay loam. NRCS soils are listed below, and formal descriptions are presented in Appendix G. The other local soil types are depicted for context but not described below. The Point Sur region is characterized by sedimentary parent material and soils that are predominantly shallow and poorly developed, dark in color, with a slightly acidic reaction (CSPCSC 2004). Soil erosion hazard was cited as characteristic that may affect potential land uses in the Point Sur area by the CSPCSC (CSPCSC 2004).

- Antioch Very Fine Sandy Loam
- Lompico-Felton Complex, 5 to 30 Percent Slopes
- Lockwood Shaly Loam, 2 to 9 Percent Slopes
- Los Osos Clay Loam, 9 to 15 Percent Slopes
- Maymen-Rock Outcrop Complex
- Maymen Variant Sandy Loam, 5 to 30 Percent Slopes
- Pacheco Clay Loam
- Santa Lucia Shaly Clay Loam, 50 to 75 Percent Slopes
- Sur-Catelli Complex, 50 to 75 Percent Slopes
- Zayante Coarse Sand, 5 to 30 Percent Slopes
- Zayante Coarse Sand, 30 to 50 Percent Slopes
- Badland

3.4.4 Vegetation Communities and Habitats

The landscaped portion of the NAVFAC facility, which is dominated by introduced kikuyu grass and Monterey cypress, is identified as Disturbed.



Map 3-10. Soils at the Point Sur Facility.

3.4.5 Wetlands and Other Regulated Habitats

Using the 1987 USACE manual and the arid west guidance, TDI (2011) conducted a wetland assessment for NSA Monterey. This study observed approximately 0.027 acres of jurisdictional unvegetated waters of the U.S occurring on the Point Sur Facility. TDI (2011) also noted the presence of 0.05 acres of vegetated wetland waters of the U.S. just to the west of the Point Sur Facility. Wetland areas and acreages for the Point Sur Facility is shown on Map 3-11.

3.4.6 Plant, Fish and Wildlife Populations

3.4.6.1 Plants

The Point Sur Facility contains two native and one non-native terrestrial plant species: brodiaea (*Brodiaea* sp.), Monterey cypress, and kikuyu grass, respectively (Appendix E). The brodiaea individual was observed flowering on the easement property in May 2009.

Marine vegetation observed at the Point Sur Facility during the most recent surveys included primarily kelp and algae. A total of 12 species were observed (Appendix E).

Rare, Endemic and Special Status Plants

Table 3-2 lists rare and endemic plants that could possibly be supported at the Point Sur Facility (based on CNDDB records).

Noxious and Invasive Species

Kikuyu grass dominates at the Point Sur Facility. This grass also dominates all State-owned adjacent lands along the bluff at Point Sur.

3.4.6.2 Wildlife

Reptiles and Amphibians

Three amphibian species have been observed at the Point Sur Facility: the bullfrog (*Lithobates catesbeianus*), Pacific treefrog, and the federally listed California red-legged frog (Appendix E). While the Point Sur Facility is relatively small (under one acre), it is possible that the non-native bullfrog there is contributing to the low amphibian species diversity; it is known to compete with and prey upon native frog species.

No reptiles have been observed at Point Sur Facility.

Birds

Nine avian species were observed at Point Sur Facility during the most recent surveys (GANDA 2011), primarily land-birds (Appendix E). None are federally listed. Of note was the California fully protected brown pelican observed offshore.

Map 3-11. Wetlands sites at the Point Sur Facility.

Terrestrial Mammals

Five terrestrial mammal species were observed at Point Sur Facility, all of which are bats, including the California species of special concern Townsend's big-eared bat (Appendix E). A habitat assessment during the most recent surveys (GANDA 2011) indicated that suitable foraging and roosting habitat likely occurs throughout the facility. Riparian drainages bordering the facility are likely to concentrate foraging activity. Bats were observed in relatively small numbers occupying 16 of the 41 structures inspected. Bats were observed using structures for night roosting, and they were seen emerging from structures at sunset, indicating day roosts are on site. However, day roosts were not found and are suspected to be in inaccessible attics, roofs and trees. Of bats that were trapped via mist netting, both males and females were present and two individuals appeared to be born during the year of the surveys (2010). The females showed no signs of having had pups over the summer; however, the first-year bats may indicate a reproductive population in the area (GANDA 2011).

Acoustic monitoring during the surveys suggested that in addition to those bats definitely identified, the silver-haired bat may be present (GANDA 2011).

Marine Life

Four marine fishes identified by the Point Sur Facility include northern clingfish (*Gobiesox maeandricus)*, Pacific staghorn sculpin (*Leptocottus armatus*), kelp fish (Chrionemidae Family), and prickleback (Stichaeidae Family). Other marine species identified included a harbor seal, purple shore crab (*Hemigrapsus nudus*), and purple sea star (*Pisaster ochraceus*), as well as various species of barnacles, snails, and mussels (Appendix E). In addition, red abalone (*Haliotis rufescens*) was also observed. There were a total of 20 species observed, including the fishes, none of which are federally listed. Southern sea otters were searched for in the most recent surveys (GANDA 2011), but were not observed.

3.4.7 Feral Animals

There are no known feral animal issues at the Point Sur Facility.

3.4.8 Special Status Species

Table 3-2 lists special status wildlife that the Point Sur Facility could possibly support (based on CNDDB records).

Marbled Murrelet (Federal-Listed Threatened, State-Listed Endangered)

The marbled murrelet occurs occasionally in the near-shore waters off the coast of the Point Sur Facility. However, this species has not been observed at the Point Sur Facility. More information on this species is presented in Appendix F.

California Red-Legged Frog (Federal-Listed Threatened)

Surveys by GANDA (2012) documented three adult California red-legged frogs on the property. On an adjacent property there were three adults and approximately 120-200 tadpoles in a water basin, indicating that this location is a breeding site for the frog (GANDA 2011). These basins are on property owned by CSP. Designated Critical Habitat for this species overlaps the entire Point Sur Facility (Map 3-12). More information on this species is presented in Appendix F.

3.5 NIROP Santa Cruz

3.5.1 Ecoregional Setting

The 275-acre NIROP Santa Cruz property is located within the Santa Cruz Mountains eco-subregion as depicted in Map 3-1. An area that contains intersections of a wide range of meteorological conditions, elevations, soils types, and biogeographic provinces, the western edge of the Santa Cruz Mountains is one of the most biologically rich areas of the state (Doak et al. 1996). Due to its topography, the region is one of California's wettest coastal regions south of San Francisco, averaging approximately 50 inches of precipitation annually (Western Regional Climate Center 2010). This area includes redwood and Douglas-fir forests as well as perennial streams. Chaparral occurs on dry slopes with shallow soils. As with much of California, fire is the dominant form of natural ecological disturbance. Although much of the eastern flank of the Santa Cruz Mountains has been developed to the point that many individual species have been excluded, this is not the case in the vicinity of NIROP Santa Cruz, where large tracts of relatively undeveloped land remain (Doak et al. 1996).

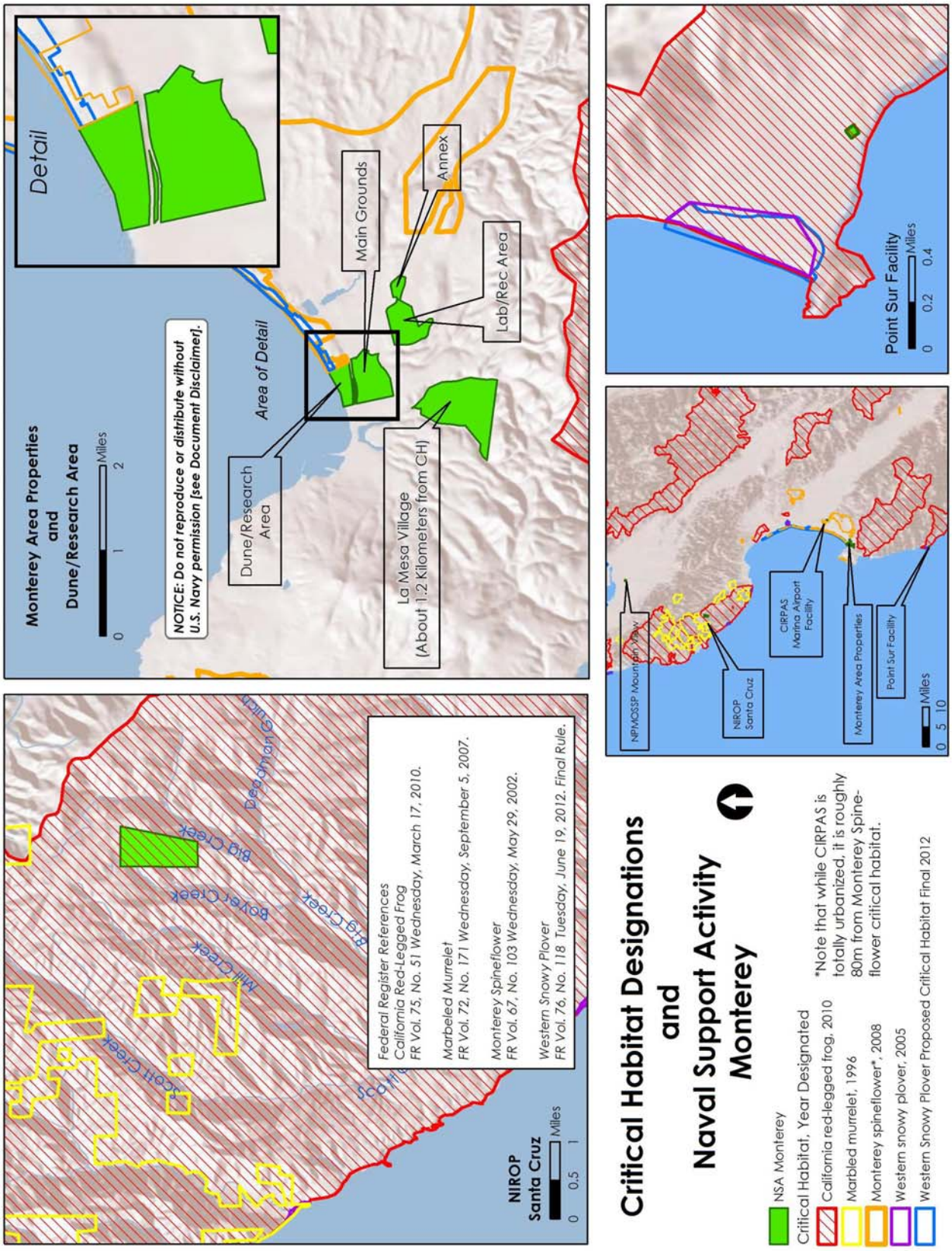
3.5.2 Local Climate

Located on Ben Lomond Mountain, NIROP Santa Cruz experiences a modification of the typical coastal regime with less summer fog, warmer summer temperatures, cooler winters, and greater overall rainfall (Table 3-5). A majority of rainfall occurs in intense, short-term, winter storms (Doak et al. 1996). Snowfall is rare but not unknown from the higher elevations in the Santa Cruz Mountains (Doak et al. 1996).

3.5.3 Physical Conditions

3.5.3.1 Dominant Geographic Features

The NIROP Santa Cruz property on Ben Lomond Mountain ranges in elevation from a height of 2,419 feet in its northwestern corner to an elevation of 1,520 feet in its southwestern corner. The majority of the facilities are on a small ridge at 2,185 feet with steep valley slopes found on all of its edges. Ben Lomond Mountain, a long ridge-like feature one mile to the east, peaks at 2,635 feet.



Map 3-12. Critical habitat designations at Naval Support Activity Monterey.

3.5.3.2 Underlying Geology

The region is dominated by the granitic Ben Lomond Block of the western Santa Cruz Mountains, which are part of the Coast Range province of California. The Ben Lomond block is bounded by the Zayante fault to the northeast and the San Gregorio fault to the west. Rock units are typified by Cretaceous age (146-65 million years BP) granitic intrusions overlain by tertiary (65-1.8 million years BP) sedimentary rocks.

Ben Lomond Mountain is a fault block within the San Andreas Fault zone of California composed of a central core of Cretaceous age granite overlain by a thin veneer of sedimentary rocks (ITC 1991 as cited in Doak et al. 1996). The upper most sedimentary unit is the upper Miocene-Pliocene Santa Cruz Mudstone which is underlain by Santa Margarita sandstone of upper Miocene age, with granite under the sandstone. The core of the mountain is believed to be granodiorite of Cretaceous age, exposed along the entire length of Empire Grade Road, which follows the crest of the mountain and at numerous locations on the surface of the Lockheed Martin facility. Older metamorphic rocks, principally marble and schist of probable Paleozoic (542-251 million years BP) age, are found in scattered outcrops within the granitic rocks.

The granitic rocks of Ben Lomond Mountain are composed mainly of quartz diorite, which was intruded into metamorphic rocks 70 to 90 million years ago. Almost the entire NIROP Santa Cruz property is underlain by granitic rocks. The granitic rocks are deeply weathered, particularly at lower elevations, forming thick soils. The soil and the underlying weathered granitic rock are very erodible, particularly on steeper slopes. At higher elevations the granite appears to be fresher, less altered, and more resistant to erosion. Several borings were drilled into the granitic rock as part of a foundation study during 1957-1958.

The miocene (23-5.3 million years BP) age Santa Margarita Sandstone is medium-to course-grained, massive sandstone which overlies granitic rocks. It is exposed in a small area in the northeast portion of the facility. The sandstone is uncemented or poorly cemented and usually very friable. The unit averages about 150 feet in thickness and dips gently seaward.

3.5.3.3 Surface Water Resources

The following is adapted from Geologic and Hydrologic Investigation of the Lockheed Martin parcel, Santa Cruz County (Griggs 1975) as cited in Doak et al. (1996).

NIROP Santa Cruz is located within the Scott Creek drainage. Scott Creek is a third order stream that empties into the Pacific Ocean 4.2 miles north of Davenport. The main channel of Scott Creek is approximately 11 miles in length and an additional 17.4 miles in perennial tributaries.

Small portions of the Lockheed Martin property drain directly into Scott Creek. However, a majority of the property drains into Mill, Boyer, and Big Creeks, all of which are tributaries of Scott Creek. The confluence of Big Creek and Boyer Creek occurs in the southern part of the Lockheed Martin property, and Big Creek merges with Scott Creek further to the south.

The majority of the NIROP Santa Cruz property drains into Boyer Creek, a small reach of which flows through the northeastern corner of the parcel. A small easterly portion of the NIROP Santa Cruz property drains into Big Creek. Importantly, Boyer Creek receives run-off from nearly all the building areas at the NIROP Santa Cruz property and merges with Big Creek about 7500 feet south-southwest of the property.

FEMA Flood Hazards

The Lockheed Martin facility shows flood susceptibility at the Mill Creek Reservoir.

3.5.3.4 Water Quality

The previous NIROP INRMP (Doak et al. 1996) discusses tests to assess the feasibility to site groundwater production at NIROP Santa Cruz. Drilled to a maximum of 600 feet below the surface grade, the engineers found inadequate water supplies to meet the needs of the Lockheed Martin facility, and no bore holes were completed as production wells. The steep slopes and high elevation of the property effectively prevent ground water from storing under the surface (Doak et al. 1996).

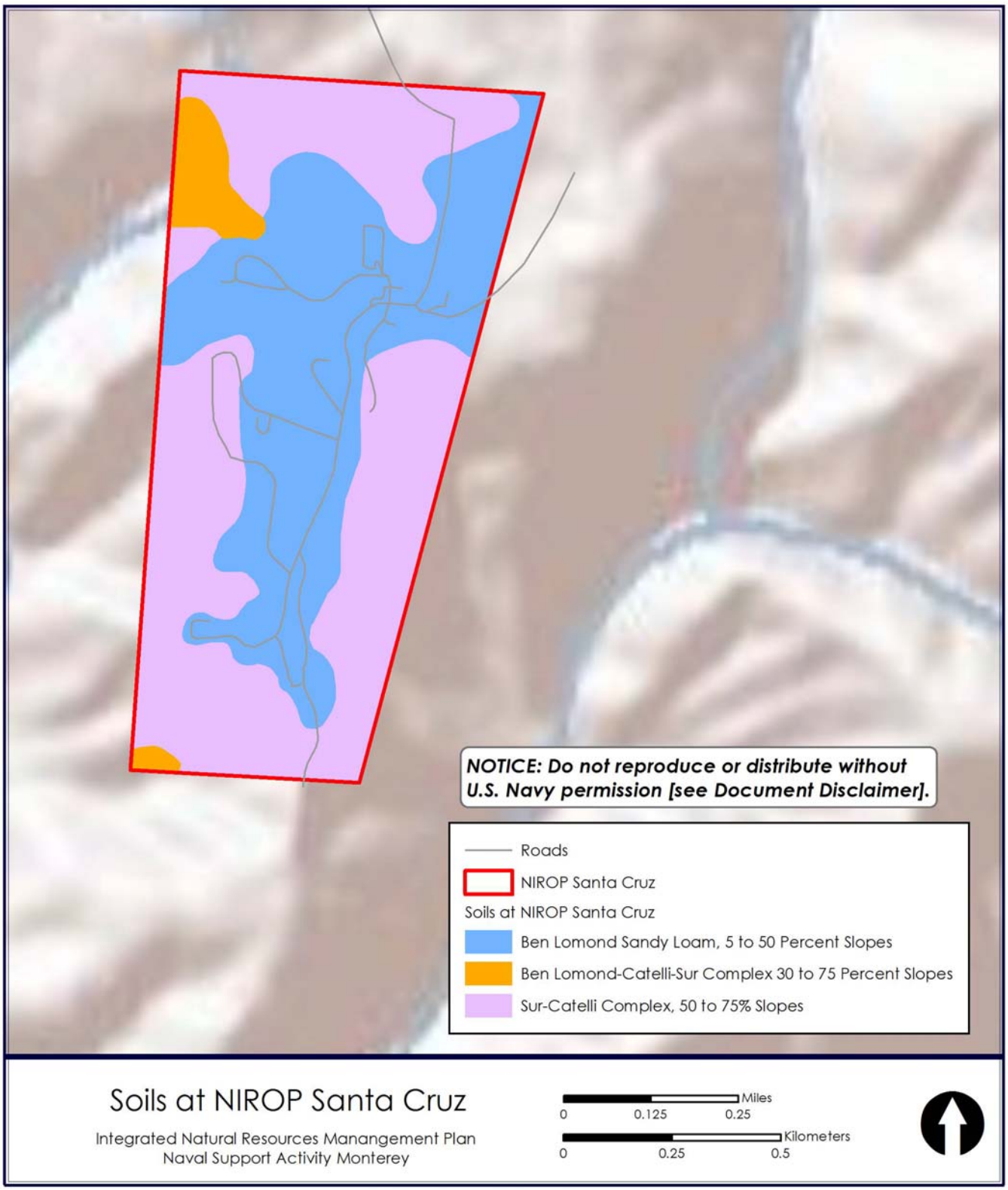
3.5.3.5 Soils and Soil Condition

The following list is the NRCS soil descriptions (SCS 1980) for NIROP Santa Cruz depicted on Map 3-13. Formal descriptions of soils are presented in Appendix G.

- Ben Lomond Sandy Loam, 5 to 15 Percent Slopes
- Ben Lomond Sandy Loam, 15 to 50 Percent Slopes
- Ben Lomond-Catelli-Sur Complex, 30 to 75 Percent Slopes
- Sur-Catelli Complex, 50 to 75 Percent Slopes

3.5.4 Vegetation Communities and Habitats

The Santa Cruz Mountains are home to a diverse array of plant communities. This diversity results from the underlying complexity of soil, temperature, moisture, and fire conditions. This complicated set of factors favors inter-mixtures of radically varying plant communities over small spatial scales throughout this area. The NIROP Santa Cruz is no exception to these generalities. The majority of the landscape is undeveloped and supports mixtures of chaparral, grassland, redwood forest, and mixed oak/evergreen forest. The relatively undisturbed mixed evergreen forest is the primary vegetation community found throughout the area. Together with the similarly undisturbed lands surrounding it these communities support a wide range of plant species, and thus, a rich biological landscape for wildlife and human activities (Doak et al. 1996).



Map 3-13. Soils at Naval Industrial Reserve Ordnance Plant Santa Cruz.

Vegetation Classification and Mapping

1994 vegetation mapping (Doak et al. 1996) determined dominant vegetation communities for sampling stations located along routes of travel focusing on plant community structure on the property. It revealed the relative lack of clear plant community types at NIROP Santa Cruz.[12] However, it did support Thomas' (1961)[13] classification of three major communities in this area: mixed evergreen forest, chaparral/grassland, and redwood forest communities.

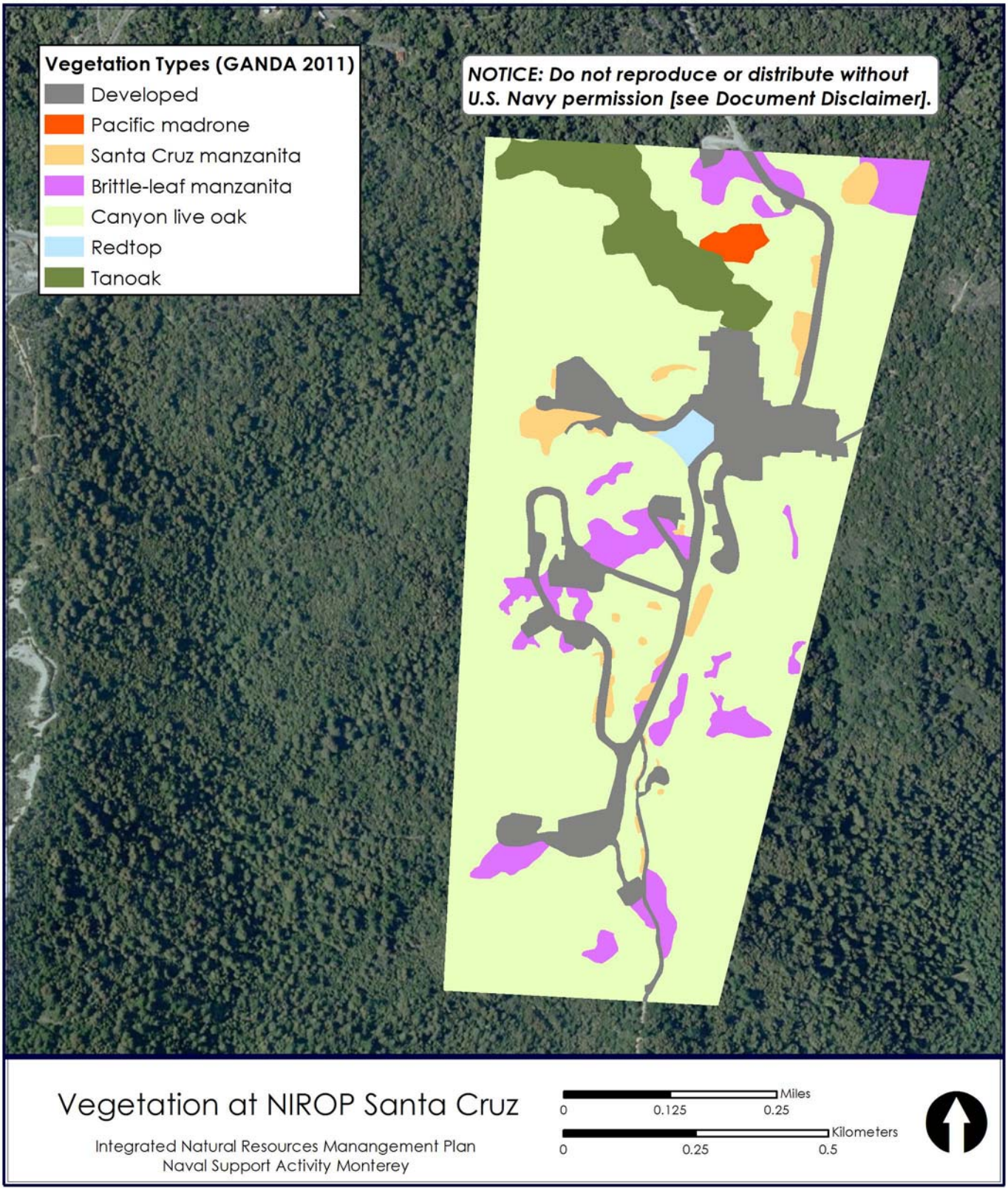
The most recent surveys (GANDA 2011) classified and mapped the property according to the National Vegetation Classification System (NVCS) to describe its floristic composition and associations. This information is depicted in Map 3-14. According to this system, vegetation types include: (i) four alliances: brittle-leaf manzanita (*Arctostaphylos crustacea*), canyon live oak (*Quercus chrysolepis*), Pacific madrone (*Arbutus menziesii*), tanoak; (ii) one semi-natural stand: redtop (*Agrostis gigantea*); (iii) and one natural stand: Santa Cruz manzanita (*Arctostaphylos andersonii*). Canyon live oak was found to be the main vegetation type occurring throughout the property with a large stand of tanoak in the northwest section.

Both classification systems provide important information for resource managers. The most recent mapping (GANDA 2011) complies with to-date California standards for vegetation classification and describes vegetation alliances floristically, which is important for vegetation management on the property. However, the 1994 mapping describes plant communities in light of their structural and floristic relevance and importance for other components of the ecosystem, including soil erosion and wildlife habitat. Given the need to consider vegetation, wildlife, soils, etc. in resource management, the following sections present information using the framework provided by the 1994 mapping effort (Thomas 1961) while providing cross-references (Table 3-9) to relate the floristic information provided by the most recent mapping effort (GANDA 2011).

Mixed Evergreen Forest, Chaparral and Grassland

Mixed evergreen forest is present in varying successional stages with several dominant tree associations. These community types are intermixed throughout the site, forming a homogeneous habitat with few distinct areas that could be characterized as pure forest, chaparral, or grassland. The undifferentiated structure and similar composition of plants found throughout the area is a primary factor shaping the wildlife community. Because typical evergreen forest and chaparral are naturally composed of a patchy mosaic structure with different successional stages, changes in the relative amounts of different aged stands can greatly influence animal populations. These changes often are a result of natural fire regimes, providing a powerful ecological and evolutionary influence over all biological elements.

12. Patches of different forest types over much of the property were too small and intermixed to be usefully mapped.
13. Most similar to the Holland or Munz classification system.



Map 3-14. Vegetation at Naval Industrial Reserve Ordnance Plant Santa Cruz.

Table 3-9. Naval Industrial Reserve Ordnance Plant Santa Cruz vegetation classification and mapping crosswalk.

1994 Classification Effort: Thomas 1961	2010 Classification Effort: National Vegetation Classification System	Comments
Chaparral (Holland: Central maritime chaparral; Munz: Chaparral)	Brittleleaf manzanita: *Arctostaphylos* (*crustacea*, *tomentosa*) Shrubland Alliance Santa Cruz manzanita (*Arctostaphylos andersonii*) Natural Stand	These two species often associate together in the Santa Cruz area. Both are components of central maritime chaparral. Brittleleaf manzanita alliance requires fire to maintain its current species composition.
Grassland (Holland: Coastal terrace prairie, Montane meadow; Munz: Coastal prairie, Valley grassland)	Redtop: *Agrostis* (*gigantea, stolonifera*)-*Festuca arundinacea* Semi-Natural Herbaceous Stands	Redtop (*Agrostic gigantea*) and tall fescue (*Festuca arundinacea*). Both are non-native, though only tall fescue is rated by Cal-IPC ("limited" invader). This semi-natural stand tolerates flooding events and is resilient to fire, but is sensitive to drought.
Redwood Forest	N/A - as associates with tanoak and Douglas-fir, may be included as part of relevant National Vegetation Classification Standard alliances that fall under mixed evergreen forest.	Associates with tanoak and Douglas-fir.
Mixed Evergreen Forest		
Tanoak	Tanoak: *Lithocarpus densiflorus* Forest Alliance	Feral pigs and sudden oak death syndrome are affecting many stands in California. May occur in riparian areas along with redwood.
Madrone	Pacific madrone: *Arbutus menziesii* Forest Alliance	Even though a common secondary species in many forest types, does form distinctive stands of high cover worthy of recognition. May occur in riparian areas along with redwood.
Mixed Oak	Canyon live oak: *Quercus chrysolepis* Forest Alliance	Often associated with Madrone. May occur in riparian areas along with redwood.
Madrone-Douglas Fir	Pacific madrone: *Arbutus menziesii* Forest Alliance	Does associate with the *Pseudotsuga menziesii-Lithocarpus densiflorus* alliance (Douglas fir-Tanoak) in northern parts of California. May occur in riparian areas along with redwood.

Source: Doak et al. 1996; GANDA 2011; Sawyer et al. 2008; Thomas 1961.

The late-successional mixed evergreen forest is largely uniform in age and structure and is quite old, while the younger though mature chaparral is a temporary result of human disturbance that will gradually return to mixed evergreen forest. This age-structure is reinforced by the low diversity of small mammal species and dominance of the brush mouse. This species is often associated with dense mature chaparral (USDA 1990), and its presence over a large portion of NIROP Santa Cruz sites indicate homogeneous vegetation communities (Doak et al. 1996).

Mixed Evergreen Forest

The mixed evergreen forest usually occurs on drier sites and occupies a considerable amount of the forested region of the Santa Cruz Mountains (Thomas 1961). The vast majority of the vegetation on NIROP Santa Cruz belongs to the mixed evergreen community: 90 percent of the 1994 sampling stations.

According to Thomas (1961) this community can be subdivided into a number of subordinate ones. 1994 cluster analysis identified four types of mixed evergreen communities: tanoak, madrone, mixed oak, and madrone-Douglas fir (Table 3-9). However, as Thomas (1961) indicates, these sub-communities generally replace one another over very short distances and integrate extensively. Sites sampled in 1995 re-emphasize the finding that the various mixed evergreen communities are not well differentiated; many sites were identified with vegetation types interme-

diate between the four. Vegetation alliances identified during the most recent vegetation mapping effort which fall within the mixed evergreen forest community include: Tanoak Forest Alliance; Pacific Madrone Forest Alliance; and Canyon Live Oak Forest Alliance (Table 3-9) (GANDA 2011; Doak et al. 1996; Sawyer et al. 2009; Thomas 1961).

This habitat type is preferred by some small mammals, including Monterey dusky-footed woodrat[14], California pocket mouse (*Chaetodipus californicus*), and western harvest mouse (Doak et al. 1996).

Chaparral and Grassland

Both chaparral and grassland are dominated by either fire-adapted shrubs or herbaceous plants. Only six percent of the sites sampled in 1994 were identified as chaparral and grassland. On the western slopes of the Santa Cruz Mountains, chaparral occupies some of the higher ridges and steep, south-facing slopes (Thomas 1961). On NIROP Santa Cruz, chaparral mostly occurs in areas with high exposure, in particular along road edges disturbed by grating and bulldozing. Shrubs which commonly occur in the chaparral community on NIROP Santa Cruz include coyote brush, yerba santa (*Eriodictyon californicum*), California broom (*Lotus scoparius*), and silver lupine (*Lupinus albifrons*). Vegetation alliances identified in the most recent vegetation mapping effort (GANDA 2011) that are part of the chaparral community include: Brittle-Leaf Manzanita Shrubland Alliance and Santa Cruz Manzanita Natural Stand.

Areas of grassland occupy the tops of some ridges adjacent to chaparral, and small areas of grassland are scattered throughout the mixed evergreen forests (Thomas 1961). At NIROP Santa Cruz, patches of herb-dominated areas are common near buildings, where other vegetation has been cleared away. In grassland at NIROP Santa Cruz, the commonly occurring species include various grass species: bracken fern (*Pteridium aquilinum*), bedstraw (*Galium* ssp.), cat's ears (*Hypochoeris glabra*), several species of lotus, and sky lupine (*Lupinus nanus*). Redtop-Tall Fescue Semi-Natural Herbaceous Stand is part of the grassland community and was identified by the most recent vegetation mapping effort (GANDA 2011).

For the most part the chaparral and grassland communities on NIROP Santa Cruz are temporary results of human disturbance that will gradually return to mixed evergreen forest. Because chaparral plants are much more fire prone than are most forest species, these areas pose a significant fire hazard.

The deer mouse prefers the chaparral and grassland community at NIROP; it was not found predominantly in the mixed evergreen areas and not at all in the redwood areas (Doak et al. 1996).

14. This species was observed by researchers from U.C. Santa Cruz in 1996 as reported in Doak et al. (1996). However this species was not observed in 2011 during general flora and fauna surveys by GANDA (2011).

Redwood Forest

Redwood forest occurs along Boyer Creek, the perennial stream that flows through a shaded ravine in the northwest corner of NIROP Santa Cruz. Redwood forest typically inhabits such cool ravines and is often associated with streams (Thomas 1961). It is the predominant vegetation type in riparian areas on NIROP Santa Cruz and is of paramount importance in maintaining creek bank stability and in creating a riparian area that is suitable habitat for many wildlife species. Due to small occurrence of streams and riparian zones at NIROP Santa Cruz, redwood forest is a small component of the vegetation here: only two percent of the sites sampled in 1994 were classified as redwood forest. The floor of the redwood forest generally supports few shrub and herb species (Thomas 1961). For redwood forest on NIROP Santa Cruz tree cover was quite high, averaging 70 percent, while both shrub and herb cover were low, averaging 18 and 8 percent, respectively. California blackberry was the only shrub species commonly occurring in the redwood understory. Wood rose (*Rosa gymnocarpa*) and Pacific rhododendron (*Rhododendron macrophyllum*) were occasionally found in redwood areas. However, no herb species occurred commonly within the redwood areas that were sampled. The stands of redwood located on NIROP Santa Cruz are not pure, but rather mixtures of redwoods with several other trees: tanoak, Douglas-fir, and Pacific madrone.

The redwood stands that primarily occur along riparian areas at NIROP Santa Cruz are important for birds on the property. They provide valuable habitat and foraging opportunities (including insect and invertebrate species), especially for neotropical migrants that feed and rest here during their annual spring and fall migrations.

Small mammals preferring the redwood forests at NIROP Santa Cruz include the brush mouse and California mouse (*Peromyscus californicus*). In particular, the brush mouse is associated with steep, wooded areas such as those along Boyer Creek where the redwoods are found (Doak et al. 1996).

3.5.5 Wetlands and Other Regulated Habitats

The property is situated at the head of the Boyer Creek watershed. As a result, the creek at NIROP Santa Cruz and its associated riparian zone are located within the stream division known as the erosion zone. Much of the sediment that enters the watershed is produced in this section (Faber 1989).

Riparian areas and permanent or seasonal ponds and seeps are wetlands on NIROP Santa Cruz which contain important feeding, watering, resting and breeding sites for a large variety of vertebrates and invertebrates alike (Brode and Bury 1984). Their association with redwood forest increases their importance for wildlife. They are especially important for fish and amphibians. These areas also provide an ample food supply for many animals in the form of organic materials, vegetation, and insect and other invertebrate species. These riparian areas act as corridors for migrating animals, including mammals and birds

that move seasonally through the area. Although the wetlands at NIROP Santa Cruz are few, their value to wildlife and to the overall ecology of the area cannot be overemphasized. Reptiles and amphibians found in this area include California newt, Monterey ensatina, western yellow-bellied racer (*Coluber constrictor mormon*), western skink (*Eumeces skiltonianus skiltonianus*), Pacific treefrog, and California slender salamander (*Batrachoseps attenuatus*). The non-native bullfrog was also present; it is known to compete with and prey upon native frog species. The riparian habitat at NIROP Santa Cruz is of particular importance to many neotropical migrants, since these birds feed and rest in the area during their annual spring and fall migrations (Doak et al. 1996). Bobcats and weasels are also found within the riparian area at NIROP Santa Cruz, which they use as water sources and movement corridors.

The high erosion found along roads contributes sediment into the wetland areas, especially Boyer Creek, which can lead to poor water quality and in turn affect the amphibian and reptile populations.

Using the 1987 USACE manual and the Arid West guidance, TDI (2011) conducted a wetland assessment for NSA Monterey. This study observed approximately 0.28 acres of jurisdictional unvegetated waters of the U.S., and 0.45 acres of vegetated wetland waters of the U.S. occurring on NIROP Santa Cruz. Wetland areas for the NIROP Santa Cruz are shown on Map 3-15.

3.5.6 Plant, Fish and Wildlife Populations

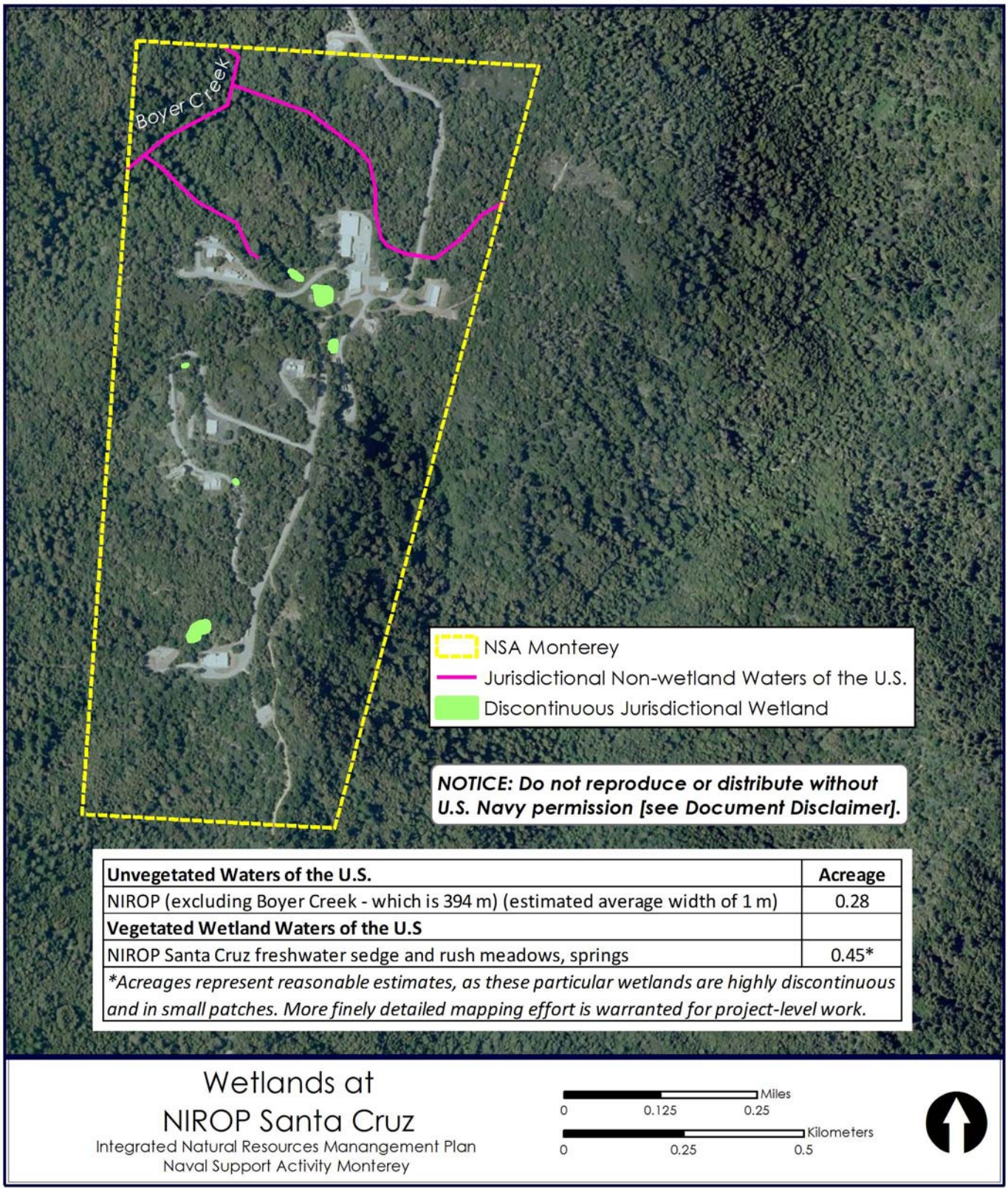
3.5.6.1 Plants

NIROP Santa Cruz contains 260 distinct taxa (Appendix E). Of these, 200 are native, 50 are non-native and 10 are undetermined.[15]

Rare, Endemic and Special Status Plants

Five special status plant species have been confirmed to occur on NIROP Santa Cruz, all of which are on the CNPS List 1B: Hoover's bent grass (*Agrostis hooveri*), Santa Cruz manzanita, white-flowered rein orchid (*Piperia candida*), Northern California black walnut (*Juglans hindsii*), and Monterey pine. The latter two species were identified in the most recent plant surveys in 2010 (GANDA 2011), and noted as planted individuals. White-flowered rein orchid was observed during recent wetland delineation surveys (TDI 2011). Table 3-2 lists rare and endemic plants that could possibly be supported at the NIROP Santa Cruz property (based on CNDDB records).

15. The individual observed could only be identified to genus level. Some species of these genera are native and some are non-native.



Unvegetated Waters of the U.S.	Acreage
NIROP (excluding Boyer Creek - which is 394 m) (estimated average width of 1 m)	0.28
Vegetated Wetland Waters of the U.S	
NIROP Santa Cruz freshwater sedge and rush meadows, springs	0.45*
**Acreages represent reasonable estimates, as these particular wetlands are highly discontinuous and in small patches. More finely detailed mapping effort is warranted for project-level work.*	

Map 3-15. Wetlands at Naval Industrial Reserve Ordnance Plant Santa Cruz.

3.5.6.2 Invasive Non-Native Plants

At NIROP Santa Cruz, the number of invasive plant species and individuals is relatively low. Four species are rated High invaders by Cal-IPC: red brome, cheatgrass, pampas grass, and French broom. Of the species identified for management concern, those NIROP Santa Cruz are French broom, pampas grass, and tall fescue (Table 3-3).

3.5.6.2.1 French Broom (CDFA List C, Cal-IPC "High" Invader)

At NIROP Santa Cruz, French broom occurs along a fire trail near the southern boundary of NIROP Santa Cruz. However, it is not yet common on NIROP Santa Cruz (Doak et al. 1996). More information on this species is provided in Appendix F.

3.5.6.2.2 Pampas Grass (Cal-IPC "High" Invader)

Pampas grass is along XN Road in the center of the NIROP Santa Cruz property.[16] While still relatively uncommon on NIROP Santa Cruz, this species is a severe pest elsewhere in the Santa Cruz Mountains and could easily spread on NIROP Santa Cruz (Doak et al. 1996). More information on this species is provided in Appendix F.

3.5.6.2.3 Tall Fescue (Cal-IPC "Moderate" Invader)

Tall fescue occurs on NIROP Santa Cruz in an open grassy area at the center of the property, near one of the loop roads.[17] This area was bulldozed in 1995, and the invasion of tall fescue at the property may be aided by such disturbance events (Doak et al. 1996). More information on this species is provided in Appendix F.

3.5.6.3 Wildlife

Terrestrial Invertebrates

The most recent surveys (GANDA 2011) comprise the only baseline survey of terrestrial invertebrates at NIROP Santa Cruz. Twenty-two Orders of terrestrial invertebrates were identified from seven classes (Arachnida, Chilopda, Diploda, Entognatha, Insecta, Oligochaeta, Symphyla). In addition, six families (Aphididae, Coccinellidae, Formicidae, Gryllidae, Raphidiidae, Staphylinidae), one subfamily (Stenopalmatinae), and one superfamily (Spoidea) were identified (Appendix E). Bees, wasps, harvestmen, Jerusalem crickets, rove beetles, and ladybird beetles were observed, but were not identified to the species level.

Fishes - Freshwater

The western mosquitofish was the only fish identified by recent surveys (GANDA 2011) at NIROP Santa Cruz.

16. The location of pampas grass at NIROP Santa Cruz was first documented in 1996 INRMP for NIROP (Doak et al. 1996). See the map on page 55 of the 1996 INRMP.
17. The location of tall fescue at NIROP Santa Cruz was documented in the 1996 INRMP for NIROP (Doak et al. 1996). Its location is described as "at the northeast end of transect A" (see map on pg. 58).

Reptiles and Amphibians

Eleven species of reptiles and six species of amphibians are documented at NIROP Santa Cruz (Appendix E). None are federally listed. It is possible that the non-native bullfrog at NIROP Santa Cruz is contributing to the low amphibian species diversity. It is known to compete with and prey upon native frog species. Suitable habitat for the California red-legged frog was found during the most recent surveys (GANDA 2012).

For the most part during the 1994 surveys, amphibians were only present near the riparian areas or during and after rains, discussed in the wetlands section above. At that time, the dominant lizard species was the western fence lizard. Both species of alligator lizards (*Elgaria coerulea* and *E. multicarinata*) were also sighted frequently. Rare to occasional snakes included: sharp-tailed snake (*Contia tenuis*), western racer (*Coluber constrictor*), gopher snake (*Pituophis melanoleucus*), western garter snake (*Thamnophis elegans*), and Pacific rattlesnake (*Crotalus oreganus*). During the most recent surveys (GANDA 2011), four amphibian and four reptile species were observed: California slender salamander, Monterey ensatina, rough-skinned newt (*Taricha granulosa*), California newt (*Taricha torosa*), Pacific rattlesnake, California alligator lizard, western skink, and western fence lizard.

Birds

Fifty-four avian species were observed at NIROP Santa Cruz. Of note are two California bird species of conservation concern: short-eared owl and yellow warbler (Appendix E). Bird species only recorded during the most recent surveys included ruby-crowned kinglet (*Regulus calendula*), warbling vireo (*Vireo gilvus*), and golden-crowned sparrow (*Zonotrichia atricapilla*). Although the NIROP Santa Cruz INRMP (Doak et al. 1996) identified a northern goshawk (*Accipiter gentilis*) during surveys, the NIROP Santa Cruz property occurs outside of the known range of this species (GANDA 2011).

Commonly heard and seen birds during the 1994 surveys were neotropical migrants such as the orange-crowned warbler (*Vermivora peregrina*) and black-throated warbler (*Dendroica nigriscens*). The wrentit (*Chameaea fasciata*) and spotted towhee (*Pipilo maculatus*) were two common resident species at that time; the most frequently observed raptor species at NIROP Santa Cruz was the red-tailed hawk (*Buteo jamaicensis*) and the most often heard species was the great horned owl (*Bubo virginianus*) (Doak et al. 1996). The most recent surveys (GANDA 2011) noted that the diversity of native bird species at NIROP Santa Cruz includes raptors, hummingbirds, quail, and sparrows.

Terrestrial Mammals

A total of 30 mammal species have been documented as present at NIROP Santa Cruz (Appendix E). During the most recent surveys (GANDA 2011), seven rodent species were observed and the brush mouse was the most frequently captured species. Mule deer were also frequent.

Small Mammals

Although small mammal species are not distinctly associated with any vegetation community at NIROP Santa Cruz, they have shown some preference. The Monterey dusky-footed woodrat[18], a California species of concern, California pocket mouse, and western harvest mouse prefer the mixed evergreen habitat. The most predominant small mammal to use the redwood forest is the brush mouse, which has shown a greater habitat preference for redwood forest than for mixed evergreen forest or chaparral/grassland communities. The brush mouse is associated with steep, wooded areas such as the areas along Boyer Creek where redwoods are found. The California mouse also preferred redwood forest to mixed evergreen and was absent from chaparral. Deer mice were commonly found in the chaparral and grassland community, more so than in the mixed evergreen areas and it was not found at all in the redwood areas. Other small mammals include the Trowbridge shrew (*Sorex trowbridgii*) and Merriam's chipmunk (*Neotamias merriami*). Similar to the 1994 surveys, the most recent surveys (GANDA 2011) identified that the brush mouse was the most common small mammal at the property.

Bats

There are up to six bat species known to occur at NIROP Santa Cruz. Recent surveys directly observed three: Townsend's big-eared bat, a California species of special concern, big brown bat, and hoary bat. In addition to those bat species definitively identified, acoustic monitoring suggests that the Yuma myotis (*Myotis yumanensis*) and California myotis (*Myotis californicus*) are both likely present and that long-legged myotis may be present (GANDA 2011).

It had previously been suggested that poor stream health and the subsequent lack of invertebrates for insectivorous birds and bats may have contributed to lack of such species on NIROP Santa Cruz. However, the recent identification of three additional bat species suggests the opposite.

A recent habitat assessment (GANDA 2011) indicated that suitable roosting habitat (both natural and anthropogenic) and foraging habitat occurs throughout the property. Potential roosting habitat was observed in trees; at least three species of bats were roosting in the test stand building, including Townsend's big-eared bat, found day roosting on the third floor, in the basement and in the ground level cave-like space. This bat species typically roosts on open surfaces, as opposed to crevices or cavities. One or more *Myotis* species were roosting throughout the multi-roomed basement and several individuals roosting in the ceiling features on the third floor of the test stand building.

18. This species was observed by researchers from U.C. Santa Cruz in 1996 as reported in Doak et al. (1996). However this species was not observed in 2011 during general flora and fauna surveys by GANDA (2011).

Large Mammals

Common meso and large mammals include mule deer, opossum, raccoon, and coyotes (*Canis latrans*). Deer are common in this area, especially with low numbers of natural predators. The 1994 surveys identified wild boar/feral pigs (*Sus scofa*) as common, based on the presence of their tracks and evidence of rooting. However, recent surveys (GANDA 2011) note that there was no current evidence of wild boar at NIROP Santa Cruz. Less common large mammals include the bobcat (*Lynx rufus*), mountain lion (*Puma concolor*), gray fox (*Urocyon cinereoargenteus*), non-native red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), and long-tailed weasel (*Mustela frenata*). Given their large ranges, territorial behavior and minimal evidence of activity on the property, only one sighting of a mountain lion occurred in 1994 (Doak et al. 1996). While none were observed during the most recent surveys, according to data recently compiled by Dr. Chris Wilmers of the University of California of Santa Cruz, mountain lions use NIROP Santa Cruz for traveling, hunting deer and feral pigs, denning, and mating. Two adult males, one subadult male, two females, and three cubs are currently known to use the NIROP Santa Cruz property (C. Wilmers as cited in GANDA 2011). The population of deer in the area may be kept to a manageable level by the presence of mountain lions.

3.5.7 Feral Animals

Wild Boar

In the early 18th century, domestic pigs were brought to California by Spanish and Russian settlers. Some pigs escaped captivity, bred, and became feral. At the beginning of the 20th century, wild boar, native to central Europe, were introduced to California by a Monterey landowner for hunting. The two swine species now interbreed freely and a hybrid wild boar/feral pig has proliferated. This invasive species is found in 56 of 58 California counties and inhabits woodland, chaparral, meadow, and grassland habitats. They are omnivorous scavengers, foraging from dusk to dawn using their characteristic rooting behavior. They favor grasses and forbs in the spring, mast and fruit in summer and fall, and will eat roots, tubers and invertebrates throughout the year. Piglets fall prey to wolves, brown bear, large felines, and birds of prey. The CDFW established a wild pig hunting season in 1957, adding a game tag requirement in 1992. The 1994 surveys identified wild boar as common at NIROP Santa Cruz, based on the presence of their tracks and evidence of rooting. At the property they occur where thick chaparral brush and the high density of oak trees provides superior pig habitat. Its populations there can have negative impacts on native vegetation, including signs of increased erosion and gullying of soil in areas that they frequently use (Doak et al. 1996). However, recent surveys in 2010 (GANDA 2011) noted that there was no current evidence of wild boar at NIROP Santa Cruz.

3.5.8 Special Status Species

Table 3-4 lists special status wildlife possibly supported at the NIROP Santa Cruz property (based on CNDDB records).

Marbled Murrelet (Federal-listed Threatened, State-listed Endangered)

The marbled murrelet breeds at least as far south as Big Basin Redwoods State Park, located just north of NIROP Santa Cruz. In 2007[19], Critical Habitat for this species was designated at this park, as well as south of NIROP Santa Cruz in Henry Cowell Redwoods State Park, including the nearby Fall Creek Unit (USFWS 2007). The USFWS did not designate Critical Habitat on NIROP Santa Cruz. It is possible that NIROP Santa Cruz may contain potential habitat for this species, given its preference for nesting in Douglas-fir branches, as well as in old-growth redwood stands in Santa Cruz County (USFWS 1997). More information on this species is presented in Appendix F.

Marbled Murrelet
(Brachyramphus marmoratus)
Photo credit: USFWS

California Red-Legged Frog (Federal-Listed Threatened, California Species of Concern)

California red-legged frogs were not observed during the most recent surveys at NIROP Santa Cruz; however, suitable upland habitat was found (GANDA 2012) and designated Critical Habitat for this species entirely overlaps the property. More information on this species is presented in Appendix F.

California Red-legged Frog
(Rana draytonii)
Photo credit: Garcia and Associates

3.6 NPMOSSP Mountain View

3.6.1 Ecoregional Setting

NPMOSSP Mountain View is located within the Bay Flats sub-ecoregion as defined by the USFS (1995) as depicted on Map 3-1. Prior to the construction of artificial barriers along the southern edge of the San Francisco Bay, this area was often flooded at high tides, as the entire area is more or less under ten feet in elevation. Pickleweeds, sedges, and saltgrass were the predominant vegetation types.

The dense urban landscape in which the NPMOSSP Mountain View is now embedded is at the mouth of the Santa Clara Valley. The Santa Clara Valley is bounded by the San Francisco Bay to the north, the Santa Cruz Mountains to the west, the Diablo range to the east, with the region around the city of Gilroy establishing its southern extent. The Valley rises from sea-level at its northerly end, and elevations of 150 to 400 feet to the south. While the area encompassed by NPMOSSP Mountain View is entirely urban, the undeveloped areas in the region include

19. Federal Register Vol. 72, No. 171 Wednesday, September 5, 2007.

salt water and fresh water marshes, scrublands, needlegrass grasslands, and coast live and blue oak woodlands (USFS 1995). Prior to large scale urban development, the Santa Clara Valley was a very productive agricultural region due to its basin's fertile soils. Now largely developed, its urbanized northern cities are known as Silicon Valley and are home to many of the world's largest technology companies.

3.6.2 Local Climate

Situated roughly four miles from the southern shores of the San Francisco Bay, NPMOSSP Mountain View has a typical Mediterranean climate with warmer summers and cooler winters than the previously mentioned coastal properties of NSA Monterey. This area also experiences spring and summer fog; however, warm temperatures in the southern Santa Clara Valley often dispense with the marine layer by midday. Rainfall averages 15.2 inches per year.

3.6.3 Physical Conditions

3.6.3.1 Dominant Geographic Features

NPMOSSP Mountain View sits at sea level, south of the large salt evaporation ponds that line the southern edge of the San Francisco Bay. The foothills of the Santa Cruz Mountains rise roughly five miles to the west, and those of the Diablo Range begin about ten miles to the east.

3.6.3.2 Underlying Geology

NPMOSSP Mountain View is underlain entirely by Holocene (11,500 years BP) alluvium (Graymer et al. 2006). This massive formation occupies much of the upper Santa Clara Valley, including the cities of San Jose, Santa Clara, Mountain View, Palo Alto, and Milpitas.

3.6.3.3 Surface Water Resources

Unlike other NSA Monterey properties that are central coast hydrologic region, NPMOSSP Mountain View belongs to the San Francisco Bay hydrologic region. Run-off from the nearly flat and developed NPMOSSP Mountain View property drains into the Mountain View municipal drainage system.

FEMA Flood Hazards

NPMOSSP Mountain View is within the 500-year floodplain.

3.6.3.4 Water Quality

No known water quality issues exist at NPMOSSP.

3.6.3.5 Soils and Soil Condition

Information regarding the soils in Santa Clara County for the area that underlies the NPMOSSP Mountain View is unavailable (NRCS 2010).

3.6.4 Vegetation Communities and Habitats

No natural vegetation exists at NPMOSSP Mountain View.

3.6.5 Wetlands and Other Regulated Habitats

No wetlands or other regulated habitats exist at NPMOSSP Mountain View.

3.6.6 Plant, Fish and Wildlife Populations

3.6.6.1 Plants

No natural vegetation exists at NPMOSSP Mountain View.

Rare, Endemic and Special Status Plants

No natural vegetation exists at NPMOSSP Mountain View.

3.6.6.2 Invasive Non-Native Plants

There are no known noxious and invasive weeds at NPMOSSP Mountain View.

3.6.6.3 Wildlife

Seven species of birds were observed recently at NPMOSSP Mountain View (Appendix E). All are land-birds often found in developed areas.

3.6.7 Feral Animals

No feral animals exist at NPMOSSP Mountain View.

3.6.8 Special Status Species

No special status species exist at NPMOSSP Mountain View.

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4.0 Natural Resources Management Objectives and Strategies

This Chapter details the management approach NSA Monterey will take to the natural resources described in Chapter 3.

4.1 Managing with an Ecosystem Approach

Background

The Sikes Act (as amended) states that the INRMP goals "shall be to maintain or develop an ecosystem-based conservation program…" The Navy is required to ensure that ecosystem management is the basis for all management of its land and waters (OUSD Memo of 08 August 1994, Implementation of Ecosystem Management in the Department of Defense). The DoDI 4715.03 Natural Resource Conservation Program requires that installations "shall follow an ecosystem-based management approach to natural resources-related practices and decisions, using scientifically sound conservation procedures, techniques, and data."

The guidance provides a DoD definition of ecosystem management as "a goal-driven approach to managing natural and cultural resources that supports present and future mission requirements; preserves ecosystem integrity; is at a scale compatible with natural processes; is cognizant of nature's timeframes; recognizes social and economic viability within functioning ecosystems; is adaptable to complex and changing requirements; and is realized through effective partnerships among private, local, state, tribal, and federal interests. Ecosystem-based management is a process that considers the environment as a complex system functioning as a whole, not as a collection of parts, and recognizes that people and their social and economic needs are a part of the whole."

The DoD guidance further prescribes that ecosystem-based management will:

1. Avoid single-species management and implement an ecosystem-based multiple species management approach that is consistent with the requirements of the ESA.

2. Use an adaptive management approach to manage threats to natural resources, such as climate change.
3. Evaluate and engage in the formation of local or regional partnerships that benefit the goals and objectives of the INRMP. Due to policy and fiscal implications, partnerships involving external stakeholders or multiple military services require proper advanced coordination through DoD component chains of command. Natural resources personnel must be included in the planning and implementation phases of all resulting agreements.
4. Use the best available scientific information in decision-making and adaptive management techniques in natural resources management.
5. Foster long-term sustainability of ecosystem services.

Furthermore, as a component of biodiversity conservation, the guidance directs installations to "maintain ecological processes, such as disturbance regimes, hydrological processes, and nutrient cycles, to the extent practicable."

The NSA Monterey ED has already adopted many elements of an ecosystem approach including habitat integrity first (before population-level management), protection of key areas of biodiversity, use of focal management species, regional partnerships, and adaptive management. The ED continues to conserve and protect plant and wildlife habitat quality through the use of avoidance measures, signage, fencing, and education. Invasive plant removal is conducted in sensitive habitat areas. Invasive species containment measures have reduced the threat of these invasions at key locations. Routine monitoring of federally listed and certain other species has enabled reporting and adaptive management of these species. Planning of ground water and water quality strategies and monitoring continues to provide information on managing the future of this resource, which is key to sustaining both the military mission and natural resources locally and regionally.

Specific Concerns

- Beach and dune erosion, changes in fire regime, invasive species, and climate change threaten to alter the condition of terrestrial vegetation communities (Moser et al. 2012). This in turn may affect the abundance and diversity of wildlife and rare plants (Ackerly et al. 2012).
- Significant ecosystem changes are anticipated for NSA Monterey based on predictions for sea level rise and increased air and sea surface temperature. Climate change and associated sea level rise present a long term concern for natural resources management at the Dune/Research Area, the Point Sur Facility, and the Main Grounds.
- The known threats to functioning ecosystems are difficult to address for any one jurisdiction, such as the Navy, in isolation. This is because the concerns are regional (and in some cases global) in scale. Examples are: fire management planning, climate change, dune erosion, invasive species, air pollution, and soil pollution. Agency and community partnerships are needed to jointly address such threats.

- Regional degradation of dune habitat is exacerbated by the mining of sand in Monterey Bay and by historical reductions in sediment input from the Salinas River.
- Habitats have little buffer from adjacent land uses and suffer from fragmentation and indirect impacts such as light, noise, excess irrigation that may attract invasive species, and others.
- Urban development compounded by concerns like climate change, soil ecosystem function impairment due to past land use, and changes in fire regime present challenges to invasive species prevention and control.
- Compounding the altered fire regime at the core properties of NSA Monterey is the close proximity of human-occupied structures to forest ecosystems. Fire as an ecological tool for restoration and forest regeneration is not likely to gain support, thereby reinforcing the fire suppression policy, the senescence of the forest, and the advance of invasive species in the understory. The forested ecosystems consisting of either Monterey pine or mixed conifers are likely naturally affected by stand replacement fires every 70-300 years. These fires may be patchy or much larger in scale (such as the Lockheed Fire) depending on weather at the time of the fire. Oak woodlands are expected to experience more frequent low intensity ground fires that leave the canopy intact, or stand-replacing fires that obliterate the stand. Maritime chaparral is largely resilient to fire except under the most severe fire weather conditions that rarely occur in the Monterey area.
- Regional groundwater security is a concern with plans for growth of the city of Monterey, county of Monterey, and military use at NSA Monterey.
- Ecosystem metrics and benchmarks for NSA Monterey are not identified for use in this INRMP and the annual interagency metrics meeting. The current long-term monitoring program does not sufficiently inform managers as to ecosystem sustainability and threats. Plant community or habitat metrics for NSA Monterey are not identified, such as the mix of expected species when a site is high functioning or damaged, soil condition, or the status of a management focus species.

Current Management with an Ecosystem Approach

Current activities that partially support an ecosystem approach at NSA Monterey include, but are not limited to, the following:[1]

- Monitoring, invasive species control, and native habitat restoration in accordance with the BO (1-8-01-F-29) issued by the USFWS for federally listed plant species;
- Cooperating with the Southern Monterey Bay Coastal Erosion Workgroup;
- Working with local universities for research;
- Supporting research from non-profit scientific organizations such as the Monterey Aquarium and the Pacific Grove Museum of Natural History; and

1. Refer to Appendix H for a list of all stewardship research projects proposed as part of this INRMP.

- Supporting participation by organizations such as the Monterey Peninsula Audubon Society in educational activities and surveys such as Earth Day celebrations and Christmas bird counts.

Assessment of Current Management

This INRMP complies with federal and DoD guidelines regarding adoption of an ecosystem approach to land management. This INRMP formalizes the use of an ecosystem approach to natural resource management at NSA Monterey.

A premise of this INRMP is that management on a project-by-project basis is inadequate to manage ecosystem integrity because the scale and time frame associated with projects is unlikely to consider all the resources, processes, and interdependencies that may be affected. At the same time, viewing issues on an ecosystem level may allow some important management concerns to fall through the cracks, such as biodiversity conservation.

Due to urban development and other reasons, many natural processes that maintained the original native ecosystem are no longer functioning. These include fire regime, sediment supply, watershed hydraulic functions, soil integrity for supporting native species, and resistance to invasion. In the largely urban or suburban setting of most of the NSA Monterey properties, there is a complex interplay between military mission, preserving human life, and maintaining functioning ecosystems and natural processes. Ecosystem management and restoration should focus on balancing and mitigating these concerns, especially in developed areas and wildland/urban interfaces.

Current management of natural resources at NSA Monterey tends to be project, or species-based, and generally within annual to three-year budget cycles.[2] Current research and monitoring efforts are mostly driven by the need for impact assessment under the ESA or NEPA. While past management focused on high-profile species that require monitoring, such as federally listed species, they are often poor indicators of ecosystem function for several reasons. Populations at abnormally low levels may respond to environmental changes quite differently from responses at higher population levels. Also, the species may not be widespread enough to experience changes in the environment to be representative of other species and their responses. In addition and importantly, these species are already provided some protection by law. Due to their protected status, listed species may be shielded from changes in the ecosystem that may occur due to human pressures. One aim of ecosystem management should be to prevent species and processes that are currently high functioning from becoming threatened and unbalancing the ecosystem. Therefore, monitoring current functioning processes and sustainable species populations may be necessary for establishing baseline data.

Monitoring is expensive and may require a trade-off with other necessary natural resources work, including the direct reduction of threats to habitats and federally protected species. The most efficient and infor-

2. For a list of all projects proposed as part of this INRMP, refer to Appendix I.

mative approach possible should be designed for NSA Monterey; one that can be conducted in both low and high funded years, integrated with regional programs to get the most cost-effective benefit possible.

This INRMP provides an opportunity to better institutionalize coordinated approaches toward high-value ecosystems through partnerships to manage ecosystems that cross boundaries, which can be more effective and cost-efficient.

Management Strategy

Project Summary	Legal Driver[a]	Property
Implement a coordinated monitoring program using land ecosystem function and focal species indicators that can be implemented cost-effectively over time, and that facilitates reporting on natural resource conditions in relation to other central coast areas and annual INRMP program metrics questions. Set habitat objectives based on ecological sites, ecosystem function indicators, and the requirements of focus species. Do this in a manner that can be scaled up to the work of other agencies, in order to report on the ecosystem function of NSA Monterey lands.	Sikes Act (as amended), EO 13186, EO 13112, DoD guidance on ecosystem approach. DoD Interagency MOU on federal data standards, Navy guidance on annual INRMP program metrics.	All properties.
INRMP revisions and associated Environmental Assessment to incorporate current resources and management knowledge.	Sikes Act (as amended)	All properties.
Apply sustainability principles to the management of habitats, species, and ecological functions on NSA Monterey by identifying resource specific best practices similar to Sustainable Sites Initiative approaches.	Sikes Act (as amended), NEPA, CWA, EO 13423, EO 13514, EO 11514, EO 11991	All properties.

a. See Table 6-3 for a list of acronyms for legal drivers.

Goal: Sustainable and effective natural resources program that uses an ecosystem approach to management.

Objectives for an Ecosystem Approach

Objective: Maintain the natural high value and integrity of the NSA Monterey ecosystem by conserving whole, native ecological processes as well as the parts, and by recognizing the connection among all components. Ensure the full achievement of present and future military mission requirements.

I. Maintain and improve the sustainability and integrity of the ecosystem by planning and managing at key ecological scales.

II. Implement an approach based on habitats for terrestrial management. Conserving habitats and communities is more biologically prudent and scientifically sound than managing individual species one at a time.

A. Develop, implement, and enforce bio-security and invasive species objectives and strategies. Control invasive species through early detection, maintaining nutrient rich soils and native perennials that resist invasion appropriate for the site, intact hydrology, and fire regime within a range that vegetation is resilient, and through effective partnerships.

B. Ensure that habitats are able to sustain viable populations of special status species.

C. Ensure that habitats have all essential elements needed to maintain productivity and soil stability. Habitats and ecosites should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species. Habitat or ecosite indicators include:

1. Vegetation composition (relative abundance of species)
2. Vegetation structure (life forms, cover, height, and age classes) at potential condition or recoverable
3. Vegetation distribution (patchiness, corridors)
4. Vegetation productivity

D. Avoid habitat fragmentation on base, and advocate for alternatives to fragmentation off-base where appropriate.
   1. Avoid and minimize road or traffic characteristics that promote plant invasions, or result in significant habitat fragmentation for animals.
   2. Work with local governments and organizations to minimize fragmentation and build habitat corridors where feasible.

E. Maintain the abundance of perennial grasses where they are dense, and or increase it where they are missing.

F. Set habitat restoration goals based on the historic record of ecosystem processes such as fire, and plant community composition, especially of wetlands.

G. Avoid or minimize disturbance as compatible with mission requirements outside of a site's natural ability to recover by using ecological site descriptions (ESDs) or another method to establish objectives for the condition of habitats and their functions. The ESDs allow grouping of sites that respond similarly to disturbance based on soils, climate, and the amount and type of vegetation. These are evidence-based (using state-and-transition models) and currently in use by multiple federal land management agencies, with leadership from the NRCS.

III. Use benchmarks to monitor and evaluate outcomes, such as the status of focus species, which is a principle of ecosystem management for federal agencies (DoDI 4715.03).

IV. Use focus species to scale analysis to ensure management decisions are achieving the desired outcome

V. Facilitate the shift from single species to multiple species conservation. This INRMP proposes to monitor a set of ecological indicators and certain target species to detect trends and provide management cues.

A. Monitor species that may be affected by military or other uses.

B. Monitor sentinel species that may be regional indicators of climate change (See Section 5.1.3).

C. Monitor sentinel species that may decline or increase with altered fire regime (See Section 4.4).

D. Consider beneficial pollinators as a management focus of a broader ecosystem approach (See Section 4.7).

E. Monitor for specific avian species annually on permanently established walking transects in the appropriate habitat. Management focus species should be able to sustain viable populations as an indication that they have sufficient habitat conditions.

VI. Coordinate and report status at the annual INRMP metrics meeting and share with partner agencies.

VII. Facilitate sustainable military and other uses of natural resources (See Section 5.1). Supporting sustainable uses is a guiding principle of ecosystem management for federal agencies (DoDI 4715.03).

VIII. Integrate the ecosystem approach of this INRMP with multiple installation plans and programs, including the IPMP, Vegetation Management Plan, and others, through the management units.

IX. Mimic disturbance regimes through restoration and vegetation management to ensure both a diversity of successional habitats and a functioning ecosystem at the landscape scale.

X. In cooperation with partners, consider participating in vulnerability assessments for habitats and species in relation to climate change.

XI. Consider collaborating with the California Landscape Conservation Cooperatives for regional conservation planning.

XII. Participate in or ensure consistency with regional monitoring protocols in order to derive additional interpretive power from Navy data sets. Partner with other regional land management organizations to standardize data collection and share results across the population range of species.

XIII. Continue to support cooperative research ventures with schools, universities, and non-profit, scientific, research organizations.

XIV. Rely on the best science available to collect and analyze data for NSA Monterey ecosystems.

XV. Apply sustainability principles to the management of habitats, species, and ecological functions on NSA Monterey by identifying resource-specific best practices similar to what has been done for energy and water in the built environment (See Section 5.1) using Sustainable Sites Initiative principles and following the NSA Monterey landscaping plan.

XVI. Protect basic components of the ecosystem's sustainability and resilience to disturbance.

- *A.* Facilitate sustainable military and other uses of natural resources (See Section 5.1).
- *B.* Ensure soil and hydrologic processes are intact. Plan for and anticipate recurring disturbance (See Section 4.3).
- *C.* Control invasive species through early detection, maintaining nutrient rich soils and native perennials that resist invasion appropriate for the site, intact hydrology, and fire regime within a range that vegetation is resilient, and through effective partnerships (See Section 4.5.3).
- *D.* Develop coordinated approaches toward high value ecosystems through partnerships to manage ecosystems that cross boundaries. Since ecosystem boundaries are rarely synonymous with

property ownership, installations such as NSA Monterey are encouraged to form cooperative partnerships with nearby communities, as appropriate, and take part in public awareness initiatives in an effort to manage ecosystems more successfully.

XVII. Rely on the best science and data available and adaptive management.

A. Develop the best available scientific and field-tested information for use in land management decisions in a manner that can be scaled up to the work of other agencies, such as the NRCS National Rangeland Inventory, in order to report on the ecosystem function of NSA Monterey lands.

B. Adopt a cost-effective, long-term monitoring program to support adaptive management. The long-term monitoring should be designed at the lowest base cost possible for consistent implementation, and given the need for management decision support regarding compliance, risk, vulnerabilities, separating natural background from anthropogenic, and cost-effectiveness.

C. Ensure that all surveys and reports that contain spatial data are submitted with an accurate and complete Geographic Information Systems (GIS) geodatabase that meets DoD and Navy standards.

XVIII. In accordance with DoDI 4715.03, integrate the Natural Resources Conservation Program with other DUSD(I&E) activities, including, but not limited to, business enterprise integration, environmental management, safety, occupational health, facilities, global climate change, ecosystem services, renewable energy, installation requirements, GIS, EMS, the Readiness and Environmental Protection Initiative, project planning programs, and range and training area management and sustainment programs.

4.2 Managing the Physical and Chemical Environment

4.2.1 Water Resources and Water Quality

Specific Concerns

- Water quality from the well at the Annex is compromised by high salinity concentrations. Currently, potable water is being used for most irrigation on that property.
- Water in the southeastern portion of Del Monte Lake contains low levels of dissolved oxygen, and may threaten fish, as well as contribute to unpalatable odors.
- Blooms of algae or excessive aquatic plant growth create large amounts of plant material which eventually dies and decomposes, consuming and depleting dissolved oxygen in the water that is needed by fish. This may result in a fish kill and possible noxious odors as oxygen is depleted.

- There is a need to efficiently and effectively manage bulrush along the lake and siltation basin. When left unchecked, bulrush can encroach into a lake from its shoreline and lower the lake's floodwater carrying capacity. At the same time however, this plant offers valuable wildlife habitat.
- There is a need to establish an understanding of the factors that should be considered when deciding when to dredge Del Monte Lake.
- Del Monte Lake is important habitat for migratory birds.
- Native invertebrate populations are missing from Del Monte Lake.
- There is a need to establish a regimen for key water quality indicators at Del Monte Lake.
- Low Impact Development (LID) is required by the Energy Independence and Security Act (EISA) of 2007 for all federal installations starting in Fiscal Year (FY) 2011.
- The lake/wetland habitat at Del Monte Lake currently supports the double-crested cormorant, a State Species of Special Concern. The cormorant uses trees associated with Del Monte Lake as night roosts during winter months. It may fish opportunistically in the lake, but the ocean is its primary fish source.
- Water quality of habitat at NIROP Santa Cruz and the Point Sur Facility needs to be assessed as a part of conservation measures for the California red-legged frog.

Current Management

Much of the water resources management history at NSA Monterey concerns Del Monte Lake as this is the source for most of the irrigation water on the Main Grounds. Del Monte Lake receives stormwater runoff from the upper part of the hydrologic sub-unit in which the NSA Monterey Main Grounds is embedded. This water flows underneath State Highway 1 and into a siltation basin on the Main Grounds, and eventually into Del Monte Lake. The lake has suffered from water quality issues for some time, due to algal blooms, low levels of dissolved oxygen, and a depauperate fauna. A Lake Management Plan was prepared by Cressey and Aquatic Environments (2009).

In addition to municipal water, there are a variety of ground and surface waters at NSA Monterey. Three wells supply irrigation water at the golf course and water quality at these wells is within compliance standards. The golf course also contains shallow retention ponds with high levels of algae. This water serves landscaping purposes and provides a small amount of irrigation water for the golf course. A well drilled at the Annex produces water that is high in salinity, making it unsuitable for irrigation of some plants. Water from this well is stored in a 500,000 gallon tank and used for irrigation of lawns and other vegetation that is not sensitive to the salinity. Del Monte Lake, the Annex, and the Main Grounds irrigation systems are connected via pump and gravity fed pipelines. Irrigation water can be moved between any of these three properties.

There is no municipal water at NIROP Santa Cruz. Water for facilities at NIROP Santa Cruz is supplied by a water treatment facility on the adjacent Lockheed Martin property. There are no known water quality issues at NIROP Santa Cruz, CIRPAS Marina Airport Facility, the Point Sur Facility, or NPMOSSP Mountain View. There is a drainage ditch at the Point Sur Facility. This is kept clean of debris, and feeds a small wetland located off of the property.

Assessment of Current Management

Along with a reassessment of Del Monte Lake's ecosystem function, a revision of the Lake Management Plan is being conducted by the ED at NSA Monterey. The Lake Management Plan should consider invasive species, landscaping, indicators of ecosystem function, thresholds that specify when to dredge, and methods to reduce run-off and pollutants from entering the lake.

There is no understanding of water quality in the drainages flowing across, or originating at, NIROP Santa Cruz or the Point Sur Facility. These properties are overlain by Critical Habitat for the California red-legged frog and should be assessed for non-point source pollution.

Management Strategy

Project Summary	Legal Driver	Property
Continue to revise and refine the Del Monte Lake Management Plan.	CWA, EOs on Migratory Birds, Invasive Species, Sustainability	Main Grounds
Conduct water quality sampling at high value habitat for the California red-legged frog.	ESA, CWA	NIROP Santa Cruz, Point Sur Facility
Develop management plan and interim goals for 20% reduction of irrigation water use on Monterey area facilities.	EO 13514, EO 13423	Monterey Area Properties
Develop a long-term strategy for decreasing the impact of saline irrigation water on Annex landscaping	EO 13514, EO 13423,	Annex

Goal: Diverse and functioning lake ecosystem. Water quality within acceptable limits for California red-legged frog. Compliance with EO 13423.

Objectives for Water Resources and Water Quality

Objective: Maintain the quality of waters presently in compliance with state and/or federal water quality standards. Improve the quality of waters found to be in noncompliance.

I. Monitor water quality indicators—chemical, physical, and biological constituents—so that waters identified in the Regional Water Quality Control Board (RWQCB) Central Coast Basin Plan do not exceed water quality standards. Monitor water quality using regionally consistent methods.

II. Using Best Management Practices (BMPs) as identified by the California and Central Coast Region RWQCB, minimize contributions from both point and non-point sources of pollution (including salts) resulting from NSA Monterey land management actions, including construction and facilities management review. Water quality BMPs are methods, measures, or practices selected by an agency to meet its non-point source control needs. They include but are not limited to

structural and nonstructural controls and operation and maintenance procedures. The BMPs can be applied before, during, and after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR § 103.2[m]).

III. Ensure water quality standards are met at Del Monte Lake through the continuing development and implementation of actions presented in the Lake Management Plan.

A. Continue to conduct semi-annual and annual groundwater sampling at the Annex well and Del Monte Lake to conduct trend analysis. The work characterizing the water at the lake should also continue as part of the Lake Management Plan.

B. Implement LID alternatives to stormwater management using various methods including bioswales and rain gardens to reduce stormwater flow into Del Monte Lake, while simultaneously improving infiltration.

C. Use the implementation of LID measures as an educational opportunity for both water conservation and water quality.

IV. Ensure water quality standards are met in Critical Habitat for the California red-legged frog by conducting regularized sampling in high value habitat areas at the Point Sur Facility and NIROP Santa Cruz. Refer to Section 4.5.1.1: California Red-Legged Frog - Federally Threatened and Appendix K for detailed information concerning measures to comply with recovery measures.

V. Ensure that all surveys and reports that contain spatial data are submitted with an accurate and complete GIS geodatabase that meets DoD and Navy standards.

Objective: Continue to reduce the use of the irrigation water across NSA Monterey, as well as reduce the impact of saline water used at the Annex.

VI. Develop management plan and interim goals for 20% reduction of irrigation water use on Monterey area facilities based on EO 13514.

VII. Develop a long-term strategy for decreasing the impact of saline irrigation water on Annex landscaping.

A. Establish a soil testing schedule and protocol to ensure saline level are below toxic levels for landscaping in each irrigation zone.

B. Install drought tolerant landscaping so irrigation is only required until plants are established.

C. Use irrigation water from Del Monte Lake or golf course to flush irrigated areas once per summer or more as needed, based on soil tests.

4.2.2 Floodplains

Specific Concerns

- There are portions of the Main Grounds around Del Monte Lake that are within the 100-year flood plain and several small drainages in this area would benefit from reconfiguration with bioswale vegetation.

- The wetland and culvert leading into Del Monte Lake should be highlighted as a functioning bioswale with interpretative signage. Vegetation management within this bioswale should be tailored to maximize wildlife habitat and bioswale functionality.

Current Management

FEMA regulates floodplains. Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map or Flood Hazardous Boundary Map. Each zone reflects the severity or type of flooding in the area (FEMA 2009). See Map 3-6 for the floodplain map available from FEMA for NSA Monterey.

Navy guidance 5090.1C CH-1 states the Navy will avoid direct or indirect development of floodplains, and restore and preserve the natural and beneficial values served by floodplains. Potential effects of actions in floodplains must be evaluated and early opportunity for public review of proposals in floodplains must be provided. This includes any development that may obstruct, divert, or retard flood flows, or which may affect flood elevations and flood protection. EO 11988 (24 May 1977, 42 Federal Register [FR] 26951) was also developed to avoid adverse impacts associated with the occupancy and modification of floodplains.

Assessment of Current Management

Current management of floodplains, including review during the NEPA process and efforts to increase bioswale functionality through vegetation management, is sufficient to comply with Navy instructions.

Management Strategy

Project Summary	Legal Driver	Property
Develop a checklist of items to consider during NEPA review that identifies issues of relevant to protecting the natural ecological integrity, structure, and functional values of floodplains at NSA Monterey.	Sikes Act (as amended), CWA, CZMA, LRPPA, WPFPA, EO 11990, NEPA	All Properties

Goal: Full accounting of the environmental values floodplains provide and the impacts of actions on them.

Objectives for Floodplains

Objective: Preserve and restore the natural and beneficial values provided by floodplains.

I. Identify any special or unique flora and fauna associated with floodplains in order to identify the natural and beneficial functions provided by floodplains.

A. Use these types of vegetation to create bioswales where appropriate.

B. Ensure that all surveys and reports that contain spatial data are submitted with an accurate and complete GIS geodatabase that meets DoD and Navy standards.

II. Evaluate through the NEPA and site approval process the potential effects of actions in floodplains, and provide early opportunity for public review of proposals in floodplains. This includes any development in a floodway and floodplain that may obstruct, divert, or retard flood flows, or which may affect flood elevations and flood protection.

A. Develop a checklist of items to consider during NEPA review that identifies issues of relevant to protecting the natural ecological integrity, structure, and functional values of floodplains at NSA Monterey.

4.2.3 Soil Resources

Specific Concerns

- Monterey Bay has one of the highest coastal erosion rates in the country. Beach sand mining in the vicinity of the Salinas River mouth continues to be a source of contention as it annually diminishes the total sand available to the beaches lining the southern region of Monterey Bay. As with the rest of this region, the Dune/Research Area is thought to suffer as a result of this mining; wave erosion is expected to continually remove sand without the benefit of the full, naturally occurring, annual summer sand replenishment. The erosion at the Dune/Research Area, as well as sand mining, is considered an encroachment issue.
- Historical importation of terrestrial soils to the Dune/Research Area, to supplement the dunes, favored populations of annual nonnatives. Over time, a humus layer developed across much of the dunes as the level of annual detritus input increased. As this organic layer continues to develop and its water-holding capacity increases, species adapted for this soil condition will gain a competitive advantage over the dune-adapted special status plants that are adapted to sandy conditions with a minimal organic component.
- There is currently no soil erosion control plan for NSA Monterey.

Current Management

Federal agencies must manage lands to control and prevent soil erosion and preserve natural resources by conducting surveys and implementing soil conservation measures. The Sikes Act (as amended), Soil and Water Conservation Act, CWA, DoDI 4715.03, and 5090.1C CH-1 require BMPs for soil and water resources on federal lands. For wind erosion, Clean Air Act-implementing regulations also restrict particulate matter emissions that result from soil disturbance).

The guidance for INRMPs (Refer to Chapter 1) requires the reporting of soils inventory at least to the association level, and this is provided in Chapter 3. Soils mapping is a function of the federal government under the NRCS, but characterization of soils also occurs through vegetation classification and mapping protocols, wildlife habitat values mapping, and in engineering studies associated with construction projects.

There is currently no formalized erosion management plan at NSA Monterey, and apart from coastal zones, erosion concerns across the installation are presently minor. Any project-specific concerns are addressed by implementation of BMPs pursuant to the California Storm Water Best Management Practices Handbook.

On a regional scale NSA Monterey is partnering with other local coastal managers and land owners to seek an equitable solution to sand mining in Monterey Bay. In addition to potentially suffering from the sand mining, maintaining soil chemical and physical properties at the Dune/Research Area in a condition that favors special status species is a priority for NSA Monterey. Importation of beach sand is considered prohibitively expensive; therefore, annual weeding as specified in the Vegetation Management Plan (AgriChemical & Supply 2011) is considered the best option for maintaining the soil properties required by special status species.

Assessment of Current Management

Soils at NSA Monterey were mapped to sufficient scales for natural resources management purposes by the SCS in 1972 and 1980 (SCS 1972, 1980; Refer to Map 3-7, Map 3-10, and Map 3-13).

The Sikes Act (as amended), the Soil and Water Conservation Act, and DoDI 4715.03 require BMPs for soil and water resources on federal lands. Implementation of programs and projects called for within INRMPs is a means of fulfilling this requirement, including studies or projects for erosion control. The development of a formalized soil erosion control management plan would help to serve as a consolidated reference for erosion concerns, provide a clearinghouse for BMPs, and provide recommendations and action items to mitigate against threats.

Management Strategy

Project Summary	Legal Driver	Property
Develop and implement an erosion control plan.	Sikes Act (as amended), SCA, CWA, CZMA, DoDI 4715.03	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View

Goal: Soil conservation is implemented and ecosystem services are fully provided in support of the military mission and ecosystem integrity.

Objectives for Soil Resources

Objective: Improve soil conditions in the Dune/Research area to promote the viability of the populations of special status species located there.

I. Implement vegetation control measures consistent with NSA Monterey's Vegetation Management Plan (AgriChemical & Supply 2011) to create soil conditions favored by special status plants.

II. Consider further researching the option of using dredge material from the marina as a method of enhancing the sandy component of dune soils.

III. Support research of the analysis of soil physical and chemical properties before and after habitat restoration.

Objective: Protect dune habitat through the long term by seeking to limit factors that prevent sand replenishment.

I. Seek funding along with regional stakeholders to sponsor studies to determine the etiology and extent of dune erosion within Monterey Bay.

II. Continue to partner with regional stakeholders to seek equitable limits on sand mining to prevent further degradation of this habitat.

Objective: Conserve soil productivity, nutrient functioning, water quality, air quality, and wildlife habitat through effective implementation of BMPs to prevent and control soil erosion related to construction or other uses of natural resources.

I. Develop an Erosion Control Management Plan.

II. Soil conservation shall be considered in all site feasibility studies and project planning, design, and construction. Appropriate conservation work and associated funding shall be included in project proposals and construction contracts and specifications.

A. Compile and evaluate specification of local agencies for water erosion control, such as Monterey County, the USDA Agricultural Research Service, and other federal agencies, and evaluate for use at NSA Monterey. The measures would be used for NEPA planning, scopes of work, and construction specifications, and if needed a soil erosion correction plan.

B. As per 5090.1C CH-1, ensure incorporation of BMPs in the preliminary engineering, design, and construction of facilities involving ground disturbance.

1. Use the specific guidance for selecting BMPs as presented in the California Storm Water Best Management Practices Handbook (California Stormwater Quality Association 2012), including project planning and design guides, Storm Water Pollution Prevention Plans, Water Pollution Control Programs preparation manuals, Construction Site BMPs Manual (California Department of Transportation 2003), and wind erosion/dust control measures.

2. Continue to minimize disturbance by locating staging areas in disturbed areas only. Staging areas should be prohibited within sensitive habitat areas. Staging areas should be delineated on the grading plans and reviewed by the resources agencies and project biological monitors prior to start of construction.

C. Keep a record of the most effective BMPs for use in NEPA planning and mitigations. Monitor BMPs in terms of:

1. Implementation to expected specifications;

2. Having the desired management effect; and

3. Soundness in context of the overall management strategy.

D. Incorporate responsibilities for BMPs and sensitive resource protection in all Real Estate agreements (leases and easements) when they come up for renewal.

III. Provide guidance for routine maintenance activities while preventing erosion and protecting sensitive natural and cultural resources.

IV. Ensure spring margins and streambanks have adequate stability to resist unnatural levels of wind and water erosion to sustain the hydrologic cycle to support the native diversity supplied by the water source.

   A. Ensure appropriate native plant cover and diversity.

   B. Soil indicators include rock fragments, aggregate stability, litter, bare ground, presence or absence of pavement, presence or absence of compaction, and the amount of interspace between perennial plants that is bare ground.

   C. The soil indicator for streambanks is stream bank stability.

V. Stabilize disturbed sites.

   A. Use appropriate native erosion control plants or protective materials.

      1. Consider mycorrhizae as part of the success of stabilizing larger restoration areas.

      2. Consider the needs of plants dependent on specific pollinators in restoration planning.

   B. Ripping compacted soils to decompact them, then constructing divets or depressions that naturally collect water, has been found to be a cost-effective means of initiating self-recovery of roads and highly compacted trails.

   C. Plant disturbed sites that are erosion hazard or air quality nuisance with appropriate erosion control or landscape plants. Adopt locally proven revegetation practices.

   D. Adopt specifications for planting techniques and types of plants (native species that easily establish) such as establishing vegetation islands, windbreaks, and protecting volunteer plants. Also include specifications for: irrigation; timing of planting and irrigation; maintenance; cut/fill slope maximums; and success criteria or standards for compliance.

4.2.4 Wildland Fire Management

Specific Concerns

- A wildland fire management plan (WFMP) for NIROP Santa Cruz does not currently exist.
- NSA Monterey does not currently pool resources or cooperate with adjacent and regional landowners to reduce the risk of wildland fire.
- NIROP Santa Cruz has many structures that are not currently fire safe.
- The forest at NIROP Santa Cruz has not burned for many years, perhaps not at all, since it was clear-cut in the early 1950s.

Current Management

The DoD adopted federal wildland fire management policy through DoDI 6055.6 (DoD 2006b). DoDI 6055.6 provides policy and criteria for the allocation, assignment, operations, and administration of the DoD Fire and Emergency Services and Emergency Medical Service programs. Federal wildland fire policy mandates that all federal lands with burnable vegetation have a WFMP and resources to safely mitigate losses. A WFMP is a strategic document that guides the full range of fire management related decisions, including evaluating the potential for allowing fire to play its natural ecological role. It addresses all aspects of wildland fire management consistent with federal fire policy (USDA & USDI 2009).

Assessment of Current Management

The lack of a WFMP and the implementation thereof at NIROP Santa Cruz, is in violation with DoDI 6055.6 and federal fire policy.

Management Strategy

Project Summary	Legal Driver	Property
Develop and implement a WFMP for NIROP Santa Cruz.	DoDI 6055.6	NIROP Santa Cruz

Goal: Forests are managed such that they minimize the potential for, and the negative impacts of, wildfire.

Objectives for Wildland Fire Management

Objective: Protect the human, infrastructure, natural and cultural resources of NIROP Santa Cruz from the harmful impacts of wildfire and fire management interventions.

I. To comply with DoDI 6055.6 and federal fire policy, develop a comprehensive wildland fire management plan for NIROP Santa Cruz.

A. Develop a fire planning atlas. Map vulnerable facilities, areas of human occupation, shelter and evacuation, and natural and cultural resources. Identify drivable roads and water sources for helicopter buckets. Analyze fire risk, fire weather, and fire spread scenarios with respect to vulnerable resources. Analyze the need to pre-define locations to stop a fire and to stage apparatus or water close to an expected fire control effort. Analyze situations where a fire should be kept as small as possible including any need to disturb ground. In contrast, analyze situations where fires should be allowed to burn to a natural barrier (road, ridge, wash), where they do less harm. Analyze the need for local training to enhance on-site response. Analyze the cost-effectiveness of staging and training.

B. Consider the practice of suspending engine testing, based on fire danger. If a given test is a fire hazard standby crews should be used.

C. Analyze areas where the use of fire retardant should be avoided.

D. Provide, maintain, or upgrade fire management cooperative agreements, memoranda of understanding, and reciprocal agreements to provide maximum protection of resources and

infrastructure values. The Navy shall take necessary precautions to prevent and suppress forest and brush fires occurring within NSA Monterey lands as a result of military activities. The U.S. Bureau of Land Management and USFS may provide assistance in suppression of such fire through an MOU; however, the Navy will have to compensate the California Department of Forestry and Fire Protection or USFS for assistance.

E. Ensure that all surveys and reports that contain spatial data are submitted with an accurate and complete GIS geodatabase that meets DoD and Navy standards.

II. Consider the following approaches to developing a fire management approach for NIROP Santa Cruz, and consider the following

A. As a first priority, prevent ignitions that ignite wildfires. Second priority is to manage fuels in strategic locations of high fire risk (such as targets). Suppression is an expensive and last resort.

B. Make weather data, including wind patterns, easily available to natural resource managers.

C. Maintain a database to track all fires, including acres burned, how suppressed, fire cause, fire perimeters, and fire severity.

D. Emphasize staging of fire suppression and post-suppression rehabilitation resources so that inevitable wildfires may be responded to in a non-crisis atmosphere with proper planning.

1. For suppression, this includes equipment pools, water, retardant, suppression prescriptions by management area, and funding.

2. Provide fire suppression support commensurate with resource and adjacent property values at risk. Develop specific tactics and initial attack schemes based on buildings occupied by humans, highly valuable infrastructure, presence of California red-legged frog Critical Habitat, historic districts, and unique vegetation communities.

E. Educate to decrease ignitions. Prevent human-caused fires through education, investigation, and public outreach.

F. Develop post-fire rehabilitation guidelines appropriate to NIROP Santa Cruz and plant communities.

G. Develop seed caches for erosion control spot treatment, and for possible restoration of islands of vegetation to stimulate more rapid and effective habitat recovery.

H. Develop equipment pools, site descriptions, treatment prescriptions based on research findings and historic successes, and funding to enhance fire recovery.

I. Identify roads that can function as strategically located fuelbreaks to break up the continuity of fuel and increase the probability of safely suppressing an ignition before it becomes a mega-fire.

J. Train qualified installation personnel to provide initial response to a wildfire.

K. Consider supporting partnerships with outside organizations that are in engaged in researching wildland fire and forest health.

4.3 Management of Habitats and Plant Communities

4.3.1 Terrestrial Vegetation Communities and Habitats

Background

The goals and objectives of the habitat management program conform to those outlined in 5090.1C CH-1. As it is Navy policy to incorporate ecosystem management as the basis for managing habitats on NSA Monterey, this management program uses a long-term view of human activities, including military uses, and biological resources as part of the same environment. To this end meeting the goals and objectives outlined below will sustain the biological integrity of NSA Monterey's habitats while maintaining the primary military mission.

Specific Concerns

- Climate Change and Sea Level Rise. These effects are expected to be felt first for species and habitats at the margins of their distribution and population stability. Moreover, sea level rise combined with the high erosion rates documented for Monterey Bay makes coastal habitat especially vulnerable.
- Altered Fire Regime. Coastal forest types, maritime chaparral, and coastal prairies require fire to regenerate, yet fire suppression has been a key component of management for many decades. Nonetheless, due to the topography and the highly reticulated wildland-urban interface in the Monterey area, the use of prescribed fire in many cases is highly problematic. Moreover, much is unknown about the natural fire regime specific to each habitat type. Compounding the altered fire regime at the Monterey Area Properties is the close proximity of housing (La Mesa Village) and other facilities to forest ecosystems. Fire as an ecological tool for restoration and forest regeneration is not likely to gain support, thereby reinforcing the fire suppression policy, the senescence of the forest, and the advance of invasive species in the understory.

  The natural fire regime specific to each habitat type on NSA Monterey lands needs further study. However, the forested ecosystems consisting of either Monterey pine or mixed conifers are likely impacted by stand replacement fires every 70-300 years, and may be patchy or catastrophic in scale largely depending on weather at the time of the fire. Oak woodlands may be impacted by more frequent low intensity ground fires that leave the canopy intact, or by catastrophic fires that replace the stand. Maritime chaparral is largely immune to fire except under the most severe fire weather conditions that rarely occur in the Monterey area. It may be possible to reduce the impact of fire on forests interfacing with housing or other development by understory clearing and removal of dead, downed wood.

  The ecological baseline for land cover types at NSA Monterey is discussed in Chapter 3. Objectives for ecosystem management must, however, consider the complex interplay between military mission, preserving human life, and maintaining the high value ecosystems. Restoration should focus on balancing and mitigat-

ing these concerns, especially in developed areas and wild-land/(sub)urban interfaces.

- Invasive Species. Invasive and non-native plant species such as French broom and other nonnatives are a problem on several properties.
- Fragments and Broken Corridors. Habitat fragmentation hinders ecological processes that require landscape connectivity, such as natural fire regimes, movement of wide-ranging species, and genetic exchange, and makes remaining natural lands more vulnerable to pollution and invasion by non-native plants and animals (Soule and Terbourgh 1999).
- Urban Fringe and General Development Pressure on Boundaries. The Monterey County General Plan, City, and Local Coastal Plan contain land use restrictions that ameliorate some of this threat, and local and regional conservation lands provide additional buffering for the conservation of rare and endemic habitats and species. Public access, mainly off-path foot traffic into habitat areas, continues to disturb and degrade habitat.
- Critical Habitat. Critical Habitat for the California red-legged frog has been designated at NIROP Santa Cruz as well as the Point Sur Facility. The California red-legged frog is known to occur on the Point Sur Facility property, but not NIROP Santa Cruz (GANDA 2012).

Current Management

Terrestrial communities and habitats at NSA Monterey are currently managed using strategies identified in the Vegetation Management Plan (AgriChemical & Supply 2011). The primary elements of this plan include: federally listed species population inventories; invasive species control; identification of restoration sites; identification of guidelines for construction landscape and facilities maintenance; and limiting public access.

Surveying and population monitoring of rare plant species have been a major focus of vegetation management at NSA Monterey. These activities are required under NSA Monterey's INRMP and BO. Population monitoring through field mapping and counts is be carried out every two to three years, unless circumstances warrant increased frequency. Formal surveys for sensitive plants on NSA Monterey occurred in 1992, 1993, 1999, 2005, 2006, 2007, 2008, 2009, and 2010.

NSA Monterey has an ongoing program to remove invasive non-native plants from portions of its property. Invasive non-native plants can be a serious threat to natural plant habitat by changing the structure of the plant community and degrading its value for wildlife and native plant species. All NSA Monterey activities to control invasive non-native species conform with EO 13112 (February 1999), which directs federal agencies to prevent the introduction of invasive species and to provide for their control.

Vegetation mapping at Monterey Area Properties was recently completed by Garcia and Associates (GANDA 2011). This survey used the Sawyer and Keeler-Wolf community classification system, National Vegetation Classification System to describe its floristic composition and associations and complies with California standards for vegetation classification.

Assessment of Current Management

There is a need to refine and standardize methods for determining rare species' population numbers so that multi-year data can be compared with confidence. Survey efforts have had different objectives, so not all sensitive plant species were surveyed each time, and different portions of NSA Monterey were included in the various efforts. The level of detail in population counts and mapping also varied significantly. Presence of listed species should also be noted when adjacent to NSA Monterey facilities. During 2009 surveys, Monterey spineflower was observed growing on airport property directly above the Annex habitat areas.

There is currently no comprehensive mapping of invasive non-native plants on NSA Monterey. Garcia and Associates mapped some vegetation types dominated by non-natives (ice plant, blue gum eucalyptus) in 2010 (GANDA 2011). Mapping of priority non-native plant species would help in planning/assessing control activities and budgeting/scoping work activities.

Refinement of the vegetation map for NSA Monterey should be an ongoing process. The Vegetation Management Plan (AgriChemical & Supply 2011) proposed the following adjustments: (1) Areas mapped as developed should be differentiated as either developed or disturbed habitat (some of these areas support native vegetation and rare plants, particularly in the dune area). (2) Only facilities, roads, and parking lots should be mapped as developed. (3) Stands of native trees (Monterey pine and live oak) should be mapped in the Laboratory/Recreation Area. Some of these areas support rare plants, particularly the main Yadon's rein orchid enclosure. (4) Maritime chaparral habitat supporting Yadon's rein orchid on the southern boundary of the Annex should be included in a revision of the vegetation map.

Vegetation management at Del Monte Lake should be reviewed and a determination made if in compliance with federal and state regulations. Removal of wetland vegetation, if required as a maintenance action for siltation removal from the lake, should occur in rotation, so that only a portion of the lake is affected at one time. This allows migratory and resident wildlife to occupy undisturbed portions of the lake. Regulatory permits may be required for sediment removal and vegetation disturbing activities in wetland areas under USACE and CDFW regulatory codes. If federally protected wildlife are demonstrated to use the lake habitat USFWS consultation could also be required. An approved vegetation management plan for Del Monte Lake would help to avoid any regulatory actions and delays of work.

The Vegetation Management Plan (AgriChemical & Supply 2011) needs to be updated to include NIROP Santa Cruz, the Point Sur Facility, CIRPAS Marina Airport Facility, and NPMOSSP Mountain View.

Management Strategy

Project Summary	Legal Driver	Property
Restore degraded vegetation communities.	ESA, Sikes Act (as amended), EO 11990, EO 13186, CWAP, DoD MOU on Ecosystem Approach (partnerships), BO (1-8-01-F-29), DoDI 4715.03	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View
Continue to limit public access to sensitive species habitat.	ESA, Sikes Act (as amended), EO 11990, EO 13186, CWAP, DoD MOU on Ecosystem Approach (partnerships), BO (1-8-01-F-29), DoDI 4715.03	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View
Monitor all federally listed plant populations.	ESA, Sikes Act (as amended), EO 11990, EO 13186, CWAP, DoD MOU on Ecosystem Approach (partnerships), BO (1-8-01-F-29)	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View
Develop a vegetation management plan for the historic Del Monte Lake that considers, among other issues marine and aquatic invasives.	ESA, CWA, Sikes Act (as amended)	Main Grounds
Develop a map and database for invasive species.	ESA, Sikes Act (as amended), EO 11990, EO 13186, CWAP, DoD MOU on Ecosystem Approach (partnerships), BO (1-8-01-F-29), DoDI 4715.03	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View
Conduct base-wide flora surveys.	ESA, Sikes Act (as amended)	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View

Goal: Terrestrial vegetation communities have high native species diversity and support populations of special status species.

Objectives for Terrestrial Vegetation Communities and Habitats

Objective: Reduce threats to native vegetation and federally listed species while maintaining no net loss to the military mission.

I. Control invasive species from areas within and adjacent to sensitive species habitat.

II. Educate NSA Monterey personnel and outside contractors about invasive non-native plants.

- *A.* Develop materials to allow NSA Monterey personnel and outside contractors to identify and report on incidental observations of invasive species.
  - *1.* Contract scope of works should include language allowing work activities only in non-sensitive species habitat areas. Maps and figures should outline areas that are restricted.
  - *2.* NSA Monterey resource managers should be included in contract scoping and a process for field verification should be included to ensure contractors are in compliance.
- *B.* Ensure that non-native plant control and landscaping efforts do not pose a threat to sensitive habitat and species. Non-native plant control, carried out in areas with sensitive species, needs to be carried out by adequately trained and supervised contractors/personnel to avoid negative impacts to the sensitive species and their habitat.

III. Map invasive species across NSA Monterey, assign threat levels, and prioritize removal efforts.

IV. Limit public access to sensitive habitat.

A. The goal of access control is to contain people and pets within designated areas so that impacts to the habitat are not spread over a wide area.

B. Techniques for access control include barriers to keep areas completely off- limits, cable fencing to guide and contain people on certain pathways, and signage to educate people on what they should be doing and why it is important.

V. Ensure that construction activities follow set guidelines that outline the procedures to be followed in sensitive resource areas. Similarly, complete land use impact assessments of large projects in or adjacent to listed species habitat areas.

VI. Attend local Weed Management Area meetings, and participate and share control and plant distribution data. Invasive non-native plants are a regional issue, most effectively managed through cooperative action. New threats and risk assessments can be shared at these local and regional meetings.

Objective: Maintain or restore remaining native ecosystem types across their natural range of variation.

I. Restore or rehabilitate altered or degraded landscapes and associated habitats to promote native ecosystems and land sustainability when such action is practicable and does not conflict with military mission or capabilities consistent with EO 13514.

A. Consider restoration of the twenty-six sites on NSA Monterey that have been identified and prioritized for management and restoration activities in the Vegetation Management Plan.

B. Develop a vegetation restoration/landscaping plan for Del Monte Lake integrated with the revision of the Del Monte Lake Management Plan that includes provisions for marine and aquatic invasive species.

Objective: Ensure that biologically or geographically significant or sensitive natural resources, such as ecosystems or species, are monitored and managed for their protection and long-term sustainability.

I. Maintain ecological processes, such as disturbance regimes, hydrological processes, and nutrient cycles to the extent practicable.

II. Manage and monitor resources over sufficiently long time periods to allow for adaptive management and assessment of changing ecosystem dynamics (i.e. incorporate a monitoring component to management plans).

III. Consider effects to native plants and federally listed species when conducting revegetation or landscaping at the facilities.

Objective: Support monitoring of native vegetation habitat types and sensitive species.

I. Continue to refine the NSA Monterey vegetation map.

A. Use the vegetation classification and mapping protocols that meet national Federal Geographic Data Committee and DoD standards and ESD approximations, along with expert knowledge, to derive habitat value maps for species of management interest.

B. Validate the vegetation map with field surveys as needed.

II. Implement conservation and management efforts to further the conservation of State-listed species when such action is practicable and does not conflict with legal authority, military mission, or operational capabilities.

III. Make use of the CNDDB to provide managers with up to date location information of sensitive species. Provide the CNDDB with sensitive species locations generated by NSA Monterey surveys.

IV. Conduct standardized sensitive plant species monitoring according to refined, tested, and repeatable methods tailored for each federally listed plant species.

V. Support research that investigates wildland fire and forest ecosystem function.

VI. Ensure that all surveys and reports that contain spatial data are submitted with an accurate and complete GIS geodatabase that meets DoD and Navy standards.

4.3.1.1 Specific Issues for Coast Live Oak/Monterey Pine

Specific Concerns

- Proper management and restoration of this community is essential to the high value ecosystem of the endangered Yadon's Rein orchid populations.
- Regeneration of the oaks could potentially be limited by landscaping practices at the Main Grounds that do not selectively remove/cut understory growth.
- Areas of coast live oak and Monterey pine on the Main Grounds lack a natural understory partly because security measures require clear lines of sight to the border fenceline. Restrictions imposed by service level 4 grounds maintenance contract also makes maintenance of an understory in these areas difficult.
- The use of prescribed fire as an ecological tool for restoration and forest regeneration is problematic at NSA Monterey.
- Maintenance of the forest canopy will require active plantings and replacement trees as older individuals senesce and die.
- Well water for coast live oaks at the Annex is toxically saline. Potable water is currently used for irrigation, which is undesirable because it wastes drinking water.
- Within coast live oak and Monterey pine forests French broom threatens to outcompete rare and native understory plants.

- Future weed control efforts in Monterey pine habitat should refrain from clearing rattlesnake grass when orchid plants are present; the orchid species is not harmed by the presence of rattlesnake grass and appears to thrive under its cover.
- Sudden oak death, due to infections by plant pathogen *Phytophthora ramorum*, is an emerging concern for the city of Monterey as positive identifications of infections have occurred both to the north and south of the city.

Current Management

Coast live oak and Monterey pine forests have been managed primarily for the benefit of Yadon's rein orchid under the conditions specified by the USFWS 2001 BO (1-8-01-F-29). These efforts include restoration, mainly in the form of invasive removal, protection through signage and education, and monitoring. In areas where Yadon's rein orchid does not exist on the Main Grounds, landscaping crews are responsible for maintaining an understory free of obstructions that might limit views of the border fence for security reasons.

As with other habitats, impacts to coast live oak and Monterey pine forest are generally avoided and minimized through the NEPA Site Approval and Project Review Process codified in NBVCINST 11010.1.

Assessment of Current Management

Careful maintenance of the Monterey pine canopy should be considered a priority in ensuring long term ecosystem function of Yadon's rein orchid populations. Since Monterey pine is a short-lived, fire-adapted species, maintenance of the favored canopy requires a very careful protocol. The protocol must balance fire prevention near buildings with maximizing preferred habitat for Yadon's rein orchid. Key elements of the protocol should include immediate planting of replacement trees, which are very fast growing, with planned removal of old and dead trees. Maintenance of a mulch of Monterey pine needles where Yadon's rein orchid is known to occur would benefit the soil ecology necessary for the protection of these stands.

Management Strategy

Project Summary	Legal Driver	Property
Conduct focused surveys annually for Yadon's rein orchid in coast live oak and Monterey pine habitat.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties
Restore coast live oak and Monterey pine habitat for the Yadon's rein orchid.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties
Protect coast live oak and Monterey pine habitat for Yadon's rein orchid using fencing, signage, and educational materials.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties
Develop revised protocols for weeding and landscaping in coast live oak and Monterey pine stands.	Sikes Act (as amended)	Monterey Area Properties

Goal: Coast live oak and Monterey pine forests are protected from wildfire, have a diverse understory, and support native and species status species.

Objectives for Coast Live Oak/Monterey Pine

Objective: Maintain the function and diversity of coast live oak and Monterey pine forests at NSA Monterey.

I. Monitor key elements, including invasive species, for changes in trend that may affect the integrity of coast live oak and Monterey

II. Ensure protection of conditions that favor the Yadon's rein orchid through protection, restoration, and monitoring of coast live oak and Monterey pine forests.

A. If feasible restore, enhance, or maintain habitat based upon recommendations from monitoring

1. As Monterey pine is a fast growing species, plant replacement trees in areas where older trees show early signs of senescence to maintain a tree canopy.

2. Develop and implement a protocol for the long term maintenance of the Monterey pine canopy that address both the population structure of the overstory tree and fire hazard of old, dying or dead trees.

3. Use a mulch of Monterey pine needles where Yadon's rein orchid is known to occur to enrich the soil.

III. Develop revised protocols for weeding and landscaping in coast live oak and Monterey pine stands.

A. On the Main Grounds adopt practices that achieve security goals while balancing understory habitat and regeneration concerns.

B. Adopt watering practices that are tailored to the needs of coast live oaks on the Annex.

IV. Monitor for sudden oak death syndrome on an incidental and annual basis.

A. Notify the Monterey County Agricultural Commissioner's office of any suspected infections: Agricultural Commissioner's Office, Monterey County Agricultural Department, 1428 Abbott Street, Salinas, CA 93901-4013, 831/759-7325.

B. Incorporate suspected locations of the disease into the invasive species map.

C. Attend local forest ecosystem function conferences and symposia as appropriate as advertised by the California Oak Mortality Task Force: http://www.suddenoakdeath.org.

D. Adopt landscaping practices that reduce the potential for Phytophthora ramorum infections, including removing turf and eliminating irrigation under live oak trees to include a two foot buffer past the tree drip line. Plant new oaks where irrigation is not used and ensure landscaping in that area is maintained to compliment live oak ecosystem function. Minimize tree trimming by planting new oaks where their mature size will be appropriate and accepting a natural form for existing trees. If disease becomes prevalent in the Monterey area, consider preventative injections of Agri-fos fungicide.

E. Evaluate the efficacy of sudden oak death syndrome prevention and treatment schemes.

4.3.1.2 Specific Issues for Central Maritime Chaparral

Specific Concerns

- Central maritime chaparral is one of the primary habitat types for Yadon's rein orchid, Monterey spineflower, and Monterey gilia.
- The Laboratory/Recreation Area and the Annex area, while primarily landscaped, support remnant maritime chaparral vegetation. Historically, the Annex's central maritime chaparral habitat has supported Yadon's rein orchid.
- Monterey spineflower occupies the central maritime chaparral communities adjacent to the Annex on Monterey Airport property.
- Due to the small size of this habitat on the Annex and Laboratory/Recreation Area, prescribed burning for restoration and regeneration purposes is not an option.

Current Management

Remnant central maritime chaparral at NSA Monterey occurs at the Laboratory/Recreation Area on the non-irrigated perimeter of the golf course and the Annex area concentrated along the southern boundary adjacent to the Monterey Peninsula Airport. The primary management issue for this area is the requirement for perimeter vegetation clearing. Naval policies require clearing vegetation near fence lines.

As with other habitat impacts to central maritime chaparral, plant communities are generally avoided and minimized through the NEPA site approval and project review process.

Assessment of Current Management

While the area of central maritime chaparral is small, a number of woody shrub species occur in this habitat. One species known to occur in this habitat on NSA Monterey lands, sandmat manzanita, is a species of concern. Other rare or endangered species (Yadon's rein orchid and Monterey spineflower) have been known to occur in this habitat from time to time. Monitoring should include observations of endangered plants across the fence line of adjacent property owners given recent sightings in the past.

It is recommended that these areas continue to be maintained according to general guidelines, with particular attention to weed removal. Woody species of this assemblage may be relatively short lived. Senescent individuals should be removed and replaced, according to the restoration plant list for this habitat.

Management Strategy

Project Summary	Legal Driver	Property
Conduct focused surveys for Yadon's rein orchid, Monterey gilia, and Monterey spineflower in central maritime chaparral habitat.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties
Restore central maritime chaparral habitat for the Yadon's rein orchid, Monterey gilia, and Monterey spineflower when appropriate.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties
Protect central maritime chaparral habitat for Yadon's rein orchid, Monterey gilia, and Monterey spineflower using fencing, signage, and educational materials when appropriate.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties

Goal: Central maritime chaparral communities have high native species diversity and continue to support populations of Yadon's rein orchid, Monterey gilia, and Monterey spineflower.

Objectives for Central Maritime Chaparral

Objective: Maintain the function and diversity of central maritime chaparral communities at NSA Monterey.

I. Continue to monitor for weeds and engage in needed removal efforts.

II. Monitor for structural and functional diversity, and if needed, replace senescent individuals with new plantings.

III. Ensure protection of federally endangered plant species, given their occurrence in this community.

A. Central maritime chaparral on NSA Monterey and adjacent properties should be monitored closely to detect new observations on NSA Monterey or potential recruitment from adjacent properties.

B. If federally protected species are located on central maritime chaparral, provide for adequate protection, restoration, and monitoring of these species in accordance with the 2001 USFWS BO (1-8-01-F-29).

4.3.1.3 Specific Issues for Dune Scrub

Specific Concerns

- Monterey Bay has one of the highest coastal erosion rates in the country. (See also Section 4.2.3: Soil Resources).
- Historical importation of terrestrial soils to the Dune/Research Area, to supplement the dunes, favored populations of annual non-natives. (See also Section 4.2.3: Soil Resources).
- Despite weeding efforts, the seed bank in this area has not diminished sufficiently to prevent re-establishment of the herbaceous grasses and forbs. It is also likely that seeds are being dispersed along the service roads.
- The eucalyptus grove on the backdunes inhibits growth of natives and supports an understory dominated by invasive weeds. At the same time eucalyptus groves at the Dune/Research Area likely provide over-wintering habitat for the migratory monarch butterfly.
- There is potential to support Smith's blue butterfly, a federally endangered species. The host *Eriogonum* plants are present within the dune habitat; however, no butterflies have been observed since 1981. The butterflies are present in other coastal dune habitat on Monterey Bay and could potentially remain present, in diapause, in the litter beneath its host plant, dune buckwheat (See also Section 4.5.1.3: Smith's Blue Butterfly - Federally Endangered).
- Dune habitat currently supports the California legless lizard, a State Species of Special Concern.

- A fencing system that provides for security, limits trespass into endangered species habitat, and provides for appropriate public access is currently lacking on the eastern edge of the Dune/Research Area property (See also Section 4.5.1.5: Monterey Spineflower - Federally Threatened, and Section 4.5.1.6: Monterey Gilia - Federally Endangered).

Current Management

Management of the Dune/Research Area, including weed control and restoration efforts, has been driven primarily by efforts to protect and sustain federally listed species occurring there. This includes protection of habitat for the Smith's blue butterfly through a focus on its host plant, dune buckwheat, as well as clearing invasives in areas supporting Monterey spineflower and Monterey gilia.

In 2001 NSA Monterey initiated a Section 7 Consultation with the USFWS to discuss potential management measures that would conserve and protect these species and simultaneously allow NSA to support the U.S. Navy mission. Consistent with the conservation recommendations of the 02 July 2001 BO (1-8-01-F-29) issued by the USFWS and the 2001 Monterey INRMP the installation has been undertaking: (1) population status monitoring of endangered and threatened plants; (2) removal of invasive plants; and (3) restoration of native plant communities. See also Section 4.5.1: Threatened and Endangered Species and Critical Habitat and Section 4.5: Special Status Species Protection. Refer to Appendix K for a discussion of terms and conditions of the BO.

In areas where there are sensitive plant species invasives have been removed by hand and in other areas by mechanical line trimming. Some weeding efforts have also been concentrated along the edges of service roads and at the bases of the dunes, where non-native plants have become established. Special efforts focusing on ice plant (treated with glyphosate when not near sensitive plants) and large acacia trees (cut down by machete and then sprayed with glyphosate) have also been pursued. Field operators removed the trash debris they encountered during the invasive species removal effort.

Assessment of Current Management

As dune stabilization and succession progresses, threatening listed species, there will come a point at which NSA Monterey will need to make decisions if, when, and how to return sections of the dune to the more open, sandy state the Monterey spineflower and Monterey gilia prefer. In addition to potentially investigating options to reduce effects of upstream sand mining, maintaining soil chemical and physical properties at the Dune/Research Area in a condition that favors the protected species is a priority for NSA Monterey. Importation of beach sand is considered prohibitively expensive; therefore, annual weeding as specified in the Vegetation Management Plan (AgriChemical & Supply 2011) is considered the best option for maintaining the soil properties required by special status species. Continued investigation of soil erosion processes and methods for control is also recommended for the Dune/Research Area (See also Section 4.2.3: Soil Resources).

Recommendations for invasive control at the dunes include:

- Weeding earlier in the growing season is most effective—it removes the invasive grasses before they drop their seed. Removing mature invasive plants is less productive as they are more likely to leave seed behind during the removal process or normal seed drop. Late season invasive removal (in addition to limited funding) has hindered rare plant conservation efforts at the dunes; planning must consider season and scope for the most effective results.
- It is important to maintain a steady weeding regimen of the invasive species that have become established at the base of the dunes along the service roads. It is likely that seeds are being dispersed along the service roads. In addition to timely removal an education program and consistent cleaning of vehicles that utilize these roads would help slow the spread of weed seeds and invasive plant material.
- Weed control effort on the dunes should avoid the location of potential habitat for Smith's blue butterfly. While this federally endangered species has not been documented on the site in many years, it could remain present in the litter beneath its host plant, dune buckwheat (R. Arnold, pers. com. 2010), and it is problematic to conduct weed control, including hand pulling, at these locations.

Efforts to maintain habitat for listed species at the dunes may require further vegetation management where other native species are selectively removed to provide the proper environmental milieu for the Monterey spineflower and Monterey gilia. While native grasses are present and were planted to stabilize dunes during their past restoration, they now occupy space that is potential habitat for Monterey gilia and Monterey spineflower. The removal of invasive grasses requires delicate hand-removal and diligent monitoring when they are established among populations of sensitive rare plant species. While more labor intensive, this effort would immediately produce space for the rare plant species to spread.

Invasive plants present in the Dune/Research Area will require repeated inspections and removals to be effectively controlled. Traditional methods of removal have been successful at controlling the non-native species in the area and reducing the negative effect of invasive species on the sensitive plants. Weed control efforts at the Dune/Research Area provide Monterey spineflower and Monterey gilia, both of which are annual species, more opportunity to establish each year. Future efforts will be crucial to examining the effectiveness of weed management and reported observations will help guide these efforts.

To protect results of weed control and habitat management efforts at the Dune/Research Area it is also important to control dune use. Providing adequate fencing, signs and other educational materials to keep beach users away from sensitive habitats in high traffic areas is important.

Management Strategy

Project Summary	Legal Driver	Property
Protect federally listed species on the dunes using fencing, signage and educational materials.	ESA, NDAA 2004, Sikes Act (as amended), BO 1-8-01-F-29	Dune/Research Area
Conduct focused surveys annually or semi-annually for federally listed species at the dunes.	ESA, NDAA 2004, Sikes Act (as amended), BO 1-8-01-F-29	Dune/Research Area
Restore habitat for federally listed species at the dunes.	ESA, NDAA 2004, Sikes Act (as amended), BO 1-8-01-F-29	Dune/Research Area
Continue to investigate soil erosion and control plan for the dunes	ESA	Dune/Research Area

Goal: Dune scrub communities are protected from public trespass to the greatest extent possible, have high native species diversity, and continue to support populations, and hosts plants of, special status species.

Objectives for Dune Scrub

Objective: Contribute to the conservation of the federally listed Monterey gilia and Monterey spineflower through invasive species management and manipulation of vegetation that provides open habitat for these species.

I. Protect federally listed species at the Dune/Research Area by ensuring appropriate signage and fencing exists to both educate and limit public trespass, especially in high traffic areas.

II. Coordinate with City of Monterey to modify beach maintenance activities to protect and sustain habitat for federally listed species at the Dune/Research Area. This may include resolving uncertainties surrounding the staging and use of beach rakers on the beach adjacent to the Dune/Research Area during western snowy plover nesting season. Beach raking may be inadvertently discouraging snowy plover use of the Dune/Research Area (See also Section 4.5.1.2: Western Snowy Plover - Federally Threatened).

III. Maintain habitat for protected species at the Dune/Research Area.

- *A.* Protect federally listed and sensitive species by controlling invasive plant species and continue vegetation management and restoration activities at the Dune/Research Area.
  - *1.* Continue to remove invasive plants from populations of plant species protected by the ESA by hand removal only. Consult with USFWS if herbicide application is deemed necessary in these areas.
    - *a.* Avoid intensive weed control efforts in areas with potential Smith's blue butterfly habitat.
  - *2.* Conduct weed control efforts early in the growing season to be most effective.
  - *3.* Conduct controlled experiments with various weed control strategies and document long term control and impacts to protected and rare species.
  - *4.* Prior to removing eucalyptus trees at the Dune/Research Area, examine the impact this may have on the Monarch butterfly, which over-winters in eucalyptus trees along the

central California coast. Take actions to minimize impacts of eucalyptus removal on populations of monarch butterflies using the groves at the Dune/Research Area.

5. Continue to monitor impacts and effectiveness of weed control efforts at the dunes.
6. Ensure that non-native plant control and landscaping efforts do not pose a threat to sensitive habitat and species. Non-native plant control conducted in areas with protected species needs to be carried out by adequately trained and supervised contractors/personnel to avoid negative impacts to the sensitive species and their habitat.

B. Monitor the ongoing process of dune stabilization and in areas deemed appropriate consider returning later successional stage habitat to open sand, thus creating favorable habitat for federally listed and sensitive species, using a combination of vegetation clearance and importation of sand.

IV. Continue to conduct a semi-annual or annual population census of federally listed and sensitive plant species at the Dune/Research Area.

Objective: Protect dune habitat through the long term by seeking to limit factors that prevent sand replenishment (see also Section 4.2.3: Soil Resources).

I. Seek funding along with regional stakeholders to sponsor studies to determine the etiology and extent of dune erosion within Monterey Bay.

II. Continue to partner with regional stakeholders to seek equitable limits on sand mining to prevent further degradation of this habitat.

4.3.1.4 Specific Issues for Mixed Evergreen Forest and Redwood Forest

Specific Concerns

- The Navy does not have the timber rights at NIROP Santa Cruz. This is problematic as the lack of timber rights constrains management options.
- The edges of the forest are sufficiently overgrown and present a fire liability to structures.
- Fire suppression leads to a reduction in mixed growth stages of forests and chaparral communities thereby increasing overall homogeneity of vegetation and limiting wildlife diversity and abundance. It is unknown whether forest ecosystem function is optimized in terms of stand structure and wildlife habitat, due to the lack forest inventory data.

Current Management

There is currently no specific management program for the mixed evergreen and redwood forests at NIROP Santa Cruz. There have been efforts to control fuel load and dead wood around certain areas (e.g. roads and buildings) that are a by-product of these forests.

Assessment of Current Management

A program of fire and/or fuel management is essential to prevent catastrophic wildfires from occurring, especially as all plant communities in the Santa Cruz Mountains are to some extent fire-prone and fire-adapted (Greenlee 1983). The high frequencies of many fire-prone plant species in most forest types on the property suggest that fire risks are currently high. Serious consideration of fire management strategies is also demanded by the high fuel loads documented in all parts of NIROP Santa Cruz. In addition, management of the forest for fire and fuel is the primary means of managing for wildlife species; thus, forest management for fire control is essentially wildlife management in this area. Keeping the forest (and chaparral) communities in a mixture of all age classes is optimum for wildlife and reduces fire hazards.

A WFMP, in conjunction with an overall NSA Monterey forest management plan, could be developed to guide management of the forest resource at NIROP Santa Cruz, not only to protect it from the threat of fire, but to benefit habitats and species as well. Forest management activities as part of this plan should be developed and conducted to comply with management for the California red-legged frog Critical Habitat and in cooperation with the timber owner.

From a public safety perspective the current practice of roadside clearing allows for safe evacuation of the property in the event of a wild fire; however, adequate clearance of flammable vegetation around buildings is lacking. Vegetation should be maintained on a regular basis to the level recommended by the California Department of Forestry and Fire Protection (in the absence of a WFMP).

In addition, vegetation clearing can help create a more diverse set of plant and animal communities. If multiple age classes of forests (and chaparral) are created, then species which were formerly in low abundance will be able to increase, subsequently increasing the overall diversity of habitat. However, not all dead wood should be removed as part of vegetation clearing; it is important to maintain some standing dead trees (snags) and dead wood on the forest floor for those species dependent on them for habitat (e.g. some birds, reptiles, small mammals, etc.).

Investigating the possibility to conduct prescribed burns at NIROP Santa Cruz could also help to address high fuel loads, which create potential for a large-scale fire, on that property. However, such burns should be kept away from riparian areas, where redwoods predominate, since this habitat is most sensitive to disturbance.

Management Strategy

Project Summary	Legal Driver	Property
Develop a NIROP Santa Cruz WFMP conjunction with an overall forest management plan for NSA Monterey.	ESA, DoDI 6055.6	NIROP Santa Cruz

Goal: Mixed evergreen and redwood forests are protected from wildfire and yet remain sustainable in terms of forest diversity and ecosystem function.

Objectives for Mixed Evergreen Forest and Redwood Forest

Objective: Maintain the forest stands in a sustainable, productive condition. Control the number of trees and deadwood per acre to manage fire risk, while also increasing tree and stand vigor and enhancing structural and age-class diversity of tree species to benefit wildlife.

I. Develop a forest management plan for NIROP Santa Cruz in conjunction with a WFMP.

II. Keep fuel load in the NIROP Santa Cruz forests to a minimum to reduce the potential of intense wildfires.

- *A.* Reduce fire risk from dead wood (fuel) load while maintaining sufficient large dead wood and standing snags for wildlife species.
- *B.* Clear flammable vegetation around buildings on a regular basis to the level recommended by the California Department of Forestry and Fire Protection until more specific recommendations can be developed through a wildland fire plan for NIROP Santa Cruz.
- *C.* Continue the current practice of roadside clearing to allow for safe evacuation of the property in the event of a wild fire.
  1. Use standard erosion-control measures and avoid all unnecessary grading and soil disturbance on roads adjacent to Boyer Creek to reduce erosion-induced sedimentation in that riparian area.
- *D.* Investigate the possibility of conducting prescribed burns at the property to reduce high fuel loads and potential for a large-scale fire.
- *E.* Conduct selective fuel-load clearing and/or prescribed fires in the redwood riparian areas as these are more prone to disturbance.

III. Promote a mixture of age classes in the mixed evergreen forest and redwood forest (along with chaparral and grassland) to promote more diverse wildlife.

4.3.1.5 Specific Issues for Chaparral and Grasslands at NIROP Santa Cruz

Specific Concerns

- While a small percentage (6%) of the total acreage at NIROP Santa Cruz, chaparral and grasslands add significantly to the floral and faunal diversity of the NIROP Santa Cruz forest. In addition, this fire adapted community provides a valuable seed bank for recovery after wildfire.
- The historical suppression of fire at NIROP Santa Cruz has resulted in a high intensity wildfire threat to chaparral as fuels have accumulated for decades. These habitat areas are fire prone and predominately occur near or around structures.
- Grasslands with relatively shallow topographies stay moist for much of the spring season especially in wet years and should be protected from any activities that would incur soil disturbance and degradation.

Current Management

Apart from prohibitions of off-road vehicle use and routine road maintenance activities resulting in the periodic removal of plants along the edges of this community, chaparral and grasslands at NIROP Santa Cruz require little management.

Chaparral and grassland communities are currently described, managed, and monitored as a component of vegetation as a whole, rather than separately (See Section 4.3.1: Terrestrial Vegetation Communities and Habitats). Impacts are generally avoided and minimized through the NEPA site approval and project review process codified in NBVCINST 11010.1. Management of terrestrial habitats take into consideration cultural resource management efforts.

Assessment of Current Management

Mission requirements and operations at NIROP Santa Cruz do not conflict with the management of these areas for natural resources goals. The prohibition of off-road vehicle use and the development of a fire management plan for the property should address both natural resources and wildfire concerns.

Management Strategy

Project Summary	Legal Driver	Property
Develop and implement a WFMP for NSA Monterey that includes chaparral and grasslands.	DoDI 6055.6	All properties

Goal: Chaparral and grassland communities have high native species diversity and are protected from inadvertent degradation and wildfire.

Objectives for Chaparral and Grasslands at NIROP Santa Cruz

Objective: Maintain the function and diversity of chaparral and grassland habitat at NIROP Santa Cruz.

I. Monitor key elements, including invasive species, for changes in trend that may affect the integrity of chaparral and grassland habitat.

   A. If feasible restore, enhance, or maintain habitat based upon recommendations from monitoring.

II. Ensure protection of these habitats through the development of a wildland fire management plan at NIROP Santa Cruz.

III. Continue to prohibit the use of off road vehicles, the staging of equipment, and dumping of landscaping debris on grasslands.

   A. Install signage that alerts employees and visitors to the prohibitions of off-road vehicle use, the staging of equipment, and dumping.

Objective: Contribute to the conservation of the California red-legged frog through the protection of chaparral and grassland habitats at NIROP Santa Cruz.

I. Protect and restore hydrologic processes within these communities that perpetuate high-quality breeding habitat.

A. Though focused surveys determine locations of high value habitat.

1. Develop management plans for these areas.

2. Establish BMPs for use of these areas.

B. Discourage human foot traffic from suitable breeding areas with fencing and educational signage.

C. To the extent practical, avoid or minimize impact of military activities to the species.

D. Tailor wildland management plans to benefit habitat for the California red-legged frog.

E. Install signage that alerts employees and visitors to the presence of the California red-legged frog as well as mandate that dogs should be leashed at all times.

4.3.1.6 Specific Issues for Riparian/Wetland Habitat

Specific Concerns

- While the current baseline mapping of riparian and wetland habitat is complete and the current condition of these habitats appears stable, some vigilance for emerging sedimentation concerns or invasive species could prevent large problems from developing that could become expensive to fix.
- Wildland fire or years with intense rainfall could trigger sedimentation that causes downstream damage and water quality impact.
- All riparian and wetland areas have non-native species and many are dominated by them. All are at some level degraded in relation to their potential habitat value.
- EO 13186 and the accompanying DoD-USFWS MOU require enhancement of riparian habitat to benefit migratory birds. Soil erosion prevention and control measures are required under DoD policy and Soil Conservation law (Title 16, USC 590a-590q3). Finally, Navy policy requires implementation of LID technologies for stormwater management, and these are tied to riparian area management especially in the urban setting of the Monterey Area Properties and considering the adjacency and connectivity of the ocean for all properties. The Joint Ocean Commission Initiative (2009) recommended that local leaders “make the land-sea connection” by reducing the impacts of land uses and development on water quality. The White House (EO 13547 19 July 2010) adopted this as a national priority. Riparian area management on the NSA Monterey properties can help achieve this policy.
- The DoD requires a watershed approach to management and NSA Monterey is in the early stages of implementing such an approach through partnerships. DoDI 4715.03 states “Components shall use

a watershed-based approach to manage operations, activities, and lands to avoid or minimize impacts to wetlands, ground water, and surface waters on or adjacent to installations in accordance with the guidelines and goals established in the Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management, pages 62565 through 62572 of Volume 65, FR."

- Special status animals may use riparian areas and adjacent habitats of NSA Monterey.

Current Management

Baseline mapping and jurisdictional delineation of wetlands is complete (as of 2011) for NSA Monterey. Wetlands at NSA Monterey have been delineated and classified using the Cowardin classification system (TDI 2011) and the International Vegetation Classification System (GANDA 2011).

Assessment of Current Management

Management of wetlands, or development affecting wetlands, requires careful consideration for compliance with national policy on no net loss of the structure and function of wetlands (EO 11990). Current mapping and jurisdictional delineation is sufficient for legal compliance with avoidance and minimization of impacts to these waters and habitats. However, vigilant monitoring is needed to ensure compliance during extreme conditions such as post-fire or flooding.

Some riparian and all the meadow wetlands (such as at NIROP Santa Cruz and those that once existed at the Point Sur Facility that are now drained) are degraded by invasive species and/or by altered hydrology. The placement of roads, ditches, and culverts has changed the headwater system at NIROP Santa Cruz and the coastal drainage and marsh on and around the Point Sur Facility.

Watershed management is intended to preserve soil and water productivity and functions. Erosion and water quality management approaches should be consistent with the BMPs approved by the State of California under the Non-Point Source Pollution Control Plan. The impact of altered water flows, degraded wetland vegetation, non-point source pollution, and water supply needs to be continuously assessed. Watershed protection also can be achieved through fire management, erosion control programs, and assessing the impacts of surface runoff from watersheds.

Management Strategy

Project Summary	Legal Driver	Property
Establish mitigation conceptual goals, success criteria, and a restoration approach using historical reference conditions and a watershed approach. Riparian and wetland restoration at the Point Sur Facility, NIROP, and the Main Grounds. LID technology implementation on all properties. Riparian monitoring for streambank condition, sedimentation, and invasive species.	CWA Sec. 404, 401; Sikes Act (as amended); CZMA; MBTA; EO 11990; EO 13186/USFWS-DoD MOU Migratory Birds; Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management, 62565 - 62572 Volume 65 FR; Soil Conservation (16 USC 590a-590q3); CNO Low Impact Development Policy for Storm Water Management (16 November 2007) and EO 13423; EO 13547; North American Wetlands Conservation Act, PL 101-233 (16 USC §§ 4401 - 4414); EISA section 438	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View

Goal: There is no net loss to wetlands. Wetland diversity and function is improved through efficiencies in irrigation and reductions in stormwater runoff.

Objectives for Riparian/Wetland Habitat

Objective: Consistent with EO 11990, take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.

I. Manage wetlands and riparian areas in compliance with federal laws and natural resource-related components of the CWA, and EOs 11990 and 11988. USACE permits are required under Section 404 of the CWA for the discharge of dredge or fill material into waters of the U.S., including wetlands.

- *A.* Collect and provide information on floodplain and wetland locations during construction planning to minimize potential impacts and preserve the natural and beneficial values of floodplains and wetlands.
- *B.* Manage wetlands on NSA Monterey in compliance with federal laws.
- *C.* Prohibit any alteration or destruction of any designated jurisdictional wetlands.
- *D.* Support the mitigation policy of avoidance, minimization, and compensation for any wetland losses.
- *E.* Conduct a wetlands delineation prior to conducting activities in areas that have been identified as wetlands by the 2011 Wetland Inventory Report (TDI 2011).

II. Protect riparian vegetation and perennial grasslands as "habitats of interest" in regional habitat conservation plans, for their key roles in supporting species of concern and physical stability of slopes and wetlands adjacent to riparian drainages.

III. Enhance riparian vegetation to benefit migratory birds, amphibians, and other dependent species.

- *A.* Monitor for invasive species and control as practicable when population are small. Prioritize the level of effort based on threats to special status wildlife or plants, and cost-effectiveness of immediate control measures.
- *B.* Restore, as practicable the natural hydrologic functions of streams and other wetlands on NSA properties.
- *C.* Develop conceptual habitat restoration goals and success criteria for riparian and wetland areas on each NSA Monterey property through identifying the historical reference condition and taking a watershed approach to the most beneficial restoration site selection possible. Consider opportunities for mitigation of possible future wetland impacts that may require mitigation due to military mission needs.
  1. Groundwater recharge is an important hydrologic function to maintain in restoration planning, along with diverse vegetation and habitat functions for wildlife. Foster a high groundwater table, which is important for high value riparian vegetation.

2. Identify which sites need proactive restoration, versus those that pose little problem if left to recover naturally.

IV. Protect water quality and soil productivity on a watershed basis. Maintain watershed productivity, quality, and functioning through effective non-point source pollution control program, soil erosion control as needed, and maintaining adequate vegetation cover.

A. Protect riparian water quality through improved storm water management.

1. The goal of Navy policy is no net increase in the amount of storm water volume and sediment or nutrient loading that escapes into the ecosystems surrounding Navy facilities and installations nationwide. LID strategies should be implemented in construction and renovation projects. LID is a design technology that makes use of innovative methods to capture storm water that would otherwise flow into nearby watersheds. Reducing storm water runoff helps reduce the level of contaminants such as metals and nutrients that end up downstream, resulting in improved water quality. Conventional storm water collection and conveyance systems and treatment options do not and cannot replicate natural systems, thus increasing the volume and flow of storm water as well as sediment and nutrient loadings to streams, wetlands, and other receiving water bodies such as Del Monte Lake and the Pacific Ocean. Because of continuing water quality problems, states and the EPA are considering mandatory treatment and control of storm water (Navy 2007). Conversely, LID techniques offer a suite of BMPs that maintain or restore predevelopment hydrology. Requirements and guidance for Navy implementation of LID technologies is provided by Navy policy (Assistant Secretary of the Navy [Installations and Environment] [ASN[I&E] 16 November 2007). The Navy is directed to plan, program, and budget to meet requirements of the LID policy. Annual reporting is required on how LID was implemented or waived for all projects with a storm water component (ASN[I&E] 16 November 2007).
2. Minimize the potential for contamination from infrastructure by following proper storm management practices, as described in the Stormwater Management Plan.
3. Retain the sedimentation basin that supplies water to Del Monte Lake.
4. Use specialized landscaping to develop bioswales and basins where appropriate.

B. Minimize sedimentation due to erosion into riparian areas.

1. Manage for dense riparian vegetation to reduce sediment loads into waters and protect water quality.
2. To the greatest extent possible, minimize vehicular traffic on the roads adjacent to or close by Boyer Creek.

3. Avoid and minimize all unnecessary roads, and grading and soil disturbance on roads adjacent to Boyer Creek.
4. Consider a revegetation program for presently denuded areas of the riparian zone along Boyer Creek, including the junction of Boyer Creek with the water pipeline clearing. Such a program should utilize only native plant species.
5. Minimize the use of the riparian area during the wet winter season, when erosion risk is high, and also when amphibians are most active, and also during the spring breeding season for birds (March through May).
6. Monitor for gullying at locations where water is artificially concentrated near roads.
7. Disallow stationing of vehicles off of roads, which can cause compaction, bare spots, and later gullying.

C. In support of the North American Wetlands Conservation Act, PL 101-233 (16 USC §§ 4401 - 4414), seek partnership among public agencies and other interests (1) to protect, enhance, restore, and manage an appropriate distribution and diversity of wetland ecosystems and habitats associated with wetland ecosystems and other fish and wildlife in North America; (2) to maintain current or improved distributions of wetland associated migratory bird populations; and (3) to sustain an abundance of waterfowl and other wetland associated migratory birds consistent with the goals of the North American Waterfowl Management Plan, the United States Shorebird Conservation Plan, the North American Waterbird Conservation Plan, the Partners In Flight (PIF) Conservation Plans, and the international obligations contained in the migratory bird treaties and conventions and other agreements with Canada, Mexico, and other countries.

V. Protect soil ecosystem function. Ensure limited use of fertilizers in areas within and adjacent to maritime chaparral. Soil ecosystem function in maritime chaparral depends on a low-fertility condition. Other communities and non-native species cannot tolerate the difficult soils that maritime chaparral thrives on, and the presence of nutrients above natural conditions can result in invasion and subsequent degradation of riparian areas.

A. Monitor for subterranean soil piping at the Point Sur Facility, which may result from deep cracking of clay soils from wet-dry cycles.

VI. Monitor the condition of headwater springs, meadows and drainages for proper function, including water quality, streambank condition, early gully erosion knickpoints, sedimentation, and invasive species.

A. Monitoring sedimentation and soil erosion condition at NIROP is especially important after 24-hour, 50-year events, which in this region at higher elevation is thought to be about a 4.5-inch storm (NOAA Atlas 2, 1973 [updated 1999] available: www.wrcc.dri.edu/pcpnfreq.html).

B. Monitoring end-of-drainage condition (Monterey Area Properties, Point Sur Facility) for sedimentation pulses after intense rainfall events. This is especially important after 24-hour, 50-year events, which in this region is thought to be a three- to four-inch storm (NOAA Atlas 2, 1973, available: www.wrcc.dri.edu/pcpnfreq.html).

Objective: Contribute to the conservation of the California red-legged frog through the protection of riparian/wetland habitats at NIROP Santa Cruz and the Point Sur Facility.

I. Protect and restore hydrologic processes within these communities that perpetuate high-quality breeding habitat.

A. Though focused surveys determine locations of high value habitat.

1. Develop management plans for these areas.

2. Establish BMPs for use of these areas.

B. Discourage human foot traffic from suitable breeding areas with fencing and educational signage.

C. To the extent practical, avoid or minimize impact of military activities to the species.

D. Tailor wildland management plans to benefit habitat for the California red-legged frog.

E. Install signage that alerts employees and visitors to the presence of the California red-legged frog as well as mandate that dogs should be leashed at all times.

4.3.2 Coastal and Marine Habitats

Specific Concerns

- Pollution, commercial and recreational fishing, and invasive species threaten the condition and biodiversity of coastal and marine communities. This in turn may affect the distribution, abundance and diversity of wildlife.
- Changes to marine resources jurisdictions have led to increased regulation of permissible activities within nearshore waters of NSA Monterey that has placed additional restrictions on use parameters.
- Observed changes to the environment from climate change, erosion, and intra-species competition continue to contribute to shifts in habitat and community distribution and structure that require consideration when developing management strategies.

Current Management

The current management of marine and coastal habitats associated with NSA Monterey occurring below the mean high water mark (4.44 feet for Monterey Bay 2010), considered State Tidelands and Submerged Lands is the responsibility of the CDFW as confirmed by the federal Submerged Lands Act of 1953 (43 USC 1301 *et seq.*) which granted ownership of lands and resources within this body of water to coastal states such as California (shoreline to three nautical miles [six

kilometers] offshore). The Navy supports the authority and responsibility of the CDFW to manage marine resources by providing access and information regarding use of marine resources.

Ecosystem management of marine and coastal communities and habitats on a broader scale is the responsibility of NOAA through the establishment and administration of the MBNMS in 1992. Collaborative partnerships between NOAA, USFWS, CDFW, and universities collect and assimilate data to support adaptive management strategies.

NSA Monterey projects that have the potential to interface or impact marine resources are evaluated through the site approval review process and are subject to permit requirements by state and federal regulatory agencies. Additionally, NSA Monterey has developed and implemented resource protection measures addressing the spread of nonnative species and public access focused on reducing impacts to marine and avian species utilizing the sandy beach.

Assessment of Current Management

Current management of NSA Monterey's coastal and marine resources is focused on assuring proper planning processes and access restrictions are maintained while advocating resource stewardship and conservation. NSA Monterey has a site approval process in place to address projects that may impact marine resources but a more proactive and comprehensive approach needs to be implemented to assure effective avoidance and minimization measures are employed. Communication with MBNMS and other relevant agencies (Refer to Appendix Q) needs to be improved to ensure the proper permit requirements are addressed and complied concerning the installation of future instrumentation and data collection needs.

Management Strategy

Project Summary	Legal Driver	Property
Currently there are no projects planned for coastal and marine habitats.	N/A	N/A

Goal: Impacts to coastal and marine habitats by NSA Monterey's research community continue to be minimized.

Objectives for Coastal and Marine Habitats

Objective: Conserve coastal and marine resources by continuing to cooperate with, and to work under the permitting requirements of, federal, state, and local partners.

I. Ensure that all marine research follows the permitting requirements and BMPs identified by California state boards, departments, commissions, and federal agencies. Refer to Appendix P for a list of these entities.

II. Maintain natural habitat on sandy beaches by coordinating with the City of Monterey and establish protocols to ensure that beach raking equipment does not adversely effect habitat for wildlife.

4.4 Fish and Wildlife Management

Background Information

This ecosystem-based INRMP (See Section 1.8: Management Approaches and Section 4.1: Managing with an Ecosystem Approach) takes a habitat-first approach to managing wildlife populations: stewardship at the habitat level is assumed to take care of the life cycle needs of most fish and wildlife populations. This approach obviates the daunting and inefficient alternative of managing each wildlife population individually, which is costly and prone to decisions that are often ignorant of the cause-and-effect of population fluctuations, which can be far removed from a single property or site. Nonetheless, the tracking of carefully selected populations can provide diagnostic information indicative of the functional health of ecological communities at any of the multiple scales in which they operate. For instance, mountain lions usually cross many plant communities and land jurisdictions, and are indicative of the regional ecosystem's functional health. In this case, regional partnering is beneficial to properly identify ecosystem level threats and craft efficient conservation interventions. The understanding of changes at the landscape level, such as alterations in fire frequency or habitat fragmentation, can inform the appropriate scale of conservation actions for specific wildlife populations.

In addition to species formally listed under the ESA, a variety of lists of Species of Special Concern have been created for use by other agencies and organizations, usually due to known declines or threats to these populations. Species of Special Concern lists have been created by subject matter experts at the U.S. Bureau of Land Management, USFS, National Audubon Society, USFWS, and CDFW to serve as watch lists for species that are worthy of conservation efforts and may be potentially deserving of formal listing.

Specific Concerns

- Lack of effective monitoring to assess trends in wildlife populations and impacts on them from habitat enhancement activities and/or disturbance.
- Absence of indicator species monitoring as a way to discern habitat quality and ecosystem function.

Current Management

The primary goals of the wildlife management program are to protect, promote, and conserve the game and non-game wildlife species that are located on NSA Monterey within the confines of the military mission. Achieving these goals requires objectives that allow for sustainable wildlife populations that use an array of structurally and biologically diverse habitat niches. NSA Monterey personnel, their families, and local residents benefit from proper wildlife management by having ample opportunities to view and experience diverse wildlife species. The objective of the NSA Monterey wildlife management program is to promote a progressive program of wildlife management and enhancement that complies with current and accepted scientific practices and is integrated with the

total natural resources program. As such, many NSA Monterey wildlife populations are currently managed via actions and proposals targeting their habitats (as described in Section 4.2 and Section 4.3).

Assessment of Current Management

Outside of ongoing monitoring of federally listed species, current management of wildlife populations is generally achieved through habitat and vegetation management at NSA Monterey. This approach helps to achieve ecosystem management (See Section 4.1), but generally fails to follow up with wildlife population monitoring. As a result, there is no way to assess trends in wildlife populations and whether any increases or declines may be attributed to larger regional trends or more localized disturbances. One remedy to this gap in information is to regularly monitor species that indicate quality and high value of specific habitats. Monitoring components can also be built into habitat enhancement activities, providing opportunities to identify positive or negative feedbacks of that management on wildlife species of management importance (and not just federally listed species) (See also Section 4.7: Data Integration, Access, and Reporting). Such knowledge will not only allow NSA Monterey natural resource managers to gradually improve conditions for wildlife populations, but to also better reflect their current status and needs in light of other land use proposals at NSA Monterey, including ongoing and future NEPA analyses.

Management Strategy

Project Summary	Legal Driver	Property
Continue to conduct baseline inventories and develop maps of high habitat value to manage focus species to help avoidance, minimization, and conservation of resources and reduce potential for conflict with the military mission.	Sikes Act (as amended), DoD partnership, DoDI 4715.03	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View

Goal: Native fish and wildlife populations are maintained and special status species are supported.

Objectives for Fish and Wildlife Management

Objective: Conserve populations of plants, fish, and wildlife first through habitat conservation.

I. At regular intervals continue to conduct baseline and Management Focus Species inventories to establish management responsibilities.

A. Consider developing a monitoring plan and/or criteria for determining ideal times for conducting baseline surveys.

II. Reduce potential conflicts among wildlife populations, consistent with the military mission, by emphasizing management indicator species and ensuring functional, biologically diverse habitats.

A. Identify and map high-value habitats to ensure ability to make avoidance and minimization recommendations on mission activities and development, in both developed and undeveloped areas.

1. Use the vegetation classification and mapping protocols that meet national Federal Geographic Data Committee and DoD standards and ESD approximations, along with expert

knowledge, to derive habitat value maps for species of management interest. Validate over time with field studies and observations.

III. Ensure protection and conservation of species of special management concern. Acquire, maintain and update baseline data for protected and sensitive species. Ensure these data are available to meet NSA Monterey's planning and management needs.

A. Track the listing status of species being proposed for listing under the federal ESA.

B. Develop an accurate and complete GIS database of all federally listed species, species of special management concern and related features.

IV. Define management objectives for each management focus species based on a habitat value map.

V. Protect and enhance landscape-level habitat values by adopting and implementing policies which protect large patch sizes, maintain connectivity and dispersal corridors, and establish buffer zones as compatible with mission requirements.

A. Adopt and implement policies which preserve structural and species biodiversity.

B. Minimize habitat fragmentation by:

1. aligning roads to avoid fragmentation;

2. concentrating facilities; and

3. maintaining continuity with off-site open space.

C. Delineate and maintain connectivity between habitat patches to link foraging and nesting areas, foster population dispersion and recolonization potential, and increase the area available for foraging.

VI. Monitor the effectiveness of management activities on management focus species or their habitat.

VII. Consider habitat management and enhancement options for management focus species.

A. Target habitat enhancement and restoration activities in appropriate areas to improve habitat value for native species and assemblages of management interest. Monitor success of enhancement activities relative to a baseline habitat value mapping effort.

B. Encourage landscaping with natural resource benefits including native plants that:

1. Provide a source of food for wildlife.

2. Provide necessary nesting and roosting cover for resident and migratory birds.

C. Starting with summaries in Appendix F, maintain databases for all management focus species regarding taxonomic and legal status, rangewide and NSA Monterey distribution, and

inventory techniques and time frames for monitoring and assessment (See also Section 4.7: Data Integration, Access, and Reporting).

VIII. Conduct wildlife management activities in a manner that does not conflict with cultural resources protection. Refer to Section 5.6: Integrating Other Plans for a description of restrictions and procedures for integrating cultural resource protection.

IX. Ensure biodiversity conservation in compliance with DoDI 4715.03.

A. Maintain viable populations of native species on NSA Monterey when practical.

B. Manage and monitor resources over sufficiently long time periods to allow for adaptive management and assessment of changing ecosystem dynamics.

C. Make use of the CNDDB to provide managers with important information of sensitive species locations and habitat.

D. Implement conservation and management efforts to further the conservation of state listed species when such action is practicable and does not conflict with legal authority, military mission, or operational capabilities.

E. Ensure that biologically or geographically significant or sensitive natural resources, such as ecosystems or species, are monitored and managed for their protection and long-term sustainability.

X. Ensure that all surveys and reports that contain spatial data are submitted with an accurate and complete GIS geodatabase that meets DoD and Navy standards.

4.4.1 Invertebrates

Specific Concerns

- There have been no focused surveys for invertebrates at NSA Monterey to date. The terrestrial and aquatic invertebrates that have been surveyed/identified to date are mostly only to the family level.
- Del Monte Lake lacks an invertebrate community.
- The invertebrate pollinator of the Yadon's rein orchid is unknown.
- The federally endangered Smith's blue butterfly has not been observed at NSA Monterey since the early 1980s, despite the persistence of its host plant.

Current Management

Current management of invertebrate species on NSA Monterey is accomplished primarily through the protection of their habitat.

Assessment of Current Management

Despite their importance to ecosystems as pollinators and essential constituents of the food chain among other functions, invertebrates have been a group that has remained relatively unstudied at NSA Monterey. Scheduled assessments of the community of invertebrates at the lake could be used as a metric for the high value of the lake ecosystem, and potentially provide valuable information for adaptive management. In addition, better knowledge of invertebrate presence and habitat use can help direct habitat enhancement activities that favor them.

The completion of the federally endangered Yadon's rein orchid's life cycle presumably relies upon the services of invertebrates for pollination. However, this aspect of the Yadon's rein orchid's life history is currently unknown and an elucidation thereof would provide valuable information for the conservation of this species.

The federally endangered Smith's blue butterfly was known to inhabit NSA Monterey in the past but has not been observed in recent surveys, despite the persistence of its host plant. Targeted surveys for this species during years where this species' host plant is abundant would be appropriate for assessing presence.

Management Strategy

Project Summary	Legal Driver	Property
Conduct Smith blue butterfly surveys.	ESA, Sikes Act (as amended)	Dune/Research Area

Goal: Major taxa of invertebrate populations are identified and native species are protected through habitat protection.

Objectives for Invertebrates

Objective: Identify and protect the abundance, biomass, and diversity of invertebrate functional groups that reflect high value in each habitat and the ecosystem as a whole.

I. Continue efforts to gather knowledge on invertebrate species on the NSA Monterey.

- *A.* Conduct assessments in representative habitats and locales to determine the high value and trend of invertebrate populations in the context of functioning ecosystem and management.
  - *1.* Use invertebrate surveys of Del Monte Lake as an indicator of ecosystem health.
  - *2.* Continue to support research investigations into rare invertebrate habitat and host interactions, especially pollination of rare and endangered plant species.
  - *3.* Conduct investigations in conjunction with botanical surveys.
  - *4.* Surveys should be conducted during years when plant species are in good condition and should be conducted over multiple years to avoid problems with some species exhibiting an extended superdiapause pupal stage.

II. Protect Smith's blue butterfly known and potential habitats where feasible.

4.4.2 Pollinators

Specific Concerns

- Improper use of pesticides during landscape and facility maintenance can negatively impact plants and habitats that support pollinators.
- Development/anthropogenic disturbances may adversely affect existing and to-be-developed pollinator plants and landscapes at NSA Monterey.
- Invasive species (flora and fauna) threaten quality of habitats and plants supporting beneficial pollinators.
- Various long term and regional threats exist to pollinator populations, such as habitat loss/change, erosion, climate change, removal of the natural fire regime.

Current Management

Pollinators have become the focus of special international attention due to their key role in the world supply of food, fiber, and ecosystem biodiversity, and the DoD has established partnerships and a commitment to fund projects in this subject area. The DoD is a member of the Pollinator Partnership and the North American Pollinator Protection Campaign (see http://www.dodpollinatorworkshop.com/ and www.pollinator.org). Birds, bats, insects, and other pollinators are in significant decline across the country and around the world. Nearly 80 percent of the world's crops require pollination. Thirty percent of food consumed is the result of pollinator activity.

Currently, there is no special management focus for pollinators at NSA Monterey. No baseline surveys have specifically focused on identifying pollinator species and the beneficial roles they play for NSA Monterey natural resources and habitats. Management for pollinator species is accomplished primarily through the protection and management of associated habitats.

Assessment of Current Management

Due to the extensive landscaping at NSA Monterey, there are opportunities to support pollinators with vegetation management. There may also be opportunities to benefit pollinator species through restoration and habitat enhancement work of protected habitats (such as the Dune/Research Area) and by coordinating with post-construction and facility maintenance activities. To ensure success of the above management actions, a baseline inventory of pollinators present at NSA Monterey as well as the plants and assemblages that support them are important. The role that pollinators play in sustaining federally listed species at NSA Monterey is also worthy of further investigation, and may provide opportunities to coordinate and streamline research on both. Development of educational material on pollinators and distributing information on DoD's new Pollinator Partnership will assist managers in protecting pollinator species and help to educate other NSA Monterey users as well as the public on their importance.

Management Strategy

Project Summary	Legal Driver	Property
Establish pollinator-friendly landscapes and gardens to promote the pollination of native vegetation where feasible at NSA Monterey, potentially as part of habitat enhancement activities and in coordination with construction and/or facility maintenance activities.	DoD partnership	All properties
Conduct a baseline pollinator survey at NSA Monterey and monitor pollinator populations at regular intervals. Pay special focus to the pollination requirements of threatened and endangered species.	Sikes Act (as amended), DoD partnership, ESA	All properties

Goal: Populations of pollinators species are abundant and proactively supported through habitat protection and enhancement.

Objectives for Pollinators

Objective: Maintain and enhance pollinator populations and their habitat when not in conflict with ecosystem function and safety, or the military mission.

I. Manage for beneficial pollinators in collaboration with DoD and other agency partners. The DoD is a member of the Pollinator Partnership and the North American Pollinator Protection Campaign (see http://www.dodpollinatorworkshop.com/ and www.pollinator.org).

II. Inventory and monitor populations of pollinators.

- *A.* Encourage research partnerships to establish the baseline conditions of pollinators and plants and animals dependent on them at NSA Monterey.
- *B.* Conduct focused research on the on the pollinators of threatened and endangered plant species.

III. Identify and develop pollinator-friendly landscapes. During redevelopment projects, manage landscaping to incorporate pollinator gardens where feasible.

- *A.* Seek opportunities to coordinate with post-construction and facility maintenance activities to establish and promote pollinator-friendly plants and landscapes.
- *B.* Consider pollinators to boost restoration work. For example, islands of restored vegetation can be created to function as centers of dispersal for key plants that require pollinators, and they could be made more visible to pollinator animals.
- *C.* Identify pollinator-friendly landscapes at NSA Monterey as high value habitats both on-the-ground and in NSA Monterey management plans to protect them from unnecessary development and/or anthropogenic disturbances, including any potential misapplication of pesticides.
- *D.* During new development and retrofits, advocate for facility lighting that has less negative impact on pollinator habitat, such as dark-sky compliant lights and focused LED lighting, as opposed to broadcast lighting. Advocate for parking lot occupancy sensors that decrease lighting to a minimum when not needed.

IV. Conduct a pollination study on NSA Monterey's endangered plant species, and those plants that support endangered wildlife.

V. Develop BMPs to ensure that pollinator species are not adversely impacted by NSA Monterey activities.
   A. For examples of other practices, see http://www.plant-materials.nrcs.usda.gov/technical/pollinators.html and http://www.plant-materials.nrcs.usda.gov/technical/publications/feature-pubs/TN_Biology_19_Pollinator_Biology _CA_5-09.pdf.
   B. Identify key plants that require pollinators at NSA Monterey, and for which management consideration should be provided after fire or other landscape-level disturbance.
   C. Revegetate with native species contained on the recommended plant list.
   D. Control the spread of invasive species.
   E. Develop and implement management program that supports bee relocation as opposed to bee eradication.

VI. Develop and distribute outreach and education materials on pollinators, including a pollinator protection guide for managers.
   A. Celebrate National Pollinator Week.

VII. Review existing literature on pollinators.

4.4.3 Reptiles and Amphibians

Specific Concerns

- Surveys for herpetofauna have only been conducted in the broad base-wide species surveys by GANDA (2011).
- Critical Habitat has been designated for the California red-legged frog at the Point Sur Facility and NIROP Santa Cruz. The California red-legged frog is known to occur on the Point Sur Facility. Regular focused surveys for this species are required (See also Section 4.5.1.1).

Current Management

Reptiles and amphibians are conserved at NSA Monterey primarily through the protection of their habitat. Protection of wetland, mesic, and favorable habitat sites at the Point Sur Facility and NIROP Santa Cruz is especially important due to the designation of Critical Habitat for the California red-legged frog and their observed presence at the Point Sur Facility (Section 4.5.1.1).

Assessment of Current Management

Management for reptiles and amphibians at NSA Monterey can be improved through better knowledge of presence across the installation and their habitat preferences. For example, in habitats of particular management concern, more focused reptile and amphibian inventories could be conducted at regular intervals. Indicator reptile and amphibian species can also be monitored as a means to assess overall habitat high value and quality, particularly for wetland and other mesic habitats at NSA Monterey, which provides benefits to

many other local flora and fauna. Although not a significant concern presently, it is important to take measures to control any non-native species that may adversely impact (e.g. alter habitat of, compete with or prey on) native reptiles and amphibians.

Management Strategy

Project Summary	Legal Driver	Property
Participate in DoD Partners in Amphibian and Reptile Conservation initiatives.	DoD partnership	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View

Goal: Populations of reptiles and amphibians are identified, maintained, and special status species are supported by habitat protection.

Objectives for Reptiles and Amphibians

Objective: Inventory and determine the ecosystem function and trend of amphibian and reptile populations, emphasizing those that may indicate ecological trends or may become federally listed, and control non-native species that threaten this ecosystem function.

I. Identify management focus species and determine where on NSA Monterey properties they are most likely to occur, based on observations and existence of suitable habitat (See also Section 4.5.1).

II. Control unnatural predation levels on reptiles and amphibians that place management focus species at risk. In addition, control non-native species that could affect native reptiles or amphibians.

- *A.* Survey for and extirpate non-native amphibians from water sources that may pose a predatory threat to native species.
- *B.* Per DoDI 5100.2f, ensure that free roaming pets, including cats, are not allowed in natural areas at NSA Monterey, to avoid predation on native species (See also Section 4.6.1).

III. Conserve reptile and amphibian habitat, particularly in undeveloped areas, to the extent practical.

- *A.* Focus management on high quality habitat with abundant native species to help prevent invasion by non-natives to the extent practicable.

IV. Participate in DoD Partners in Amphibian and Reptile Conservation initiatives.

4.4.4 Birds

Specific Concerns

- Continuing to document and refine knowledge of avian use on the installation, particularly during breeding season.
- Reducing the nuisance of Canada geese populations at Del Monte Lake and on golf course water ponds and lakes.
- Possible impacts of bird-aircraft collisions, particularly from local Canada geese populations.

- Western snowy plover, a federally threatened species, has not been recorded at the Dune/Research Area. Critical Habitat was proposed in 2011 on a small portion of the Dune/Research Area but was exempted in 2012.
- The riparian corridor that channels water into Del Monte Lake provides valuable and scarce habitat at the Main Grounds for migrating birds and water fowl and should be maintained as a wildlife corridor.

Current Management

Current management for avian species at NSA Monterey includes a monitoring program conducted to coincide with updates to the INRMP. This monitoring is used to update and refine the installation's species list.

NSA Monterey has also installed deterrents on some buildings. These deterrents consist of microfilament to prevent impacts from perching, nesting, and defecation from avian species on these buildings. This precludes the need to remove any birds or nests later on. Outdoor trash cans are also emptied regularly to avoid attracting gulls and other species. In addition to preventing nesting and perching on buildings, NSA Monterey also discourages the use of the golf course and other lawn areas by a local population of Canada geese through the use of dogs to scare the geese away.

Assessment of Current Management

With no federally-listed avian species currently known to be present on the installation (Refer to Section 4.5: Special Status Species Protection), management of avian populations at NSA Monterey is driven by the MBTA and by protection of habitat. Military land managers must comply with the MOU between the USFWS and DoD required by EO 13186 for integrating the MBTA into management efforts. Guidance set forth by the Secretary of the Defense offers several tools for how to implement management activities for migratory birds. Among the guidance is the development and maintenance of an installation bird checklist, which NSA Monterey should continue to refine and improve through more regular bird surveys in all habitats during all times of the year. Priority for monitoring should be placed on Species of Concern, as identified by the USFWS and other comprehensive bird conservation plans, such as western snowy plover (if found), Nuttall's woodpecker, and oak titmouse.

The MBTA protects all birds and nests from take, so NSA Monterey should obtain a depredation permit whenever nests, eggs, or chicks are impacted. Continuing to focusing routine maintenance of habitat areas (e.g. tree trimming and mowing) outside of the breeding season will also reduce MBTA-related impacts and concerns.

Additional areas of avian management should include research components and public outreach, such as participating in long-term monitoring studies (Christmas Bird Count, Monitoring Avian Productivity and Survivorship stations, etc.).

Management Strategy

Project Summary	Legal Driver	Property
Migratory and resident bird inventory and restoration management activities to conserve bird population and develop and maintain information on status and trend of population and habitats.	Sikes Act (as amended), ESA, MBTA, BEPA	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View
Implement bird conservation principles, measures, and practices through avoidance and minimization measures to protect resident and migratory bird populations.	Sikes Act (as amended), ESA, MBTA, BEPA	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View
Participate in regional avian monitoring initiatives.	Sikes Act (as amended), ESA, MBTA, BEPA	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View

Goal: The diversity of avifauna is supported and special status species are protected.

Objectives for Birds

Objective: Manage existing and potential habitat of protected wildlife species in order to support and maintain biological diversity and optimum wildlife population levels within areas of sensitive habitat. Strive for maintaining land use flexibility in support of the NSA military mission.

I. Conduct regular avian surveys of all properties at least every five years.

A. Focus surveys on areas of high-potential for occurrence of Special Status species, such as the beach and dunes for western snowy plover, oak woodlands for Nuttall's woodpecker and oak titmouse, riparian areas for yellow warbler, and grasslands for short-eared owl.

II. Participate in widespread bird monitoring initiatives (i.e. Monitoring Avian Productivity and Survivorship programs, Christmas Bird Count, etc.).

A. Investigate the compatibility of the USFS published guidelines for standardized monitoring techniques for monitoring birds (Ralph et al. 1993) for use at NSA Monterey.

B. Determine how current established monitoring programs might contribute to regional databases and monitoring protocols, including the Breeding Bird Survey, Breeding Bird Atlas, Colonial Waterbird Surveys, International Shorebird Survey, Hawk Migration Surveys, Breeding Bird Census, Winter Bird Population Studies, survey information collected locally by federal and state agencies, and the USGS Bird Banding Laboratory. As appropriate, coordinate with Avian Knowledge Network and DoD e-bird databases to ensure bird monitoring data are submitted.

C. Support biannual counts (using established methodology) of resident land birds, to determine relative abundance of species during breeding and non-breeding season.

III. Ensure the protection and conservation of species protected under the MBTA during tree removal and maintenance activities and during construction, demolition, renovation, and maintenance activities at NSA Monterey through coordination with the appropriate offices/departments.

A. Develop BMPs for identifying when a trees need to be thinned or removed.
B. Leave snags and other high-potential habitat for avian species, if it does not pose a direct threat to personnel or property.
C. Encourage shrubs and other understory vegetation in select areas to provide cover and habitat for ground and understory bird species.

IV. Identify and create habitat areas to encourage avian use.
A. Create a habitat corridor on the Main Grounds from the Main Gate to Del Monte Lake to enhance species movement at NSA Monterey.
B. Develop the Annex habitat through tree and shrub planting, particularly along airport fenceline.

V. Obtain a depredation permit for oiling eggs and other methods to control the local Canada geese population.

VI. Continue to regularly monitor bird exclusion systems installed on historic structures and other buildings to ensure their continued effectiveness for preventing nesting and avoiding take of any birds due to entanglement.
A. Continue to regulate the presence of outdoor trash to discourage seagulls from congregating.

VII. Identify and protect key nesting areas, migration routes, important prey base areas, and concentration for birds of prey on public lands by mitigating activities during NEPA compliance, and the site approval process. Consider nesting areas and sensitive wildlife concentration areas.

4.4.5 Terrestrial Mammals

Specific Concerns

- There are no known concerns for terrestrial mammals at NSA Monterey.

Current Management

Management of mammals consists primarily of maintaining current population levels through protection of potential habitat and conducting surveys to determine species distribution and abundance. Comprehensive surveys for mammals are conducted at regular intervals (GANDA 2011).

Assessment of Current Management

Monitoring of management focus or indicator mammal species could be useful, in addition to regular baseline mammal inventories at NSA Monterey. This could include species of interest that may be either native or introduced and are influencing habitat (e.g. wild boar).

Management Strategy

Project Summary	Legal Driver	Property
Monitor for terrestrial mammal surveys as part of base-wide flora and fauna surveys every five years.	ESA, Sikes Act (as amended)	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View

Goal: Populations of terrestrial mammals are identified and native species are supported by protection of their habitat.

Objectives for Terrestrial Mammals

Objective: Provide for diverse populations of large-ranging mammals and small native mammals by managing for native habitats and habitat conditions and ensuring that trade-offs between all military and natural resource projects as they affect native mammals are considered in planning, with emphasis on special status mammals.

I. Identify management focus species and determine where on NSA Monterey properties they are most likely to occur, based on observations and existence of suitable habitat (See also Section 4.5.1).

II. Continue to conduct regular mammal surveys at NSA Monterey, including identifying habitat use and preference to manage for those species through habitat management activities.

A. Support research that investigates large mammal population dynamics at NIROP Santa Cruz.

III. Conserve large-ranging and small native mammal habitat, particularly in undeveloped areas, to the extent practical.

A. Focus management on high quality habitat with abundant native species and minimize habitat fragmentation.

4.4.5.1 Bats

Specific Concerns

- Bats are currently known to roost in abandoned buildings at the Main Grounds, NIROP Santa Cruz, and Point Sur Facility. It should be determined whether bat roosting in these buildings is considered safe/suitable habitat and if it should be enhanced as such or if bats should be discouraged from using them. Currently, there are no known threats to bats roosting in abandoned buildings at NSA Monterey.

Current Management

Management of bat populations at NSA Monterey is primarily achieved through management of habitats and plant communities, as described above (See Section 4.3). In addition, there have been recent efforts to improve bat roosting opportunities at the Main Grounds by installing a bat nursery colony box for up to 700 individuals near Del Monte Lake as part of Earth Day celebrations.

Assessment of Current Management

Threats to bats on the installation are generally from intrusion of roost sites and degradation of water sources. Protection of key roosting and foraging sites, water sources, and food supply are keys to management of sustainable bat populations (Brown-Berry 1996). Management of these resources should enhance bat protection on NSA Monterey. In addition to providing additional roosting opportunities for bats and improving foraging sites, it would be helpful to identify additional opportunities to increase and manage habitat for bats at NSA Monterey.

Management Strategy

Project Summary	Legal Driver	Property
Inventory and monitor bat populations on NSA Monterey as part of base-wide fauna surveys to adapt management strategies based on current population status.	Sikes Act (as amended)	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View
Continue to use educational events like earth day for the promotion, restoration, and creation of bat habitat.	Sikes Act (as amended)	Main Grounds

Goal: Populations of bats are proactively supported while ensuring that they do not become a nuisance.

Objectives for Bats

Objective: Maintain and enhance bat populations and their habitat when not in conflict with ecosystem function and safety, or the military mission.

I. Identify management focus species and determine where on NSA Monterey properties they are most likely to occur, based on observations and existence of suitable habitat.

II. Continue to conduct regular bat surveys at NSA Monterey, including identifying habitat use and preference to manage for those species through habitat management activities.

III. Support research to inventory and monitor bat populations on NSA Monterey.

IV. Conserve and enhance bat habitat and bat-friendly conditions.

- *A.* During new development and retrofits, advocate for facility lighting that has less negative impact on bat habitat, such as dark-sky compliant lights, focused LED lighting as opposed to broadcast lighting, and parking lot occupancy sensors that decrease lighting to a minimum when not needed.
- *B.* Maintain open water areas to ensure availability to bats.
- *C.* Continue to install artificial bat roosting habitat where feasible.

V. Encourage bat use of natural and managed artificial habitats to draw them away from roosting and foraging in undesirable areas.

- *A.* Determine whether bat roosting habitat in abandoned buildings can either be enhanced to better support bat use or if bats should be discouraged from roosting in abandoned buildings.

4.4.6 Marine Mammals

Specific Concerns

- The extent to which marine mammals use NSA Monterey at the Dune/Research area and off shore of the Point Sur Facility is currently undocumented.
- As in other California bays, a potential exists for harbor seals and sea lions to become nuisances at haul out sites in public places.
- It is unknown how cable activities at the Point Sur Facility may affect marine mammals.

Current Management

The Marine Mammal Protection Act (MMPA) establishes conservation of marine mammals as well as making the take or import of those animals illegal, with specific exceptions, primarily for subsistence fishing. The USFWS is responsible for shore-using and near-shore mammals (such as sea otters). Those mammals that are truly marine inhabitants, cetaceans and pinnipeds, other than walrus, are the responsibility of the National Marine Fisheries Service (NMFS). The USFWS may authorize and permit take (with limitations and mitigation measures) of marine mammals under their purview. Similar to USFWS regulatory oversight, the NMFS is authorized to grant exemptions to the take moratorium and typically requires the collection of observation and data collection on the extent of authorized incidental take.

Assessment of Current Management

There are no known current threats to the marine mammal populations at NSA Monterey given the regional abundance of these animals at the nearby waters and beaches of Monterey and Big Sur. Moreover, military activities at NSA Monterey's modestly sized coastal habitats are minor, infrequent, and highly localized.

Management Strategy

Project Summary	Legal Driver	Property
Educate staff on proper measures regarding sick, injured, or dead marine mammals.	ESA, Sikes Act (as amended), CZMA, MMPA, National Marine Sanctuary Program Regulations, Title 15 of the CFR, Part 922.132	Dune/Research Area

Goal: Marine mammals that may occupy NSA Monterey coastal habitats are managed according to regulations.

Objectives for Marine Mammals

Objective: Maintain compliance with the MMPA.

I. Support research to inventory and monitor marine mammal populations offshore of NSA Monterey.

II. Follow the following measures regarding sick, injured, or dead animals.

A. Do not attempt to handle a sick or injured animal.

B. Contact appropriate authorities when sick, injured, or dead marine mammals are observed.

1. To report tags observed on live marine mammals, go to this web site: http://www.marinemammalcenter.org/what-we-do/rescue/report-a-flipper-tag.html.
2. Live stranded seals, sea lions, whales, dolphins, or turtles: call the Marine Mammal Center at 831-633-6298.
3. Live or dead stranded sea otters: call the Monterey Bay Aquarium at 831-648-4840.
4. Dead stranded seals, sea lions, whales, dolphins, or turtles: call Moss Landing Marine Laboratories at 831-771-4422.
5. Once the above authorities have been contacted and have provided instruction, if the carcass continues to remain a nuisance or health hazard, contact the Monterey Parks Department for disposal.

4.5 Special Status Species Protection

4.5.1 Threatened and Endangered Species and Critical Habitat[3]

Specific Concerns

The ESA was revised via the National Defense Authorization Act (NDAA) of 2004 (PL 108-136) to recognize INRMP conservation measures and species benefit that could obviate the need for Critical Habitat designation on Navy lands. All Navy installations with federally listed threatened or endangered species, proposed federally listed threatened or endangered species, candidate species, or unoccupied habitat for a listed species where Critical Habitat may be designated, must structure the INRMP to avoid the designation of Critical Habitat. The INRMP may obviate the need for Critical Habitat if it specifically addresses both the benefit provided to the listed species and the provisions made for the long-term conservation of the species. The species benefit must be clearly identifiable in the document and should be referenced as a specific topic in the INRMP table of contents.

The USFWS uses a three-point criteria test, to determine if an INRMP provides a benefit to the species. An installation is strongly encouraged to use these USFWS criteria, listed below, when structuring its INRMP to avoid the need for Critical Habitat designation.

1. The plan provides a conservation benefit to the species. The cumulative benefits of the management activities identified in a management plan, for the length of the plan, must maintain or provide for an increase in a species population, or the enhancement or restoration of its habitat within the area covered by the plan (i.e. those areas deemed essential to the conservation of the species). A conservation benefit may result from reducing fragmentation of habitat, maintaining or increasing populations, insuring against catastrophic events, enhancing and restoring

3. Refer also to Appendix K for benefits to endangered species.

habitats, buffering protected areas, or testing and implementing new conservation strategies.

2. The plan provides certainty that the management plan will be implemented. Persons charged with plan implementation are capable of accomplishing the objectives of the management plan and have adequate funding for the management plan. They have the authority to implement the plan and have obtained all the necessary authorizations or approvals. An implementation schedule, including completion dates, for the conservation effort is provided in the plan.
3. The plan provides certainty that the conservation effort will be effective. The following criteria will be considered when determining the effectiveness of the conservation effort. The plan includes: (a) biological goals (broad guiding principles for the program) and objectives (measurable targets for achieving the goals); (b) quantifiable, scientifically valid parameters that will demonstrate achievement of objectives and standards for these parameters by which progress will be measured are identified; (c) provisions for monitoring and, where appropriate, adaptive management; (d) provisions for reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of quantifiable parameters) of the conservation effort are provided; and (e) a duration sufficient to implement the plan and achieve the benefits of its goals and objectives.

Current Management

The current management of federally threatened and endangered species populations of NSA Monterey are addressed through the INRMP at both the individual and community level by avoidance, minimization, and monitoring measures developed to achieve conservation benefits. Conservation efforts and strategies at NSA Monterey have been implemented with approval and funding from CNIC and follow recognized monitoring methodologies. Annual INRMP metric updates provide a formal means to utilize adaptive management and review progress made for protecting and conserving the federally threatened and endangered species at NSA Monterey.

NSA Monterey native plant communities support the federally endangered plant species Yadon's rein orchid and Monterey Gilia, as well as the federally threatened Monterey spineflower. In 2001, NSA Monterey initiated a Section 7 Consultation with the USFWS to discuss potential management measures that would conserve and protect these species and, simultaneously, allow NSA to support the U.S. Navy mission. Consistent with the conservation recommendations of the 02 July 2001 BO (1-8-01-F-29) issued by the USFWS, and the 2001 Monterey INRMP, the installation has been undertaking: (1) population status monitoring of endangered and threatened plants; (2) removal of invasive plants; and (3) restoration of native plant communities.

Critical Habitat for the California red-legged frog was designated on NSA Monterey properties in 2010. California red-legged frogs have been observed at the Point Sur Facility but not NIROP Santa Cruz. Critical Habitat designation requires management as if the species is present

Assessment of Current Management

NSA Monterey is in the early stages of documenting and reporting its achievements under the USFWS three-point criteria for avoiding Critical Habitat designation for the western snowy plover. Other than this, current management of threatened and endangered species on NSA Monterey is adequate to maintain compliance responsibilities, identify threats, and minimize potential impacts. Current communication and partnerships with federal and state regulatory agencies is providing an adaptive management framework able to sustain the military mission while insuring long-term conservation of the species.

Management Strategy

Project Summary	Legal Driver	Property
Ensure that land use plans and activities in or near threatened or endangered species habitats are accomplished in accordance with the ESA in accordance with current BOs[a] and with ESA Section 7 Consultation Handbook (USFWS and NMFS 1998).	ESA, Sikes Act (as amended), BO 1-8-01-F-29	All properties

a. Refer to Appendix L for BOs issued for species at NSA Monterey.

Goal: Full compliance with all requirements and protection of special status species.

Objectives for Threatened and Endangered Species and Critical Habitat

Objective: Maintain viable populations of threatened and endangered species on NSA Monterey and maintain compliance with ESA requirements.

I. Fully implement requirements of the ESA to ensure that activities in or near threatened or endangered species habitats are accomplished in accordance with the ESA.

A. Conduct formal and informal consultations with the USFWS early in the project planning process for all actions, which may affect listed species.

B. Comply with requirements of species or site-specific consultations and with terms and conditions, and reasonable and prudent measures of Section 7 Consultation BO.

C. Develop long-term programmatic agreements with the USFWS to avoid time-consuming consultations which would otherwise need to be conducted on a project-by-project basis.

D. Develop an accurate and complete GIS database of all federally listed species, species of special management concern and related features. Ensure that all surveys and reports that contain spatial data are submitted with an accurate and complete GIS geodatabase that meets DoD and Navy standards.

4.5.1.1 California Red-Legged Frog - Federally Threatened

Specific Concerns

- Critical Habitat was designated across the entire boundary of both NIROP Santa Cruz and the Point Sur Facility in 2010.
- California red legged frog has been observed at the Point Sur Facility in 2012 (GANDA 2012).

Current Management

Prior to 2011, NSA Monterey has not managed for the California red-legged frog.

Assessment of Current Management

Overall, the strategy for conservation of the California red-legged frog will involve: (1) protecting existing populations by reducing threats; (2) restoring and creating habitat that will be protected and managed in perpetuity; (3) surveying and monitoring populations and conducting research on the biology of and threats to the subspecies. These strategies follow directly from the recovery actions outlined in the recovery plan (USFWS 2002).

Management Strategy

Project Summary	Legal Driver	Property
Conduct focused surveys periodically for the red-legged frog, and assess high value habitat at that time.	ESA, Sikes Act (as amended)	NIROP Santa Cruz, Point Sur Facility
Restore/enhance habitat where suitable.	ESA, Sikes Act (as amended)	NIROP Santa Cruz, Point Sur Facility

Goal: Determine the status and condition of the species at NSA Monterey; provide adequate and protected habitat.

Objectives for the California Red-Legged Frog

Objective: Contribute to the conservation of the California red-legged frog through development of cooperative, ecosystem management-based strategies.

I. Protect and restore hydrologic processes and wetland habitat that perpetuate high-quality breeding habitat.

A. Though focused surveys determine locations of high value habitat.

1. Develop management plans for these areas.

2. Establish BMPs for use of these areas.

B. Discourage human foot traffic from suitable breeding areas with educational signage.

C. To the extent practical, avoid or minimize impact of military activities to the species.

D. Conduct water quality studies on wetland sites.

E. Work with adjacent land owners to address habitat threats that cross jurisdictional boundaries.

F. Tailor both forest management and WFMPs to benefit habitat for the California red-legged frog.

G. Install signage that alerts employees and visitors to the presence of the frog as well as mandate that dogs should be leashed at all times.

II. Protect the California red-legged frog by determining the threat posed by non-native predators.

III. Support research that contributes to the conservation of this species.

IV. Conduct monitoring in support of management objective.

A. Meet with stakeholders annually to oversee implementation and prioritize projects.

B. Periodically monitor for the California red-legged frog to determine the presence or absence of the species.

4.5.1.2 Western Snowy Plover - Federally Threatened

Specific Concerns

- The western snowy plover has not been historically observed at NSA Monterey. Critical Habitat was proposed along the eastern edge of the Dune/Research Area in 2011 but was exempted in 2012.

Current Management

Prior to 2011, NSA Monterey has not managed for the western snowy plover.

Assessment of Current Management

Overall the strategy for conservation of the western snowy plover will be: (1) conducting intensive ongoing management for the species and its habitat and developing mechanisms to ensure management in perpetuity; and (2) monitoring western snowy plover populations and threats to determine success of conservation actions and refine management actions.

Management Strategy

Project Summary	Legal Driver	Property
Conduct focused surveys periodically for the western snowy plover.	ESA, Sikes Act (as amended)	Dune/Research Area
Restore/enhance habitat where suitable.	ESA, Sikes Act (as amended)	Dune/Research Area

Goal: Determine the status and condition of the species at NSA Monterey; provide adequate and protected habitat.

Objectives for the Western Snowy Plover

Objective: Contribute to the conservation of the western snowy plover through development of cooperative, ecosystem management-based strategies.

I. Protect and maintain natural coastal processes that perpetuate high-quality breeding habitat.

A. Ensure beach is clean of litter and contaminants.

B. Improve signage mandating dogs be leashed at all times.

C. Develop and maintain a feral animal predator management program.

D. Minimize activities which can affect invertebrate populations that shorebirds forage on, such as routine removal of tidal wrack.

E. Discourage human foot traffic from suitable nesting areas with fencing and educational signage.

F. To the extent practical, avoid or minimize impacts or military activities to the species.

G. Actively communicate management strategies to local community.

II. Enhance remnant dune areas as potential nest sites.

A. Identify opportunities to use suitable dredge or other materials for expansion of beach areas to create improved nesting substrate.

B. Maintain native plant coverage on dunes and control invasive weeds on dunes and beach

III. Conduct monitoring in support of management objective.

A. Meet with stakeholders annually to oversee implementation and prioritize projects.

B. Periodically monitor for the western snowy plover to determine the presence or absence of the species.

C. Regularly monitor dune and beach area and identify conflicts for immediate actions and long-term projects.

IV. Coordinate with the City of Monterey during beach raking activities.

V. Support research that contributes to the conservation of this species.

4.5.1.3 Smith's Blue Butterfly - Federally Endangered

Specific Concerns

- The Smith's blue butterfly has not been found in the Dune/Research Area since the early 1980s.
- Potential habitat exists for this species at the Dune/Research Area.
- Habitat fragmentation due to development limits dispersal in spite of unoccupied available habitat. The closest known population of Smith's blue butterfly is located north of a beach resort in southern Sand City, where Highway 1 and local streets effectively eliminate the butterfly's ability for possible southward expansion (R. Arnold, pers. com. 2010).
- Habitat degradation due to invasive species and wildfire suppression may have negatively impacted the Smith's blue butterfly. Seacliff buckwheat, a host plant for the butterfly requires low intensity wildfire for germination.

Current Management

The overall strategy for mitigating any potential impacts to this species has been protection and enhancement of its habitat at the Dune/Research Area through weeding and restoration planting of its

host plant, dune and seacliff buckwheat. The Smith's blue butterfly has been surveyed for as part of base-wide wildlife surveys (GANDA 2011), and was not found.

Assessment of Current Management

The actions to protect habitat, to increase the population of its host plant, dune buckwheat, as well as to monitor for the Smith's blue butterfly are consistent with proper management for this species given its current absence at NSA Monterey.

Management Strategy

Project Summary	Legal Driver	Property
Conduct focused surveys for Smith's blue butterfly.	ESA, Sikes Act (as amended)	Dune/Research Area
Restore and revegetate habitat for the Smith's blue butterfly.	ESA, Sikes Act (as amended)	Dune/Research Area

Goal: Determine the status and condition of the species at NSA Monterey; provide adequate and protected habitat.

Objectives for the Smith's Blue Butterfly

Objective: Contribute to the conservation of the Smith's blue butterfly through monitoring and protection of its habitat where and when feasible.

I. Conduct surveys during years when plant species are in good condition and over multiple years to avoid problems with the species exhibiting an extended superdiapause pupal stage.

II. Protect Smith's blue butterfly known and potential habitats where feasible.

III. Support regional research that inventories and monitors for the Smith's blue butterfly.

4.5.1.4 Yadon's Rein Orchid - Federally Endangered

Specific Concerns

- Public trespass, including foot traffic and dogs, continues to pose a threat to habitat, and direct injury to the plant.
- Invasive species, such as French broom, continue to pose a competitive threat to the Yadon's rein orchid.
- Fire suppression over time has led to accumulation of organic matter at high levels on the soil surface as well as increases in understory cover in Monterey pine forests, both contributing to unfavorable conditions.
- The orchid's mycorrhizal association is potentially of major importance for its germination. It is unclear how to ensure environments that would promote mycorrhizal fungi.
- Golf balls that accidentally fall within designated Yadon's rein orchid protected habitat encourage trespass.

- Nocturnal, short-tongued moths are thought to be the primary pollinators of Yadon's rein orchids. In order to maintain adequate seed production to support long-term persistence of the species, suitable habitat of sufficient size and connectivity for these and other pollinators must be maintained.
- Mule deer are known to consume the inflorescences of Yadon's rein orchid.
- Since the first formal survey for rare plants in 1992, censuses have had different objectives and methods, so not all sensitive plant species were surveyed each time and different portions of NSA Monterey were included in the various efforts.

Current Management

Consistent with the conservation recommendations of the 02 July 2001 BO (1-8-01-F-29) issued by the USFWS, and the 2001 Monterey INRMP, the installation has been undertaking: (1) population status monitoring of endangered and threatened plants; (2) removal of invasive plants; and (3) restoration of native plant communities.

Assessment of Current Management

The management of Yadon's rein orchid has been consistent with the 02 July 2001 BO (1-8-01-F-29). Limiting access and invasive weed control has contributed to maintaining a stable population. However the Yadon's rein orchid continues to be vulnerable to disturbance. Continuing aggressive measures to limit access with fencing and to educate the public, contractors, and Navy personnel is essential. Refinement of landscaping and survey protocols could also reduce direct impacts.

Aspects of the autecology of the Yadon's rein orchid are still not well documented and supporting research to investigate the species and conditions it relies on to thrive could prove beneficial. Orchid reproductive ecology is known to require both biotic and abiotic factors. Management of the species could benefit from research concerning the climatic and environmental variables that are correlated with phenological stages, the fungi that is associated with its germination, and the life history of its pollination and that of its pollinators.

In addition, positive steps can be taken that recognize the population-ecology of Yadon's rein orchid. These include careful maintenance of the Monterey pine canopy. Since Monterey pine is a short-lived fire adapted species, maintenance of the favored canopy requires a very careful protocol. The protocol must balance fire prevention near building with maximizing preferred habitat for Yadon's rein orchid. Key elements of the protocol should include immediate planting of replacement trees, which are very fast growing, with planned removal of old and already dead trees. Maintenance of a mulch of Monterey pine needles where Yadon's rein orchid is known to occur would benefit the soil ecology necessary for the protection of these stands.

Management Strategy

Project Summary	Legal Driver	Property
Conduct focused surveys annually for Yadon's rein orchid.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties
Restore habitat for the Yadon's rein orchid.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties
Protect habitat for Yadon's rein orchid using fencing, signage, and educational materials.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties

Goal: Populations of Yadon's rein orchid supported and protected in full compliance with BO.

Objectives for the Yadon's Rein Orchid

Objective: Conserve and maintain viable populations of Yadon's rein orchid and maintain compliance with BO requirements and incorporate recommendations of USFWS Five-Year Review as appropriate.

I. Protect the Yadon's rein orchid by ensuring appropriate signage and fencing exists to both educate and limit public trespass.

A. In areas supporting populations of Yadon's rein orchid within the Annex Area, flag locations of rein orchids in order to avoid inadvertent damage by ground maintenance activities.

B. Maintain existing fences and signs constructed for the protection of rein orchid populations within the Laboratory/Recreation Area (Golf Course) and consider additional fencing and/or signs to protect other populations of this species that may be subject to heavy foot traffic.

C. Place additional barriers and signage around the large orchid areas and all foot traffic prevented. Smaller populations should also be fenced off and marked with signage and established fencing and signage should be maintained. Because of the large numbers of visitors and landscapers in the area, an education program utilizing signage would indicate the need and manner of protecting the resources. Trimming weeds, turf, and Monterey pine branches all contribute to the decline of orchids. An instructional program for the maintenance and landscapers at the NSA Monterey would also prevent unwitting damage to the orchids and their habitat.

II. Protect the Yadon's rein orchid by annually controlling invasive plant species and continue vegetation management and restoration activities.

A. Continue to remove invasive plants from populations of plant species protected by the ESA by hand removal only. Consult with the USFWS if herbicide application is deemed necessary in these areas.

B. To the maximum extent possible, conduct all weed removal activities in areas supporting rein orchid populations between mid-October and early December (the time period after the seed is dispersed and before new leaves emerge).

C. Maintain and create habitat conditions that support the orchid: Monterey pine trees and duff, supportive moisture and water conditions in the soil, and shading. Use Monterey pine needle mulch to enrich the soil.

D. Develop and implement a protocol for the long term maintenance of the Monterey pine canopy that address both the population structure of the overstory tree and fire hazard of old, dying, or dead trees.

III. Continue to conduct an annual population census.

A. In the future, preliminary walkovers for the orchid should be completed in March-May, and surveys completed by mid-June.

B. Surveys of potential habitat in the Annex Area should be conducted throughout the vegetative season, more frequently during the peak growing period, in order to verify the orchids' loss in this area.

IV. Research weather patterns, phenology, pollinators, and germination ecology of the Yadon's rein orchid to better understand population dynamics.

A. Patterns in climate data should continue to be monitored in conjunction with orchid numbers, and annual surveys completed to track natural growth cycles. Consistent monitoring over a number of years will reveal important data regarding population dynamics.

B. Support research to thoroughly understand the reproductive ecology of Yadon's rein orchid. Such a study would contribute essential information for the long term maintenance of the species at NSA Monterey.

4.5.1.5 Monterey Spineflower - Federally Threatened

Specific Concerns

- Public trespass, including foot traffic and dogs, continues to pose a threat to habitat, and direct injury to the plant.
- Since the first formal survey for rare plants in 1992, censuses have had different objectives and methods, so not all sensitive plant species were surveyed each time and different portions of NSA Monterey were included in the various efforts.
- Maintaining soil chemical and physical properties at the Dune/Research area in a condition that favors the Monterey spineflower is a priority for NSA Monterey. The Monterey spineflower occurs readily on sandy substrates and, like other Chorizanthe species, where competition with other plant species is minimal.
- The pollination ecology of the Monterey spineflower is currently unknown. Spineflower species may be indirectly affected by diminished pollinator visitation. Many of the bee and wasp pollinators important to Chorizanthe pollination require bare ground for nesting.

Current Management

Consistent with the conservation recommendations of the 02 July 2001 BO (1-8-01-F-29) issued by the USFWS, and the 2001 Monterey INRMP, the installation has been undertaking: (1) population status monitoring of endangered and threatened plants; (2) removal of invasive plants; and (3) restoration of native plant communities.

Assessment of Current Management

There is a need to refine and standardize methods for determining rare species' population numbers so that multiyear data can be compared with confidence. Survey efforts have had different objectives, so not all sensitive plant species were surveyed each time and different portions of NSA Monterey were included in the various efforts. The level of detail in population counts and mapping also varied significantly. Presence of listed species should also be noted when adjacent to NSA Monterey facilities. During 2009 surveys, Monterey spineflower was observed growing on airport property directly above the Annex habitat areas.

Dune stabilization is an emerging threat to the Monterey spineflower. As succession continues on the dunes, habitat in which the Monterey spineflower is competitive diminishes. Importation of beach sand is considered prohibitively expensive, therefore annual weeding as specified in the Vegetation Management Plan (AgriChemical & Supply 2011) is considered the best option for maintaining the soil properties required by special status species. Efforts to maintain habitat for this species may require further vegetation management where other native species are selectively removed to provide the proper environmental milieu for the Monterey spineflower.

Management Strategy

Project Summary	Legal Driver	Property
Conduct focused surveys annually for the Monterey spineflower.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties
Restore habitat for the Monterey spineflower.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties
Protect habitat for the Monterey spineflower using fencing, signage, and educational materials.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Monterey Area Properties

Goal: Populations of the Monterey spineflower are supported and protected in full compliance with BO.

Objectives for the Monterey Spineflower

Objective: Conserve and maintain viable populations of the Monterey spineflower and maintain compliance with BO requirements and incorporate recommendations of USFWS Five-Year Review as appropriate.

I. Protect the Monterey spineflower by ensuring appropriate signage and fencing exists to both educate and limit public trespass.

  A. Continue to provide convenient and accurate means of identifying areas that support protected species in the Dune/Research Area as off limits to student research.

II. Enhance habitat for the Monterey spineflower.

A. Protect the Monterey spineflower by annually controlling invasive plant species and continue vegetation management and restoration activities.

1. Continue to remove invasive plants from populations of plant species protected by the ESA by hand removal only. Consult with the USFWS if herbicide application is deemed necessary in these areas.

2. Ensure that non-native plant control and landscaping efforts do not in themselves pose a threat to sensitive habitat and species. Non-native plant control that is carried out in areas with Monterey spineflower needs to be conducted by adequately trained and supervised contractors/personnel to avoid negative impacts to the sensitive species and their habitat.

B. Monitor the ongoing process of dune stabilization, and in areas deemed appropriate, return later successional stage habitat to open sand thus creating favorable habitat for the Monterey spineflower.

III. Continue to conduct an annual population census. Conduct standardized sensitive plant species monitoring according to refined, tested, and repeatable methods tailored for the Monterey spineflower.

IV. Research weather patterns, phenology, and pollinators of the Monterey spineflower to better understand population dynamics.

4.5.1.6 Monterey Gilia - Federally Endangered

Specific Concerns

- Public trespass, including foot traffic and dogs, continues to pose a threat to habitat, and direct injury to the plant.
- Since the first formal survey for rare plants in 1992, censuses have had different objectives and methods, so not all sensitive plant species were surveyed each time and different portions of NSA Monterey were included in the various efforts.
- Maintaining soil chemical and physical properties at the Dune/Research area in a condition that favors the Monterey gilia is a priority for NSA Monterey. The Monterey gilia requires semi-open areas of sandy soil to germinate and thrive.

Current Management

Consistent with the conservation recommendations of the 02 July 2001 BO (1-8-01-F-29) issued by the USFWS, and the 2001 Monterey INRMP, the installation has been undertaking: (1) population status monitoring of endangered and threatened plants; (2) removal of invasive plants; and (3) restoration of native plant communities.

Assessment of Current Management

There is a need to refine and standardize methods for determining rare species' population numbers so that multiyear data can be compared with confidence. Survey efforts have had different objectives, so not all sensitive plant species were surveyed each time and different portions of NSA Monterey were included in the various efforts. The level of detail in population counts and mapping also varied significantly. Presence of listed species should also be noted when adjacent to NSA Monterey facilities.

Dune stabilization is an emerging threat to the Monterey gilia. As succession continues on the dunes, habitat in which the Monterey gilia is competitive diminishes. Importation of beach sand is considered prohibitively expensive, therefore annual weeding as specified in the Vegetation Management Plan (AgriChemical & Supply 2011) is considered the best option for maintaining the soil properties required by special status species. Efforts to maintain habitat for this species may require further vegetation management where other native species are selectively removed to provide the proper environmental milieu for the Monterey gilia.

Management Strategy

Project Summary	Legal Driver	Property
Conduct focused surveys annually for Monterey gilia.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Dune/Research Area
Restore habitat for the Monterey gilia.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Dune/Research Area
Protect habitat for the Monterey gilia using fencing, signage, and educational materials.	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Dune/Research Area

Goal: Populations of the Monterey gilia are supported and protected in full compliance with BO.

Objectives for the Monterey Gilia

Objective: Conserve and maintain viable populations of the Monterey gilia and maintain compliance with BO requirements and incorporate recommendations of USFWS Five-Year Review as appropriate.

I. Protect the Monterey gilia by ensuring appropriate signage and fencing exists to both educate and limit public trespass.

A. Continue to provide convenient and accurate means of identifying areas that support protected species in the Dune/Research Area as off limits to student research.

II. Enhance habitat for the Monterey gilia.

A. Protect the Monterey gilia by annually controlling invasive plant species and continue vegetation management and restoration activities.

1. Continue to remove invasive plants from populations of plant species protected by the ESA by hand removal only. Consult with the USFWS if herbicide application is deemed necessary in these areas.

2. Ensure that non-native plant control and landscaping efforts do not pose a threat to sensitive habitat and species. Non-native plant control that is carried out in areas with

Monterey gilia needs to be implemented by adequately trained and supervised contractors/personnel to avoid negative impacts to the sensitive species and their habitat.

B. Monitor the ongoing process of dune stabilization, and in areas deemed appropriate, return later successional stage habitat to open sand thus creating favorable habitat for the Monterey gilia.

III. Continue to conduct an annual population census. Conduct standardized sensitive plant species monitoring according to refined, tested, and repeatable methods tailored for the Monterey gilia.

IV. Research weather patterns, phenology, and pollinators of the Monterey gilia to better understand population dynamics.

4.5.2 Other Special Status Species

Specific Concerns

In addition to formally listed species, a variety of lists of Species of Special Concern have been created for use by other agencies and organizations. Species of Special Concern lists have been created by the U.S. Bureau of Land Management, USFS, National Audubon Society, and CDFW to serve as watch lists for species that may be deserving of formal listing. Perhaps the most important is the CNDDB list of special animals. The intent of CNDDB, for the special concern category, was to give consideration to that species lacking legal protection, which may help avert costly conservation efforts that would otherwise be required to save such species (Jennings and Hayes 1994).

California Species of Concern status applies to animals not listed under the federal ESA or the California Endangered Species Act (CESA), but which nonetheless (1) are declining at a rate that could result in listing, or (2) historically occurred in low numbers and known threats to their persistence currently exist. All California Species of Concern can be found in the CNDDB. The CNDDB, now over 20 years old, is a highly valuable repository of rare plant and animal information maintained by the Habitat Conservation Division of the CDFW. The primary function of CNDDB is to gather and disseminate data on the status and locations of rare and endangered plants, animals, and vegetation types. The goal of the CNDDB is to provide the most current information available on the state's most imperiled elements of natural diversity and to provide tools to analyze these data (Bittman 2001).

Sensitive invertebrate species are not listed by the CNDDB. Additionally, very little work has been conducted on most invertebrate species; thus, little is known of their abundance, distribution, or in some cases, their status as species. Taxonomy changes occur on a regular basis, particularly for those species or groups being investigated. Invertebrates are only protected federally under the ESA.

Federal Species of Concern:

- Nuttall's woodpecker (*Picoides nuttallii*)
- Oak titmouse (*Baeolophus inornatus*)

Federally Delisted/ California Fully Protected

- California brown pelican (*Pelecanus occidentalis californicus*)

California Species of Special Concern:

- California legless lizard (*Anniella pulchra*)
- California newt (*Taricha torosa*)
- Short-eared owl (*Asio flammeus*)
- Yellow warbler (*Dendroica petechia*)
- Monterey dusky-footed woodrat[4] (*Neotoma fuscipes luciana*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)

California Native Plant Society List 1b:

- Santa Cruz Manzanita (*Arctostaphylos andersonii*)
- Hoover's bent grass (*Agrostis hooveri*)
- Hooker's Manzanita (*Arctostaphylos hookeri*)
- sandmat Manzanita (*Arctostaphylos pumila*)
- coast wallflower (*Erysimum ammophilum*)
- Monterey cypress (*Cupressus macrocarpa*)
- Northern California black walnut (*Juglans californica* var. *hindsii*)
- Monterey pine (*Pinus radiata*)

Current Management

NSA Monterey is required to manage for species warranting stewardship, as the DoD recognizes the value of maintaining diverse ecosystems. The DoDI 4715.03 states that the DoD shall, to the best of its ability, implement conservation and management efforts to further the conservation of state-listed species when such action is practicable and does not conflict with legal authority, military mission, or operational capabilities.

The Navy recognizes that it is prudent to protect rare species as a proactive strategy to prevent future Federal listings. To the extent that resources are available to support the management of these species, NSA Monterey intends to implement the following objectives and strategies. The Navy complies with the laws pertaining to regulated species by avoiding and minimizing impacts to those species and their habitat.

Assessment of Current Management

The habitat based and species specific management measures proposed in this INRMP in conjunction with the NEPA Site Approval and Project Review Process provide a sufficient level of natural resource management to protect and conserve species warranting Navy stewardship at NSA Monterey.

4. This species was observed by researchers from U.C. Santa Cruz in 1996 as reported in Doak et al. (1996). However this species was not observed in 2011 during general flora and fauna surveys by GANDA (2011).

Management Strategy

Project Summary	Legal Driver	Property
Provide for the conservation, enhancement, and protection of species warranting Navy stewardship, as a proactive strategy to prevent federal listings and continue to resolve baseline biological data gaps.	ESA, Sikes Act (as amended)	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View

Goal: Native plant and animal populations are maintained and species status species are supported.

Objectives for Other Special Status Species

Objective: Species warranting Navy consideration and the habitats which support those species, will be protected to the extent practicable by giving them consideration during the land use planning processes.

I. Provide for the conservation, enhancement, and protection of species warranting Navy stewardship, as a proactive strategy to prevent federal listings.

A. Maintain contact with regional specialists and regulatory agencies regarding the listing status of unique species known or thought to occur on NSA Monterey.

II. Continue to participate in the USFWS/NMFS review and listing process for species known or thought to occur on NSA Monterey that are being considered for listing under the ESA.

A. Stay updated on agency decisions, published material, and meetings that change the listing status of species.

B. To the extent practical, avoid or minimize impacts from military activities to species warranting Navy stewardship.

III. Continue to resolve baseline biological data gaps.

A. Support ongoing and new research on distribution and ecology of species warranting Navy stewardship. Encourage academic institutions to facilitate resource data collection.

B. Continue to inventory and map existing species warranting Navy stewardship.

C. Ensure that all surveys and reports that contain spatial data are submitted with an accurate and complete GIS geodatabase that meets DoD and Navy standards.

4.5.3 Invasive Species

Specific Concerns

- There is a need to create a GIS database of infestations across NSA Monterey to better prioritize weed control efforts and track progress.
- Invasive annuals continue to degrade habitat for listed species at the Dune/Research Area, which requires regular control efforts. Weed control for the Monterey gilia, Monterey spineflower, and Yadon's rein orchid is an important part in ensuring the preservation of these rare plants.

- Kikuyu grass dominates the sub-acre Point Sur Facility. This property is surrounded by a state park which is entirely overrun by kikuyu grass, which makes controls efforts on-site not feasible.
- There is currently no treatment of marine and aquatic invasive species in the IPMP (NAVFAC Southwest 2009) nor the Vegetation Management Plan (AgriChemical & Supply 2011).
- The Argentine ant (*Linepithema humile*) is a threat to populations of native ants.
- While problems with weedy plant species are minor at NIROP Santa Cruz, major problems will be avoided in the future in part by management to decrease weed populations that do exist.

Current Management

EO 13112 defines invasive species as an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. It directs all federal agencies to: Address invasive species concerns by refraining from actions likely to increase invasive species problems. The Federal Plant Protection Act 2000 (Title IV of PL 106-224) prohibits introducing any animal, plant or material considered harmful to this country's agriculture. The USDA Plant Protection and Quarantine Division is the enforcement authority for this Act. The Plant Protection Act consolidated and modernized all major statutes pertaining to plant protection and quarantine (Federal Noxious Weed Act, Plant Quarantine Act). It authorizes Animal and Plant Health Inspection Service to take both emergency and extraordinary emergency actions to address incursions of noxious weeds. The DoD is required to comply with this law; however it has mainly applied to prevent introductions from overseas movement of military equipment.

NSA Monterey has an ongoing program to remove invasive non-native plants from portions of its property. Invasive non-native plants can be a serious threat to natural plant habitat by changing the structure of the plant community, and degrading its value for wildlife and native plant species. All NSA Monterey activities to control invasive non-native species conform to EO 13112 (February 1999), which directs federal agencies to prevent the introduction of invasive species and to provide for their control.

Weed control for the Monterey gilia, Monterey spineflower, and Yadon's rein orchid is critical in ensuring the preservation of these rare plants. Protecting their habitats by removing invasive species allows the plants greater opportunity to recover and establish sustainable populations. In 2001, NSA initiated a Section 7 Consultation with the USFWS to discuss potential management measures that would conserve and protect these species and, at the same time, allow NSA to support the U.S. Navy mission. Weed control became part of the management objectives, as described in the 2001 BO (1-8-01-F-29) issued by the USFWS and the 2001 Monterey INRMP, and protocols were established to achieve this management activity.

The main invasive non-native plants on NSA Monterey that have been controlled during removal efforts include: ice plant, mustards, ripgut grass, pampas grass, French broom, eucalyptus, and acacia. Other species that are included in the target control list for the non-native plant control work, include: milk thistle, Italian thistle (*Carduus pycnocephalus*), Erharta grass (*Ehrharta erecta*), wild oat (*Avena fatua*), slender wild oat (*A. barbata*), rattlesnake grass, and European beachgrass.

Assessment of Current Management

The main invasive plant control area has been the Dune/Research Area, but work has also occurred at the Laboratory/Recreation area within Yadon's rein orchid habitat for non-native grasses and French broom. Other non-native plants have been controlled by landscape crews - notably pampas grass. Although this is a benefit to the habitat in general, some of the treated plants were in areas with Yadon's rein orchids. Non-native plant control activities within sensitive habitat must be carried out in a way to minimize impacts to sensitive species. The Vegetation Management Plan (AgriChemical & Supply 2011) details the invasive plant species control efforts from 1993-2011.

There has been no effort to control kikuyu grass at the Point Sur Facility as this sub-acre property sits within a larger State Park that uses kikuyu grass as the dominant ground cover. Any efforts to control the species at the Point Sur Facility would need to be coordinated with a larger effort on adjacent land owned by the CSP.

There is currently no cumulative map of invasive non-native species on NSA Monterey. These surveys should occur so that true prioritization can occur based on a complete list of non-native species with known abundance and distribution. Current information is based on information gathered during field surveys for sensitive plant species, and past restoration and invasive plant control work. Mapping of priority non-native plant species would help in planning/assessing control activities as well as budgeting/scoping work activities.

When the vegetation management plan is revised, NSA Monterey should consider adopting the approaches for controlling new invasive species described by the National Invasive Species Council (2003).

Management Strategy

Project Summary	Legal Driver	Property
Restore habitat for federally listed species that is degraded due to occupation by invasive species.	Sikes Act (as amended), ESA, EO 13112, DoDI 4715.03	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View
Develop a map that depicts all invasive species concerns on NSA Monterey.	Sikes Act (as amended), ESA, EO 13112, DoDI 4715.03	All properties except CIRPAS Marina Airport Facility and NPMOSSP Mountain View

Goal: Invasive species' populations are controlled and reduced across NSA Monterey.

Objectives for Invasive Species

Objective: Control the spread and introduction of invasive plants with priority on those with the greatest potential for sensitive species population or habitat degradation, and restore to native habitat when feasible.

I. Comply with EO 13112 on Invasive Species. Use early detection and rapid response as the first order of business. Prevent and control new introductions rapidly.

A. Identify Weed Prevention Areas for special management attention, such as those occupied by special status species, or areas that are currently lacking invasion to keep clear of pest plants.

B. Use both incidental observations as well as regular monitoring practices at strategic locations to detect new pest plant introductions. Record this data into GIS.

1. Develop a GIS database of invasive species on the installation.

2. Maintain the GIS database to add new infestations or remove successfully treated sites.

3. Ensure that all surveys and reports that contain spatial data are submitted with an accurate and complete GIS geodatabase that meets DoD and Navy standards.

4. Monitor invasive and noxious weeds and those which have the potential to become so by remapping at regular intervals.

C. Enforce invasive species control measures at construction sites or sites of routine ground disturbance that may allow for invasion. Restoration, construction, and mitigation plans should include contingencies for removing invasives as they appear and for implementing new control measures as they become available.

D. Implement the invasive control measures presented in the NSA Monterey Vegetation Management Plan.

E. Ensure the implementation of the pest management program administrative requirements applicable to invasive species and their control as presented in the current NSA Monterey IPMP.

II. Refine landscaping protocols to limit actions that promote invasive species such as the Argentine ant.

III. Attend regional Weed Management Area meetings sponsored by the War on Weeds Partnership coordinated by the County of Monterey. Participate and share control and plant distribution data.

IV. Conduct research to determine the most effective procedures to control weeds in various habitats at NSA Monterey, especially in areas where weeds degrade the habitat of federally listed species.

4.6 Prevention and Control of Wildlife Damage

Background

The USFWS defines pests as: those organisms (vertebrates, invertebrates, plants, and microorganisms and their vectors, etc.), which are detrimental to fish, wildlife, human health, fish and wildlife habitat or to, established management goals. Sometimes due to drought or other conditions, animals gravitate to human resources. These animals may knock over trash cans, attack pets, and cause a nuisance. Pest wildlife species should only be handled or removed by trained personnel, which may be provided by state and federal certified organizations.

4.6.1 Feral Animals and Pests

Specific Concerns

- The IPMP (NAVFAC Southwest 2009), identifies the following pests on NSA Monterey: household pests including ants, spiders, and cockroaches; public health pests including rodents and mosquitoes; landscape pests including weeds, gophers, ground squirrels, and geese; and various invasive weeds.

Current Management

Management of pests and feral animals at NSA Monterey is guided by the IPMP. The IPMP states that the DoD policy is to ensure DoD pest management programs achieve, maintain, and monitor compliance with all applicable EOs and applicable federal, state, and local statutory and regulatory requirements. When there is a conflict between federal and local regulations, the installation will comply with the more stringent of the two. This commonly occurs with pesticides limited for use by the State of California, which are not necessarily restricted by the EPA. In this case, the installation must comply with California regulations.

There are few feral animals on NSA Monterey, due primarily to aggressive management programs. Feral cats, a serious issue in the past, are humanely trapped and transported to the Society for the Prevention of Cruelty to Animals as soon as they appear to be permanent residents. As per DoD policy, feral cats are not permitted on the installation and “catch-neuter-release” programs are prohibited. Raccoons are common on the Monterey peninsula, and can be found on NSA Monterey. When they become nuisances by inhabiting buildings or establishing latrines in public areas, raccoons are trapped by the pest control contractor and transported to a less public area on the base. Removal of feral or nuisance wildlife is conducted as humanely as possible and is coordinated between the Facilities Maintenance Contracts Division and Integrated Pest Management Coordinator.

Peafowl are long-standing residents on the NSA Main Grounds but were not present during the historically relevant period for the Hotel Del Monte. The peafowl population should be maintained at no more than one male and three females through egg oiling, nest or egg destruction, and bird trapping and removal. NSA Monterey ED has a peafowl trap and there are groups and individuals in the community that will take the excess birds.

Assessment of Current Management

NSA Monterey pest management programs achieve, maintain, and monitor compliance with all applicable EOs and applicable federal, state, and local statutory and regulatory requirements as presented and described in the IPMP (NAVFAC Southwest 2009).

Management Strategy

Project Summary	Legal Driver	Property
Ensure pests and feral animals are managed according the IPMP.	Sikes Act (as amended), EO 12342, DoDI 4715.03	All properties

Goal: A safe, effective, and ecologically sound integrated pest management program.

Objectives for Feral Animals and Pests

Objective: Identify, prioritize, and monitor invasive plants, pests, and feral animals on NSA Monterey. Enhance the natural and artificial environment through removal of invasive plants, pests, and feral animals.

I. Review and approve new pesticides and pest management operations that may adversely impact the environment.

II. Provide technical review of the IPMP during revisions.

III. Conduct internal compliance assessments of the pesticide and pest management program.

IV. Maintain current permits, certifications, and training related to pest control.

- *A.* Obtain a depredation permit for oiling of Canada geese eggs.
- *B.* Continue to plan for staff to attend pest control training courses sponsored by NAVFAC Southwest.

V. Adopt preventative methods for pest and invasive species control using landscaping with native and adapted plants to reduce water use has reduced pest problems. Ground covers that reduce weed growth should also be considered in landscape planning.

VI. Ensure that pest control activities do not have an adverse effect on natural resources by ensure that grounds maintenance contractors comply with the IPMP section on environmentally-sensitive areas before conducting maintenance activities.

4.6.2 Bird/Animal Strike Hazard Program

Specific Concerns

- It is unclear whether the steps the City of Marina has taken to mitigate for strike hazards is consistent with Navy standards.

Current Management

BASH plans are required by the DoD for military installations where there is a potential for a conflict between military activity and wildlife (Refer to DoDI 4165.57 2 May 2011 Air Installations Compatible Use Zones, and OPNAVINST 5090.1C CH-24 (6l) dtd 18 July 2011 BASH Program). Usually BASH plans contain installation-specific guidelines to minimize collisions between aircraft and birds, such as ducks, geese, and raptors, or other animals.

Military aircraft are especially vulnerable to bird collisions because they operate at lower altitudes and higher speeds than commercial aircraft and have frequent take-offs and landings. The problem has resulted in death to pilots and crew, as well as many millions of dollars in military aircraft damage. Bird aircraft hazards vary by season, altitude, temperature, rainfall patterns, and surrounding land use. Flocking species are the most problematic. Different tactics are needed for each kind of species and generally for waterfowl flyways, migrating passerines, and local bird movements.

The Marina Municipal Airport, where the CIRPAS Marina Airport Facility is located, does not have a formalized BASH plan. In 1995, there was a memorandum of agreement to between the City of Marina and the Monterey Regional Waste Management District requiring a Bird Hazard Study prior to any expansion of the runway (Monterey County Airport Land Use Commission 1996). This study by Roberson (1997) as cited in Shedden (2009) concluded that there are no significant hazards to the aircraft of the Marina Municipal Airport caused by the Monterey Peninsula Landfill, which is nearly 7,000 feet away from the landfill. Shedden (2009) detailed the measures that the landfill takes to reduce bird activities such as operating procedures used to limit the surface area of exposed refuse, noise making propane-fired canons, elevated wire systems, visual deterrence, and falconry. In addition to bird abatement measures taken at the landfill, fencing was erected around the airport itself to keep deer off the tarmac as well as to address other security concerns.

Assessment of Current Management

NSA Monterey has determined that there is no need for the an active BASH plan for the CIRPAS Marina Airport Facility and that BASH measures taken by the airport are consistent with Navy standards.

4.6.3 Game Species

Specific Concerns

- Mule deer and wild boar are species that present an opportunity for hunting at NIROP Santa Cruz, however the military mission, as well as its relatively small size preclude any hunting on the property.
- Del Monte Lake could potentially offer fishing opportunities, however presently this option is not being considered due to management concerns as well as the present biophysical condition on the lake.

Current Management

There is no hunting or fishing permitted on NSA Monterey; there are no game species to be managed.

Assessment of Current Management

Currently there are no known negative consequences on the ecosystem function due to game animals and the prohibition of hunting at NIROP Santa Cruz. Based on the results of the 1996 surveys (Doak et al. 1996) compared to the observations of the GANDA (2011) report, the population of wild boar has decreased significantly. Levels of deer may be currently kept in check by the presence (C. Wilmers as cited in GANDA 2011) and predation of mountain lions in the area.

4.7 Data Integration, Access, and Reporting

Specific Concerns

- Currently there is no formalized natural resources data management system at NSA Monterey.
- With the recent inclusion of multiple new properties under NSA Monterey, there is a compounded need to manage and integrate data, develop access protocols, and establish data sharing relationships with regional partners.

Current Management

Currently there is no formalized data management system at NSA Monterey. Various data sets are housed by NAVFAC Southwest through the GeoReadiness Center and government contractors, however there is no single repository for all natural resources data that covers all properties of NSA Monterey. PWD at NSA Monterey has created and staffed a position to manage GIS data for NSA Monterey and ED staff are working with PWD to establish a formalized archival database.

Assessment of Current Management

The intent of developing an NSA Monterey archival database is to organize data for use by NSA Monterey natural resource staff. This is particularly important for those species that are, or may be, listed under provisions of the ESA. It is equally important to provide this information, in a usable format; to other land managers since management of

species can best be accomplished when all potential impacts are considered for a species throughout its entire range. Ecosystem-wide resource management requires mutual cooperation of regional land managers, regulators, and scientific groups and facilitates regional planning efforts towards common goals. If researchers or scientific organizations want natural resource data, they are encouraged to contact and request data from environmental program staff.

Management Strategy

Project Summary	Legal Driver	Property
Ensure GIS data and products that pertain to NSA Monterey natural resources are available to staff via a dedicated CITRIX share drive folder. Data and products that would be of general interest, such as listed species habitat areas, should be made available via GeoReadiness Explorer.	Sikes Act (as amended), EO 13423, EO 13514	All properties

Goal: Up-to-date and organized data are available to natural resources managers.

Objectives for Data Integration, Access, and Reporting

Objective: Ensure the technically sound, practical and appropriate use of library and computer technology to organize, analyze, and communicate natural resource information in support of management decisions.

I. Ensure GIS data and products that pertain to NSA Monterey natural resources are available to staff via a dedicated CITRIX share drive folder. Data and products that would be of general interest, such as listed species habitat areas, should be made available via GeoReadiness Explorer.

- *A.* Develop a plan that delineates the types of information to be included, accessible format, frequency for updating, and accessibility limits.
- *B.* Ensure that all surveys and reports that contain spatial data are submitted with an accurate and complete GIS geodatabase that meets DoD and Navy standards.

II. Participate in data sharing, technology transfer, and communication as applicable.

III. Seek standardization of the approach to communicate research and monitoring results.

IV. Continue to develop and maintain NSA Monterey's data management capabilities.

- *A.* Continue to update the GIS database by setting standards for periodic update thereby keeping GIS data current.
- *B.* Provide appropriate data to the CNDDB.

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5.0 Sustainability and Compatible Use at NSA Monterey

This Chapter summarizes natural resources management strategies from the point of view of the sustainable use of NSA Monterey's natural resources.

5.1 Sustainability of the Military Mission in the Natural Environment

EOs 13423 and 13514 state that "sustainability and sustainable mean to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations of Americans." The DoD vision of sustainability is to maintain the ability to operate into the future without decline in the mission accomplishment or in the natural and manufactured systems that support it.

Sustainability is an enabler in the performance of our mission and we must plan for and act in a sustainable manner in order to build an enduring future. Sustainability is not an individual program that belongs to the environmental or other division, rather it is a paradigm that applies to all NSA Monterey mission and program areas.

5.1.1 Integrated Military Mission and Sustainable Land Use Decisions

Background

A successfully implemented INRMP will meet two basic purposes:

1. Ensure the sustainability of natural resources at an installation; and
2. Ensure no net loss of the capability of installation lands to support the DoD mission.

Map 5-1 and Map 5-2 are *constraints maps*: locations of sensitive resources and regulatory limitations on land use. These maps are intended to show all areas on the installation where restrictions on training or mission occur due to natural resources-related issues such as listed species.

Map 5-3 and Map 5-4 are *opportunities maps*, the opposite of a constraints map. These show areas where there are little to no restrictions on the mission. The NSA Monterey mission requirements' impact on natural resources is generally limited to development and security concerns, and thus the constraints and opportunities maps are straightforward.

These maps also illustrate potential encroachment partnering areas. Partnering entities and areas include Monterey Parks Department, California Weed Management Areas, CSUMB, CNPS, and local protected areas and open space.

Current Management

Facilities and land managers effectively accommodate the growing needs of NSA Monterey's Monterey Area Properties while maintaining the natural resources it has been entrusted with.

Most of NIROP Santa Cruz's natural resources function as a safety and security buffer zone for Research, Development, Testing and Evaluation activities. Therefore, land use and a functioning ecosystem are relatively compatible. Most day-to-day activities at NIROP Santa Cruz have little potential to impact natural resources. Existing test sites are re-used, taking advantage of existing instrumentation and infrastructure and avoiding environmental costs associated with establishing new areas.

The Sikes Act (as amended) requires each installation with significant natural resources to report annually on the status of its INRMP implementation. As part of the annual INRMP review, COs must answer the following questions (ASN I&E 22 August 2006):

- Does the ED team consult with facility managers when making changes to the INRMP in order to keep it current?
- To what level do natural resources compliance requirements support the installation's ability to sustain its mission?
- Has there been a net loss of lands available for mission related activities?
- Does the INRMP process effectively consider current mission requirements?

Management Strategy

Goal: Sustainable and resilient natural resources and no net loss of current or future military value.

Objectives for an Integrated Military Mission and Sustainable Land Use Decisions

Objective: Ensure long-term and accurate data is available for adaptive management and reporting.

I. Implement a coordinated monitoring program to facilitate reporting on natural resources condition.

A. The ecosystem is resilient, functioning as much as possible independently of human intervention.

B. Maintain and improve safety and security, including safety and security buffers, for Navy property and operations.

Constraints Map for Naval Support Activity Monterey Monterey Area Properties

- NSA Monterey
- Major Roads
- Roads
- Ocean/Monterey Bay National Marine Sanctuary
- Western Snowy Plover Critical Habitat (Final 2012)
- Monterey spineflower Critical Habitat (Final 2008)
- Monterey spineflower potential habitat (Tierra Data 2010)
- Monterey Gilia potential habitat (Tierra Data 2010)
- Dune gilia (Agrichem Rare Plant Surveys 2010)
- Yadon's rein orchid (Agrichem Rare Plant Surveys 2010)
- Yadons rein orchid known sites (Tierra Data 2010)
- Yadons rein orchid potential habitat (Tierra Data 2010)
- National Wetlands Inventory Records

Wetland Assessment (Tierra Data Inc. 2011)

- Jurisdictional Non-wetland Waters of the U.S.
- Jurisdictional Wetland and Waters of the U.S.
- Mean High Water
- Discontinuous Jurisdictional Wetland
- Jurisdictional Waters of the U.S.

NOTE: This map is for informational purposes only. Specific locations and site approval should be co-ordinated through the Public Works Environmental Division.

0 0.25 0.5 Miles

0 0.5 1 Kilometers

Map 5-1 Constraints map for the Monterey area properties.

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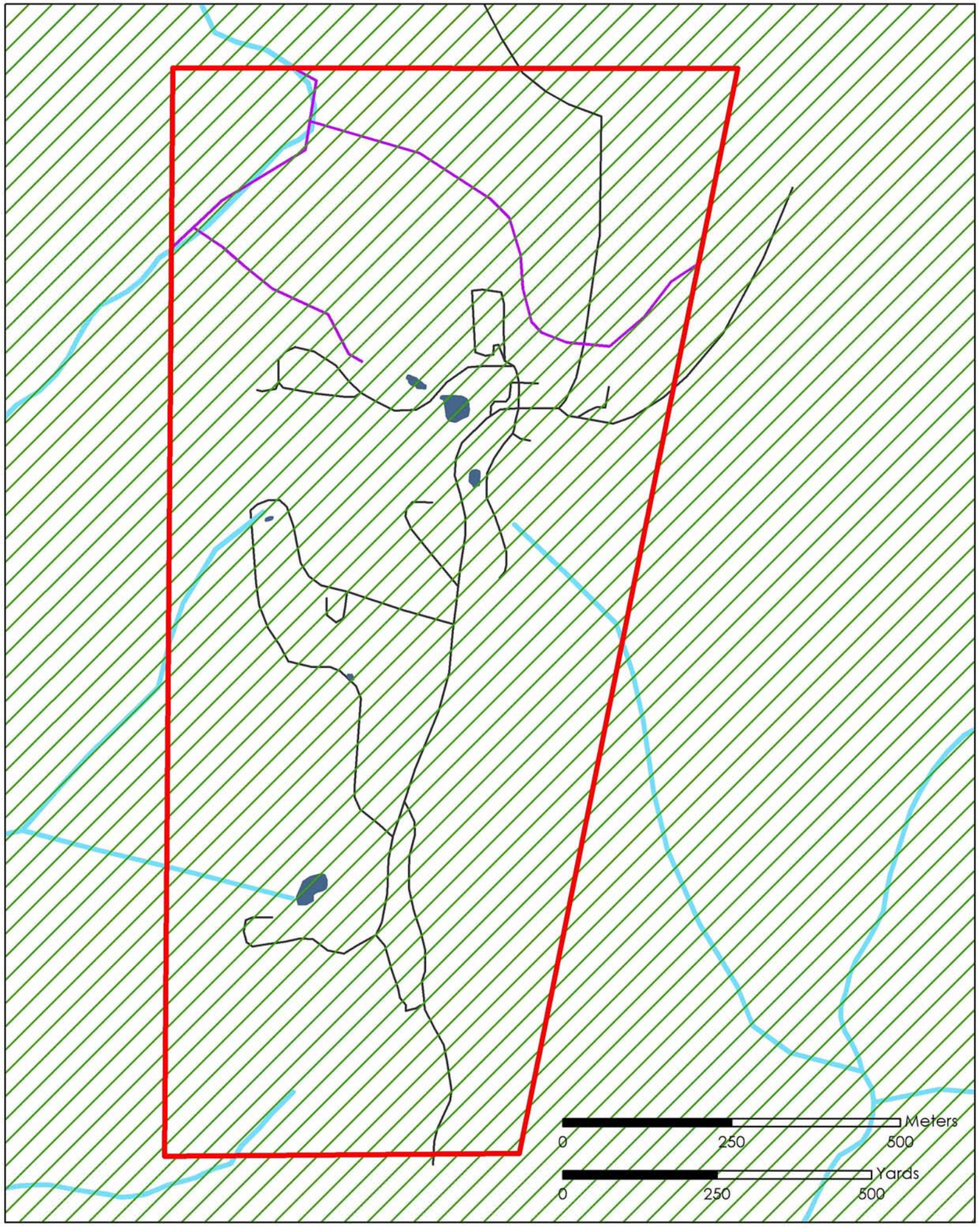
Constraints Map for Naval Support Activity Monterey Pt. Sur Facility and NIROP Santa Cruz

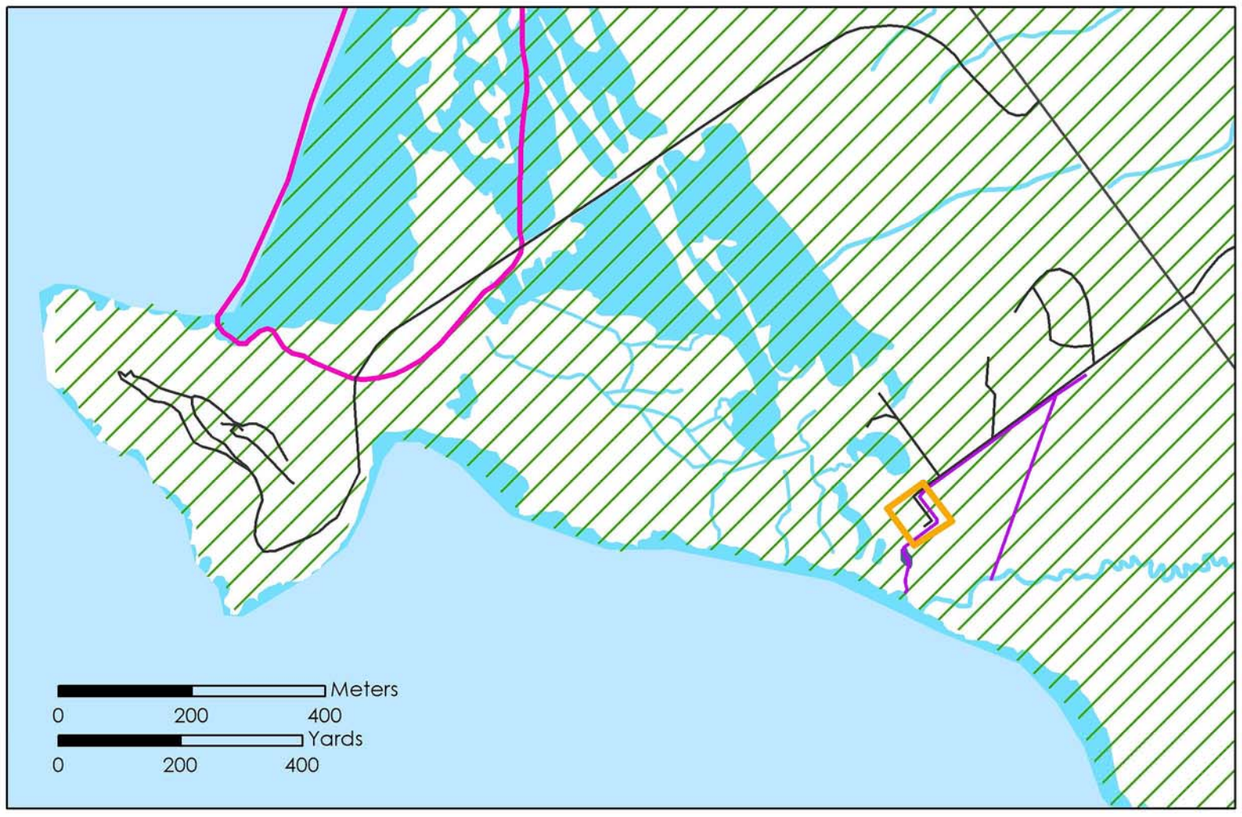
- NIROP Santa Cruz
- Point Sur Facility
- Ocean/Monterey Bay National Marine Sanctuary
- Roads
- California red-legged frog (Final 2010)
- Western Snow Plover Critical Habitat (Final 2012)
- National Wetlands Inventory Records

Wetland Assessment (Tierra Data Inc. 2011)

- Jurisdictional Non-wetland Waters of the U.S.
- Jurisdictional Wetland and Waters of the U.S.
- Mean High Water
- Discontinuous Jurisdictional Wetland
- Jurisdictional Waters of the U.S.

NOTE: This map is for informational purposes only. Specific locations and site approval should be co-ordinated through the Public Works Environmental Division.





Map 5-2 Constraints map for the NIROP Santa Cruz and the Point Sur Facility.

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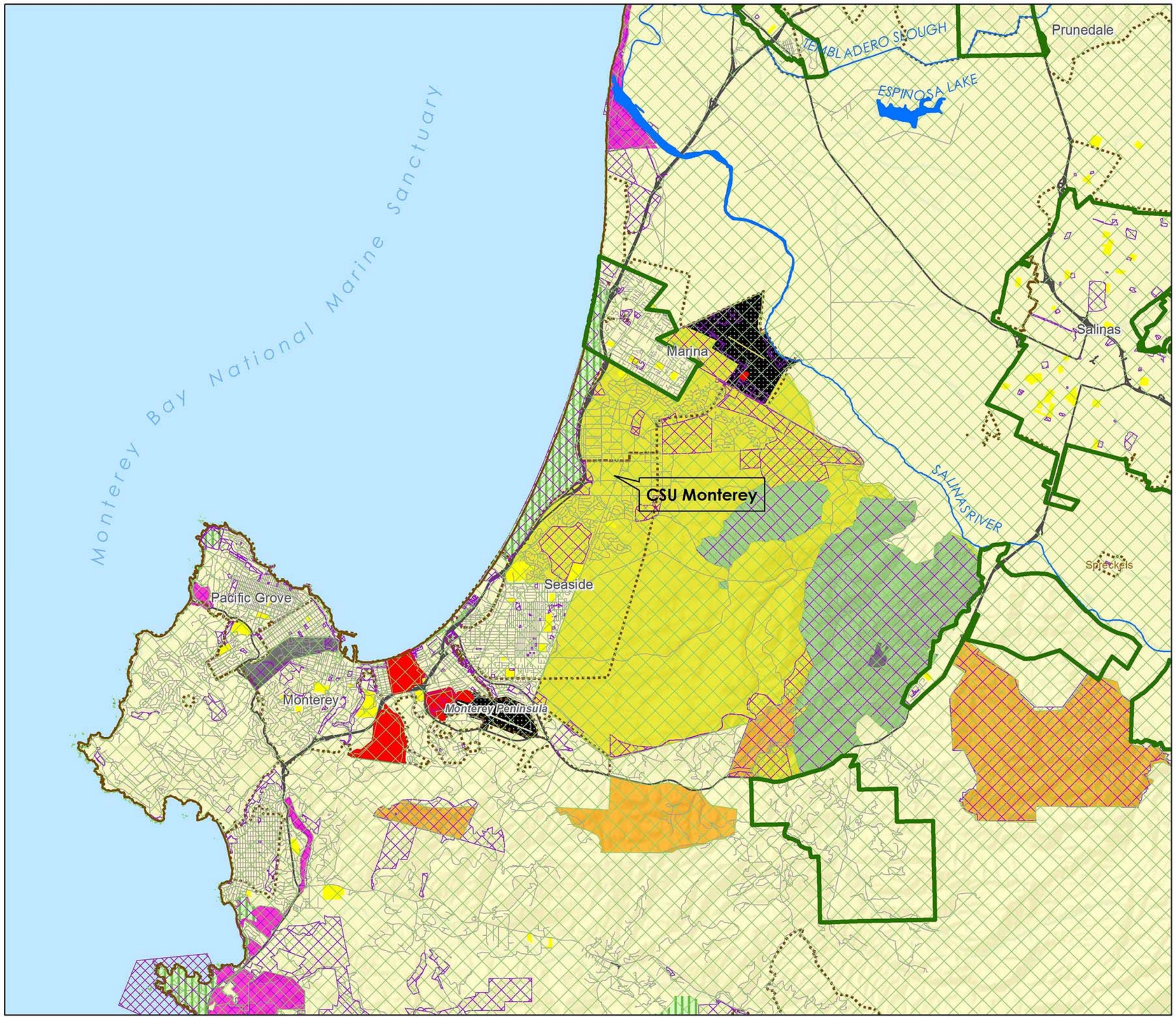
Opportunities Map for Naval Support Activity Monterey Monterey Area Properties



- NSA Monterey
- Roads
- Major Roads
- Private Water Districts
- Lakes and Rivers
- Monterey County/Weed Management Area*
- California Resources Agency Legacy Project Lands
- California Protected Areas - Open Space
- City of Monterey Boundaries
- Ocean/Monterey Bay National Marine Sanctuary (NOAA)
- Educational Institution
- Fort Ord Dunes State Park
- Airport Area

Land Ownership (BLM Data 2011)

- Unclassified Land Ownership
- California Dept. of Parks and Recreation
- County-City-Regional Parks and Preserves
- Former Fort Ord
- Monterey Presidio
- US Bureau of Land Management

*Note all of Monterey Country is designated as the, 'Monterey County War on Weeds Partnership'.

Miles
0 1 2 3 4 5

Kilometers
0 1 2 3 4 5

Map 5-3 Opportunities map for the Monterey area properties.

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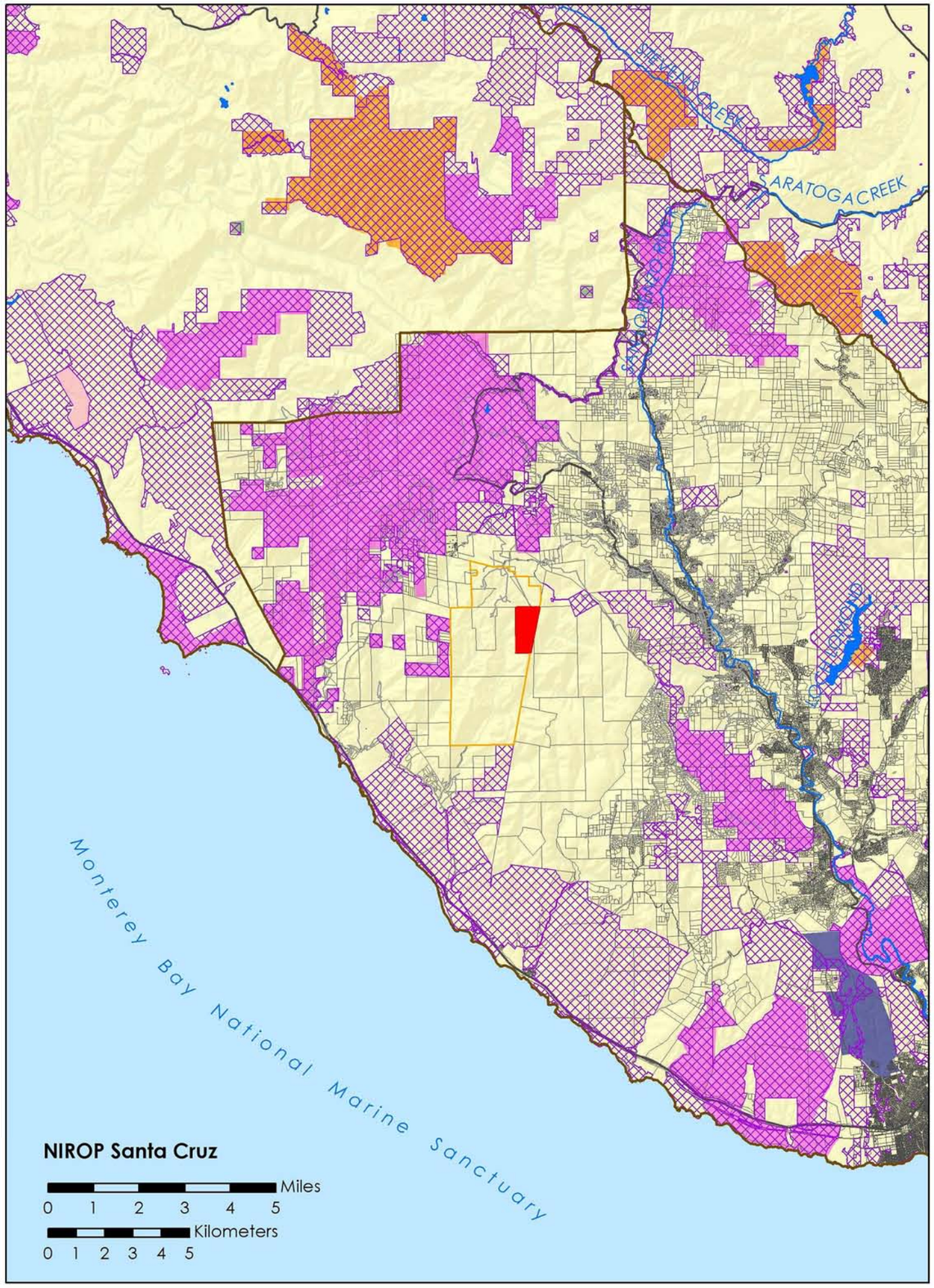

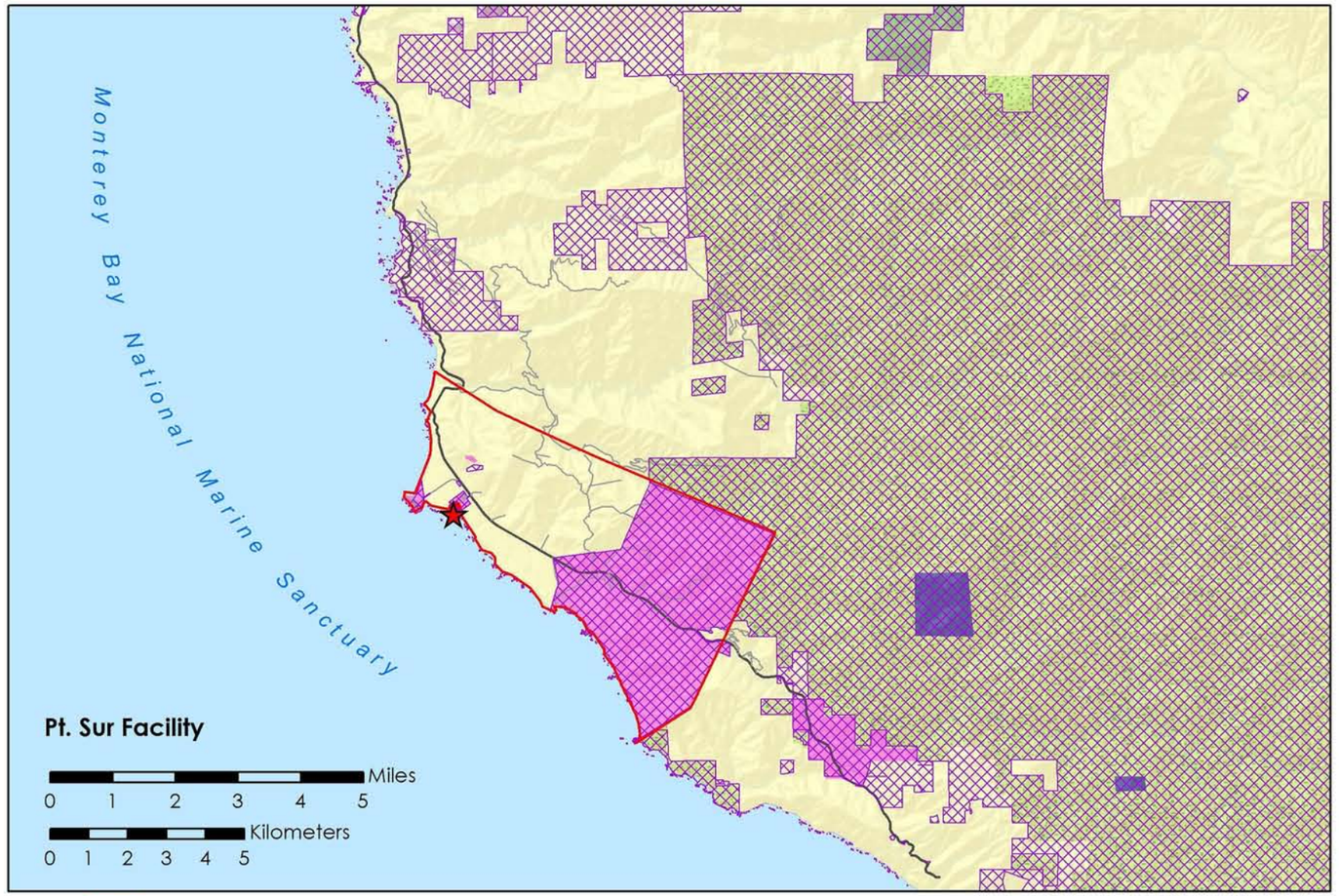

NSA Monterey
Lockheed Martin Property
Private Water Districts
Lakes and Rivers
Counties/Weed Management Area*
California Resources Agency Legacy Project Lands
California Protected Areas - Open Space
Roads
Highways
Assessors Parcels (Santa Cruz County only)
Ocean/Monterey Bay National Marine Sanctuary
El Sur Ranch

Land Ownership (BLM Data 2011)

California Dept. of Parks and Recreation
County-City-Regional Parks and Preserves
Los Padres National Forest
Other Military
State Lands--State Lands Commission
US Bureau of Land Management
Unclassified

Opportunities Map for Naval Support Activity Monterey NIROP Santa Cruz and the Point Sur Facility

*Note that all of Santa Cruz County is designated as its own weed management area. Similarly, note that all of Monterey Country is designated as the, ' 'Monterey County War on Weeds Partnership'.

Map 5-4 Opportunities map for NIROP Santa Cruz and the Point Sur Facility.

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A. Ensure that funding requirements do not hinder progressive implementation of natural resource goals that enhance military sustainability.

I. Ensure environmental documentation and compliance requirements are facilitated and not delayed.

Objective: Apply sustainability principles to the management of historic preservation, habitats, species, and ecological functions on NSA Monterey.

II. Use the NEPA process to guide decisions, document choices, analyze cumulative effects, and conserve natural and historic resources. Include NEPA coordinator in the earliest phases of project and process development.

III. Maintain high value habitats, using principles of ecosystem management and sustainability to balance goals.

A. Identify management units appropriate for the analysis of mission needs, health of natural resources, and conservation of habitats and species.

B. Establish criteria to define the relative health of each management unit, including temporal scales and appropriate sampling processes.

C. Define specific conservation areas on the installation and include GIS maps of these areas in the common installation picture.

5.1.2 Adapting to Effects of Climate Change and Regional Growth

Background

The evidence for human caused climate change is extensive and has generated consensus in the scientific community (GAO 2007; Gitay et al. 2002; and Oreskes 2004). Addressing climate change poses a new challenge for natural resources managers who will need, in addition to understanding ecosystems as they function now and in the past, to anticipate future changes in ecosystem structure and function (GAO 2007). This is a task made more difficult due to the likelihood of the emergence climates that don't have a present day analog.

Specific Concerns

- Scientific research indicates that climate change will have long-term, irreversible consequences on natural resources, including terrestrial and aquatic habitats. Native plants and animals, including special status species, may not be able to adapt or relocate quickly enough to survive.
- The CWAP (Bunn et al. 2007) identifies climate change as one of four primary stressors affecting wildlife, along with growth and development, water management conflicts, and invasive species, and makes recommendations to include climate change science in restoration work.

- Sea level rise is expected, which would increase the rate of erosion on the beach and dunes and could alter flood plain locations and frequency of flooding.
- Fire regime is expected to be altered by climate change, with warming and drying trends exacerbating the potential for full removal of the stand by wildfire. This could have a significant effect at NIROP Santa Cruz.

Current Management

NSA Monterey is still defining possible impacts from climate change and how to monitor and respond to them.

Management Strategy

Goal: A rigorous and iterative climate change management framework that maintains core ecosystem functions.

Objectives for Climate Change and Regional Growth

Objective: Adapt and mitigate the adverse impacts of climate change through annual goal setting based on science-based scenarios, targets, collaborative planning with Land Conservation Cooperatives, and adaptive management.

I. Address the anticipated shifts in species ranges and population abundances through adaptive management.

- *A.* Determine if plant community composition and productivity are as expected.
- *B.* Identify species and communities that are resilient or vulnerable to climate change impacts by conducting climate change vulnerability assessments.
- *C.* Identify data and research needs for ensuring an effective response to the consequences of climate change
- *D.* Develop a graphical depiction of the potential impacts of climate change for NSA Monterey to address anticipated shifts in species ranges and population abundances.
- *E.* Ensure that species/community conservation priorities and expenditures reflect climate change risks, such as those on the margins of their distribution patterns.

II. Identify restoration projects to adapt habitat elements for specific species which may be impacted by climate change.

III. Provide for the management of threatened, endangered, and other special status species such that changes in distribution and abundance may be understood in the context of climate change.

IV. Collaborate with the California Landscape Conservation Cooperative for the purposes of participating in regionally coordinated conservation measures.

5.1.3 Sustainability in the Built Environment

The United Nations World Commission on Environment and Development (Brundtland Commission) Report, 1987, popularized what is still the most commonly accepted definition of sustainable development:

> "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Sustainability implies a balanced relationship between natural and human systems. Sustainable development strives to achieve harmony between human development and natural systems by efficiently using the existing built environment and integrating new development with the natural context. It takes into account the full life cycle cost of a project, including broader concerns such as its effect on the environment and the community, vice just the initial financial cost.

Background

Executive Order 13514 requires each federal agency to implement high performance sustainable building design, construction, operation and management, maintenance, and deconstruction based on the Guiding Principles for Federal Leadership in High Performance and Sustainable Building (Guiding Principles). These Guiding Principles are closely related to the Leadership in Energy and Environmental Design (LEED) guidelines:

- Employ integrated design principles
- Optimize energy performance
- Protect and conserve water
- Enhance indoor environmental quality
- Reduce environmental impact of materials

Current Navy policy requires that all FY 2011 and later military construction projects achieve sustainable design and construction equivalent to, or above, LEED® Gold. In addition, NAVFAC Instruction 9830.1 requires planners, designers, and contracting officers to identify and incorporate sustainable strategies in all projects. It further tasks Resident Officers in Charge of Construction to ensure all sustainable strategies included in the design are incorporated in the construction phase. This policy prevents the loss of features during the execution of a design that may add to the initial cost of the project but decrease the life cycle cost and environmental impact.

In the case of historic buildings, the historic building policies take precedence over sustainability policies. However, renovation and repair efforts shall utilize best practices and technologies to promote resource efficiency and long-term viability of the building.

There are numerous policy and guidance documents available for sustainable planning and building. Most of these documents as well as DoD and Navy policy documents are available on the Whole Building Design Guide website.[1] NAVFAC supports the Whole Building Design Guide and considers it the primary source for sustainable development information.

Current Management

NSA Monterey documents project approval using a Site Approval Checklist that includes a section on environmental concerns. However, this checklist is generally completed and forwarded to the ED after the project scope of work is complete, which is too late to integrate environmental considerations into the project design.

In order to incorporate sustainability and environmental values into each project, is critical to employ integrated design principles. For the purposes on the INRMP, this can be satisfied by including NEPA, environmental engineering, and natural resources personnel in the design group. This could be done for many project by using a more robust checklist, routed through the ED. See Appendix L for the current Site Approval Checklist and one proposed Environmental Checklist.

Management Strategy

Goal: All major facilities and landscaping designed or retrofitted using sustainability principles.

Objectives for Sustainability in the Built Environment

Objective: Sustain natural resources and the NSA Monterey mission by supporting innovation in planning, design, project management, and implementation for development projects affecting the built environment.

I. Strengthen participation of natural resources personnel in the site and project review process. (See also Section 5.7: NEPA Compliance).

- *A.* Include a NEPA planner in project development from the earliest opportunity.
- *B.* ED should be represented at Work Induction Board and Project Initiation Meetings.

II. Ensure leadership has visibility with respect to the total cost of infrastructure and building development and redevelopment. This should incorporate climate change scenarios and the projected value of the loss of habitat.

- *A.* Natural resources asset valuation is needed to properly implement business decisions that affect resource capability (e.g. value of permitted air emissions, water quality permits, water resources availability). Identify those that sustain the mission. Assess their condition, quality, capacity, and value.

III. Use the Regional Shore Infrastructure Plan, master plan, site approval, and NEPA processes to bring interdisciplinary support to decisions early in the project planning phase that include water, air quality, engineering, and natural resources professionals.

- *A.* Ensure early project review for stormwater management, landscaping, solid waste, permitting, and construction activities.
- *B.* Expand the incorporation of sustainability principles into project scope and cost estimates, such as that reflected in DD Form 1391.
- *C.* Plan for efficient use of water through the use of natural drainage, drought tolerant landscaping, and recycling.

1. Available online at: http://www.wbdg.org.

D. Encourage landscape design that uses native vegetation and reduces or eliminates the use of pesticides, herbicides, and synthetic fertilizers.

IV. Pursue and conduct training in sustainability for engineers, construction and design professionals, contracting personnel and ED.

Objective: Conduct construction and facility maintenance in a way that allows for protection of sensitive environmental resources and the timely, cost-effective completion of environmental documentation requirements, while ensuring full accomplishment of the military mission.

I. A NPDES permit for stormwater discharges from construction activities is required for sites where one or more acres of land will be cleared, graded, excavated, or stockpiled.

A. When calculating the area of disturbance, all phases of the project shall be added together. If the total area is greater than one acre, then a construction permit is required. A project cannot be phased to avoid permit compliance or application for a permit.

B. A Storm Water Pollution Prevention Plan must be prepared prior to filing a Notice of Intent and records of site inspections must be maintained. The Storm Water Pollution Prevention Plan is kept on site and not submitted to EPA or the RWQCB unless requested.

C. The property owner (installation) must apply for coverage under EPA's General Permit for storm water discharges associated with construction activities.

D. Erosion control measures and appropriate BMPs, as required and promulgated through the Storm Water Pollution Prevention Plan and engineering designs, will be implemented before, during, and after construction activities.

E. Sealing of a previously paved area does not require a construction permit, regardless of area.

II. Promote sustainable land use by avoiding the use of undeveloped land, maintaining open space, establishing water and soil conservation areas, supporting existing natural ecosystems and endangered species habitats, and protecting floodplains.

III. Secure all appropriate permits before work commences.

IV. Consider environmental impacts in all site feasibility studies and project planning, design and construction. Appropriate conservation work and associated funding shall be included in project proposals and construction contracts and specifications.

A. Establish lay down areas where trees and other natural resources will not be affected.

B. Vehicular traffic associated with construction activities and operational support activities, including parking, will remain on established roads to the maximum extent practicable.

C. In sensitive areas construction equipment will be cleaned at temporary staging areas, in accordance with BMPs, prior to entering and departing the project corridor to minimize the spread and establishment of non-native invasive plant species.

D. Rehabilitation of construction and maintenance sites should include revegetating or the distribution of organic and geological materials (i.e. decomposed granite) over the disturbed area to reduce erosion while allowing the area to naturally vegetate.

1. Mature trees removed during construction should be replaced at a one to one ratio by the contractor unless alternative arrangements are made. Coordinate the locations for new trees with environmental and services support personnel.

2. Use native seeds or plants selected from the approved plant list in Appendix N shall to revegetate staging areas and other disturbed areas. Use site-appropriate, drought-tolerant type of seeding or sod where turf grass has been disturbed.

3. Where feasible, organic mulch such as wood chips should come from and be kept on the installation.

4. Gorilla hair or shredded-bark mulch is an appropriate mulch material for native plants.

E. The MBTA requires that federal agencies coordinate with USFWS if a construction or site activity would result in the take of a migratory bird in order to obtain applicable permits prior to construction or clearing activities. If construction or clearing activities are scheduled during nesting season (February 15 through August 31), surveys will be performed to identify active nests.

V. Design buildings to reduce bird and bat nesting potential.

A. Continue to use microfilament bird deterrent on building roofs to prevent birds (seagulls in particular) from nesting or defecating on them.

B. Select light fixtures to prevent bird nesting or roosting.

VI. Avoid the use of outdoor broadcast lighting. Downward focused lighting decreases light pollution, minimizes impacts to nocturnal wildlife, and can save energy.

A. “Night sky compliant” lighting has been certified to meet these requirements to some extent.

B. As lighting reaches the end of its life cycle or where retrofits or renovations allow, use focused outdoor lighting.

5.2 Beneficial Partnerships and Collaborative Resources Planning

Background

Cooperative management of NSA Monterey natural resources is required under the Sikes Act (as amended). The USFWS and CDFW have a statutory obligation to review and coordinate on INRMPs. Recognizing this core, three-way partnership in preparing, reviewing, and implementing INRMPs among the DoD, U.S. Department of the Interior, USFWS, and state fish and wildlife agencies, a Tripartite Agreement was signed in January 2006. The CDFW and other state fish and wildlife agencies were represented by the International Association of Fish and Wildlife Agencies. The desire is for "synchronization of INRMPs with

existing fish and wildlife service and state natural resource management plans" and "mutually agreed-upon fish and wildlife service conservation objectives to satisfy the goals of the Sikes Act."

The Sikes Act (as amended) provides a mechanism whereby the DoD, U.S. Department of the Interior, and host states cooperate to plan, maintain, and manage fish and wildlife on military installations. Sikes Act provisions and cooperative agreements for outdoor recreation, such as for hunting and fishing, are implemented nationally by an MOU between the DoD and U.S. Department of the Interior. The Sikes Act (as amended) no longer requires a Cooperative Agreement with the USFWS or CDFW as a separate document; however, the DoD 17 May 2005 guidance states that joint review should be reflected in a memo or letters.

The Navy policy calls for its installations to expand involvement in regional ecosystem planning, management, and restoration initiatives. Establishing cooperative planning efforts with surrounding land agencies and individuals will benefit NSA Monterey natural resources and those of the entire region. Cooperative planning can also reduce the costs of actions that require management across boundaries such as biological monitoring.

Currently, NSA Monterey maintains partnerships with the following entities:

- CSUMB - Students from CSUMB intern in the ED at NSA Monterey to gain experience in their fields of study. Students aid in fieldwork and natural resources planning. Professors at CSUMB are encouraged to utilize NSA Monterey property, particularly Del Monte Lake and the Dune/Research Area, for educational and research projects. Recent projects include establishing test plots for long-term weed control and native plant restoration on the dunes and periodic lake water testing by undergraduate students for comparison to the water quality in similar lakes in the area.
- Southern Monterey Bay Coastal Erosion Workgroup - This workgroup includes NOAA MBNMS, Monterey County, and coastal cities. The workgroup has developed reports such as the Sea Level Rise Coastal Hazards Evaluation for the southern Monterey Bay littoral cell. This work was funded by grants from state agencies. The study showed high erosion for NSA Monterey beach property.

Regulatory partners include:

- USFWS Ecological Services
- USACE
- California Coastal Commission

Management Strategy

Goal: Participation in collaborative planning efforts with relevant state and federal agencies.

Objectives for Partnerships and Collaborative Resources Planning

Objective: Be proactive in cooperative resources planning partnerships to create regional conservation, ecosystem-based solutions of mutual benefit while protecting the military mission.

I. Continue to participate in conservation and encroachment planning.

II. Participate in regional conservation and ecosystem planning efforts, in collaboration with other government agencies.

- *A.* Ensure NSA Monterey involvement on the following criteria:
  - *1.* Evaluation of agreements that may encumber land or resources now or in the future. Emphasize the critical importance of ensuring continuation of the military mission and its unique attributes which cannot be replaced.
  - *2.* Evaluation of the potential benefits to NSA Monterey natural resources.
- *B.* Promote development of the best available scientific and field-tested information for use in land management decisions.
- *C.* Support Navy and USFWS partnering efforts through active participation.
- *D.* Become a nonbinding partner in regional conservation planning efforts, such as Landscape Conservation Cooperatives.

III. Seek planning partnerships for invasive species and feral animal removal with adjacent landowners if compatible with mission activities.

IV. Consult with USFWS and CDFW at least annually to fulfill Sikes Act provisions and related inter-agency cooperative agreements.

- *A.* Ensure compatibility with INRMP goals, objectives, and policies as well as internal consistency in future inter-agency agreements and plans.
- *B.* Involve state and federal resources agencies in the implementation of INRMP objectives and policies when practicable.
- *C.* Promote information sharing and scientifically-based, coordinated data collection and management planning.
- *D.* Support CWAP goals and objectives.
- *E.* Support USFWS regional goals such as habitat conservation planning.
- *F.* Discuss and finalize annual INRMP metrics for the installation.

5.3 Outdoor Recreation

Background

The Sikes Act (as amended) and 5090.1C CH-1 require Navy installations to provide outdoor recreation and interpretive opportunities to the public where and when it is compatible with military safety and security needs. Outdoor recreation activities are intended to support the stewardship of DoD's natural resources (See also Section 5.4: Environmental Education and Public Outreach).

Specific Concerns

- The trails on Main Grounds at NSA Monterey are located along the edge of the property and sometimes require users to jog or walk on streets in order to access all areas of the installation. There are currently no signs along the jogging trail.
- The RV park in the Laboratory/Recreation area may not be compatible with use of the laboratories there. There is a need to evaluate if the RV park should be decommissioned, relocated or managed in another way to make it more compatible.
- Public use of the Dune/Research Area is not well controlled, potentially causing damage to special status species.

Current Management

Public recreation is permitted on the Dune/Research Area and the Laboratory/Recreation Area. Outdoor recreation on the Main Grounds is restricted to personnel with base access.

Management Strategy

Goal: Recreational opportunities are routinely used and match user preferences.

Objectives for Outdoor Recreation

Objective: Promote compatible, sustainable outdoor recreation opportunities to enhance quality of life for military personnel and the visiting public while conserving natural resources and without compromising the military mission.

I. Identify and evaluate suitable outdoor recreation opportunities for installation personnel.
   A. In concert with MWR, conduct a survey of personnel for recreational opportunities.

II. Develop a set route for trails throughout the Main Grounds.
   A. Install signs along the trail course that indicate distances.
   B. Consider message boxes for posting educational materials that explain natural and historic resources observed along the trail and which also highlight natural resource management actions.

III. Provide, where possible and compatible with the mission, access for disabled American veterans, military dependents with disabilities, and other persons with disabilities.

IV. Develop a recreation plan and development goals for appropriate public use of the Dune/Research Area.
   A. Conduct consultation with USFWS on any actions that may impact listed species.
   B. Clearly mark appropriate paths and entrances to the property.
   C. Use solid fencing and permanent signage to block non-approved walkways through dunes.
   D. Provide clear directions to beach access points from parking areas.
   E. Clearly mark entrances to dunes with rules and maps of accessible areas.

F. Use temporary or permanent fencing to guide foot traffic.

G. Develop and post interpretive signage to highlight the natural resource and NSA Monterey conservation efforts.

H. Consider developing a nature walk or tour at the Dune/Research Area. Focus elements of such a tour could include ecological significance of the dune habitat, native birds and plant species, and examples of NSA Monterey natural resource management activities.

5.4 Environmental Education and Public Outreach

Background

DoD policy encourages outreach and environmental education for the public and for DoD personnel when it comes to natural resource management on Navy installations. The DoDI 4715.03 states that the "DoD shall engage in public awareness and outreach programs to educate DoD personnel and the public regarding the resources on military lands and DoD efforts to conserve those resources" and further emphasizes that a "conservation ethic [be] integrated throughout DoD through education, training, and awareness programs."

Educational programs and information are widely varied and inclusive of students, faculty, staff, administrators, residents, contractors, visitors, and the community at large. Content focuses not only on natural resources, but also sustainability issues and historical and cultural elements unique to the Monterey Area Properties. Programs currently in place include the following:

- The Public Affairs Office sponsors tours of the botanical or historical features such as the gardens, non-native tree specimens, and buildings on the Main Grounds.
- A volunteer assistance program for maintaining the gardens on the Main Grounds promotes understanding and awareness of the landscape management program. For example, the local succulent society performs maintenance for the Arizona Garden at the Main Grounds.
- Alternative modes of transportation are encouraged. A public recreation path along Del Monte Avenue facilitates bicycle and pedestrian commuting to the campus. Additional facilities to encourage the alternative transportation are bike shelters, pedestrian kiosks, and employee showers. The use of public transportation is also encouraged. The Housing and Public Affairs Offices distribute information about the public transportation routes and schedules.
- A sign is placed at the entrance to La Mesa Village to encourage awareness of the current fire hazard.
- An installation-wide recycling program promotes the recycling of materials.
- The dune revegetation project has been recognized as a Coastal America Partnership project and success story.

The Earth Day celebration at NSA Monterey in 2011 included environmental pamphlets and literature as well as informational posters explaining the installation's recycling program, energy saving projects and other natural resource management programs. Interactive activities included an area for participants to turn in e-waste, building of a bat house to be installed near Del Monte Lake, and demonstrations of solar panels and an energy management system.

Management Strategy

Goal: Effective public outreach and environmental education program.

Objectives for Environmental Education and Public Outreach

Objective: Promote an environmental awareness and resource conservation ethic through natural resource education programming, volunteer opportunities, and distribution of NSA environmental and sustainability information for the public and installation personnel.

I. Improve existing programs for public outreach and education on natural resources values.

- *A.* Invite natural resource groups to Earth Day and other activities.
- *B.* Consider setting up an informational booth for NSA Monterey natural resources and sustainability programs and achievements during the Memorial Day and Labor Day activities on the installation. Activities could also include interpretive nature walks.

II. Encourage public participation in natural resource management activities at NSA Monterey through partnerships with volunteers and volunteer groups.

- *A.* Continue to support current volunteer programs on the installation including those that maintain historically and ecologically significant vegetation in the gardens on the Main Grounds.
- *B.* Maintain a relationship with local Boy Scout and Girl Scout troops and seek opportunities to engage them in both environmental education and volunteer projects at NSA Monterey. In the recent past, a local Boy Scout troop built a walking path at NSA Monterey with materials provided by the installation.

III. Seek opportunities to invite local educational institutions to participate in natural resource programs and projects at NSA Monterey.

- *A.* Offer NPS student Enrichment Week activities that focus on natural resource management and sustainability topics relevant to Naval officers and the Navy mission.
- *B.* Consider expanding the practice of hosting field trips to classes from the regional, focusing on natural resource activities on the installation.
- *C.* Seek opportunities to partner with nearby educational institutions to participate in natural resource management activities at NSA Monterey.

1. Local high school students are required to perform a number of community service hours, which could be satisfied through natural resource management activities at the installation. Contact local high schools to provide contact and project information.
2. Projects and research conducted by local university students could be targeted toward natural resource management and sustainability challenges or related unanswered questions on the installation.

D. Maintain a list of installation-based research projects that NSA Monterey would welcome assistance with from local researchers and students. Use this list as a start when to developing mutually beneficial projects at NSA Monterey properties.

E. Maintain a database of completed projects and research results for NSA Monterey properties.

1. Make natural resource management and sustainability information resulting from programming and public outreach available to the public and installation personnel.
2. Promote natural resource management and sustainability programs and initiatives at NSA Monterey on the installation's public website (See Section 5.4: Environmental Education and Public Outreach), in coordination with the Public Affairs Office.

IV. Ensure that NSA Monterey personnel, contractors and decision-makers have adequate natural resource management information and training relevant to their job or role on the installation to ensure compliance with natural resources conservation policies (See also Section 5.10: Training of Natural Resource Management Personnel).

V. Develop and provide interpretive signage and materials for areas that may be of interest for wildlife viewing, nature trails and other outdoor spaces valuable for outdoor recreation activities and enjoyment (See also Section 5.3: Outdoor Recreation).

5.5 Public Access

Background

DoDD 4715.03, Natural Resources Conservation Program, 18 March 2011, states:

> "The principal purpose of DoD lands and waters is to support mission-related activities. Those lands and waters shall be made available to the public for educational or recreational use of natural and cultural resources when such access is compatible with military mission activities, ecosystem sustainability, and other considerations such as security, safety, and fiscal soundness. Opportunities for such access shall be equitably and impartially allocated." Navy guidance 5090.1C CH-1 states, "Military lands will be available to the public and DoD employees for enjoyment and use of natural resources, except when a specific determination has been made that a military mission prevents such access for safety or security reasons, or that the natural resources will not support such usage."

DoDI 4715.03 (18 March 2011) further specifies that INRMPs shall describe areas and conditions appropriate for public access, and that:

1. Federal or state conservation officials shall be given access to DoD-controlled natural resources to conduct official business pursuant to applicable requirements of laws and regulations (e.g. section 1531 of the Sikes Act [as amended]) and an installation's operational, security, and safety policies and procedures.
2. Military installations shall ensure, where practicable and when not in conflict with mission objectives or the INRMP, that active and retired military service members and disabled veterans have access to its lands and waters for hunting, fishing, and non-consumptive use of wildlife.
3. Members of Native American, Native Hawaiian, Alaska Native tribes, bands, nations, pueblos, villages, or communities may have access to DoD sites and resources that are of religious importance, or that are important to the continuance of their cultures consistent with the military mission, EO 13007 (Reference [ao]), appropriate laws and regulations, and subject to safety and security. Members of federally recognized Indian tribes, Alaska Natives, and Native Hawaiian organizations shall also have access to installations for the purposes of non-commercial gathering of botanical and mineral resources for traditional cultural use.
4. Opportunities for public access shall be equitably and impartially allocated consistent with the parameters outlined within DoDI 4715.03.

Current Management

Special events at the Main Grounds often bring large numbers of the public onto the property, which is encouraged. The public can also access the Main Grounds by volunteering to help maintain the gardens or by participating in other targeted programming for specific groups.

Most of the Laboratory/Recreation Area is open to the public, subject to military safety and security requirements and the capability of natural and cultural resources to withstand user impacts. Military and government personnel, their families, and guests also have access to the RV park at Laboratory/Recreation Area.

Public access at the Dune/Research Area is confined to the boardwalk, the beach and roadways in the dunes.

All other NSA Monterey properties are closed to public access for safety and security reasons.

Consistent with the Sikes Act (as amended), when planning for public access NSA Monterey makes considerations for disabled American veterans, military dependents with disabilities, and other persons with disabilities to the extent reasonably practicable and when not in conflict with the military mission.

Management Strategy

Goal: Efficient public access at the Dune/Research Area and Lab/Recreation Area that also protects natural resources.

Objectives for Public Access

Objective: Provide opportunities for public engagement via public access to NSA Monterey properties such that it does not conflict with the military mission, safety and security, and sensitive natural and cultural resource management.

I. Continue to limit public access to NSA Monterey properties, or portions of them, for reasons that include:
- General security and liability issues
- Presence of federally endangered and threatened species
- Fire safety
- Safety and security concerns
- Cultural resource concerns

II. To comply with DoDI 4715.03, continue to grant access to NSA Monterey properties, or portions of them, to qualified individuals as warranted, including:

A. Federal or state conservation officials related to DoD-controlled natural resources and applicable requirements of laws and regulations (See also Section 5.8: Natural Resources Consultation Planning);

B. Military Service members, retired or active, and their families and guests, for outdoor recreation and non-consumptive uses of wildlife;

C. Members of Native American communities for access to sites or resources that are of religious importance or their culture, and for non-commercial gathering of botanical and mineral resources for traditional cultural use.

III. Implement and maintain a public website to explain public access opportunities and events, in collaboration with the Cultural Resources program, and Public Relations personnel.

IV. As appropriate with the mission and to the extent practical, support access for disabled American veterans, military dependents with disabilities, and other persons with disabilities.

5.6 Integrating Other Plans

5.6.1 Integrated Cultural Resource Management Plan

The current ICRMP recommendations include providing provisions for archaeological curation, cultural resources training, developing and administering a programmatic agreement for the Main Grounds.

The management of natural resources by the ED staff is coordinated with the cultural resources specialist to ensure proper and efficient management of both resources.[2] In the event that sustainability goals or practices are in conflict with historic building policies, the historic protection policies take precedence. However, if historic requirements conflict with natural resource requirements, the policy that takes precedence will be determined on a case by case basis and in concert with legal counsel and/or responsible agency.

5.6.2 Integrated Pest Management Plan

The IPMP is a comprehensive, long-range document that captures all the pest management and pesticide-related activities conducted on NSA Monterey.

The IPMP focuses on Integrated Pest Management in order to decrease the use of chemical pesticides used and related impacts on natural resources. There are specific guidelines on natural resources protection action to be taken during pest management operations. The IPMP documents locations of sensitive species and restrictions that apply to each area.

5.6.3 Stormwater Management Plan

Beginning in 2011, Navy and DoD policies (16 November 2007 and 19 January 2010, respectively) require implementation of LID strategies for stormwater management for federal facilities as mandated by the EISA Section 438 (42 USC § 17094) and the updated United Facilities Criteria 3-210-10, Low Impact Development (15 November 2010).

The EISA requires that projects on federal property that disturb over 5,000 square feet must "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow." The design objective for LID implementation is that the LID features incorporated are capable of managing the total volume of rainfall from the 95th percentile rain event.[3]

2. The NSA Monterey ICRMP (SWCA Environmental Consultants 2011) states the following with respect to potential effects on cultural resources:

   "In accordance with NHPA, a qualified individual will determine and document the Area of Potential Effects (APE) for future projects when there is potential to directly or indirectly cause alterations to historic properties. In accordance with standard practices, construction, maintenance, repair, or renovation of buildings or structures located more than 100 meters from a listed or eligible historic district, building, or structure, the APE will be limited to the project site and any lay-down or staging areas. When such projects occur within 100 m of a listed or eligible historic district, the APE will be defined to include the entire district boundary in order to evaluate the effect of the project on the whole district.

   For projects involving ground-disturbing activities, the APE will include the planned area of surface and subsurface disturbance, including any associated lay-down or staging area and a 30-meter buffer around the ground disturbance area. If any part of a known archaeological site falls within the APE, the entire documented site will be included in the APE and the project may be subject to monitoring during ground disturbance. Monitoring is required only when it is expected that the project will affect the site, adversely or not adversely, or when stipulated in consultation. In such instances, a monitoring and discovery plan will be prepared, which would contain some degree of a research design to guide any data recovery required. Consultation with the State Historic Preservation Officer (SHPO) and other consulting parties will be conducted before such work is carried out. APEs will not include potential visual or acoustic effects on known or potential archaeological resources except in the relevant vicinity of National Register–eligible or listed Native American religious or cultural sites."
3. "The 95th percentile rain event represents a precipitation amount which 95 percent of all rainfall events for the period of record do not exceed" (EPA Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act, December 2009).

The Navy policy further directs that "LID be considered in the design for all projects that have a storm water management element."

The NSA Monterey Stormwater Management Plan needs to be updated, and should compliment the sustainable development, wetlands, and water resource portions of this INRMP.

5.6.4 Installation Appearance Plan

The Installation Appearance Plan (IAP) (DeLorenzo 2008) is the official direction for designing, developing and reviewing all installation construction and renovation projects at NSA Monterey. The IAP provides aesthetic and functional direction for new development and renovation efforts, and it helps to protect and preserve the Installation's natural and historic resources. Natural resource management potentially affected by the IAP include, but are not limited to, landscaping and the development of interpretive and proscriptive signage.

5.6.5 Installation Restoration Plan

There are currently no IR sites on NSA Monterey. This IAP has a two-fold purpose.

5.7 NEPA Compliance

Background

NEPA requires federal agencies to assess, in detail, the potential environmental impacts of their actions that could significantly affect the environment. The NEPA is intended to help decision makers make informed decisions based on an understanding of environmental consequences, as well as involve the public in the process. Though NEPA requires consideration of more than the natural environment, NEPA provides planners with a process to identify and assess natural resource impacts requiring mitigation or avoidance.

The NEPA requires an analysis of whether a major federal action will result in a "significant" environmental impact. The process requires the analysis of all reasonable alternatives to the proposed action, but does not require the selection of the least damaging alternative. Individual and cumulative impacts must be considered. The NEPA process must be documented using one of the following:

1. Record of Categorical Exclusion: Categorical Exclusions are actions that the Navy and EPA have agreed do not have a significant effect on the human environment and therefore do not require preparation of an Environmental Assessment (EA) or Environmental Impact Statement (EIS).
2. An EA is the analysis to be completed when the government is uncertain as to whether an action will significantly affect the environment or whether the action is controversial; the result of

an EA is either a Finding of No Significant Impact (FONSI) or a requirement to complete an EIS. In practice, an EA is prepared when a FONSI is a near certainty.

3. An EIS is a full disclosure document that presents a full and complete discussion of significant impacts. An EIS informs the public and decision makers of reasonable alternatives to the proposed action.

An important component of NEPA is the requirement for public participation in the decision-making process. Federal agencies are to encourage and facilitate public involvement through a scoping and environmental review process. The requirements for public involvement differ between an EA and an EIS in that for EIS-level assessments, the process must meet formal requirements specified in the regulations that implement NEPA.

Specific Concerns

The point at which the NSA Monterey ED reviews projects in their development process is highly variable. Ideally, their review would occur when the project is approximately 30 percent developed, at which point the proponents begin discussing project details.

There is an opportunity to encourage earlier collaboration between project proponents and the ED through the use of an Environmental Checklist. The checklist would increase consistency of project environmental review by: (a) helping to anticipate the level of assessment (NEPA) required and natural resource issues that may arise, and (b) providing an opportunity for ED staff to ensure compliance with Navy sustainability mandates (See Section 5.1: Sustainability of the Military Mission in the Natural Environment) and to recommend actions to improve a project's long-term environmental performance. The checklist can also be applied to renovation and maintenance projects to identify feasible updates that would bring older structures into compliance with Navy sustainability goals.

5.8 Natural Resources Consultation Planning

Background

Section 7(a)(2) of the ESA requires federal agencies to insure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of a listed species or destroy or adversely modify their designated Critical Habitat. This is done through consultation with, and with the assistance from, the Secretary of Interior (through the USFWS) to emphasize identification and resolution of potential species conflicts in the early stages of project planning. The BO is the product of this interagency consultation pursuant to Section 7(a)(2) of the ESA and is covered in the implementing regulations published in 50 CFR Part 402.

Informal consultation is an optional process between the USFWS and the action agency to determine whether a formal consultation is needed. It provides an opportunity for discussion of ways to modify the action to reduce or remove adverse effects to the species or Critical Habitat. Based on the best scientific and commercial data available, the agency determines the effects on listed species and Critical Habitat. It concludes when a determination of no effect is made, when the USFWS concurs with a "not likely to adversely affect" determination, or when the agency initiates formal consultation.

Formal consultation is needed when the action agency determines, through informal consultation or a biological assessment, that the action will affect the listed species or Critical Habitat. It begins with the federal agency's written request for consultation under Section 7(a)(2) of the ESA, and concludes with the USFWS issuing a BO under Section 7(b)(3) of the ESA. No consultation is needed when the proposed action falls under an existing BO or if there is no listed species or designated Critical Habitat within the proposed action area.

Consultation strategy should be designed to avoid military mission delay or impairment. For this reason it should be designed as programmatically and comprehensively as possible.

Specific Concerns

- Critical Habitat is designated on NSA Monterey for the California red-legged frog.
- Three federally plant listed species are known to known to occur at NSA Monterey: Yadon's rein orchid, the Monterey spineflower, and the Monterey gilia.

Current Management

NSA Monterey native plant communities support the federally endangered plant species Yadon's rein orchid and Monterey gilia, as well as the federally threatened Monterey spineflower. In 2001, NSA Monterey initiated a Section 7 Consultation with the USFWS to discuss potential management measures that would conserve and protect these species and, simultaneously, allow NSA to support the U.S. Navy mission. Consistent with the conservation recommendations of the 01 July 2001 BO (1-8-01-F-29) issued by the USFWS, and the 2001 Monterey INRMP, the installation has been undertaking: (1) population status monitoring of endangered and threatened plants; (2) removal of invasive plants; and (3) restoration of native plant communities (see also Section 4.5.1: Threatened and Endangered Species and Critical Habitat).

Two NSA Monterey properties contain Critical Habitat for the California red-legged frog, designated in 2010. California red-legged frog is only known to occur at the Point Sur Facility; however, any actions that may affect Critical Habitat will require consultation with the USFWS. NSA Monterey currently does not have a BO focused on management measures and conservation recommendations for the Critical Habitat of this species.

Currently there are no species present at NSA Monterey proposed for listing.

A resource that can be used is the ESA Section 7 Consultation Handbook (USFWS and NMFS 1998).

Management Strategy

Goal: Efficient and effective development and implementation of mitigation and enhancement projects.

Objectives for Natural Resource Consultation Planning

Objective: Streamline natural resources consultation through clear communication of regulatory requirements. Collaborate with project proponents to plan mitigation and conservation measures to avoid or minimize effects on natural resources first, then "rectify, reduce, eliminate, or compensate for the impact" of unavoidable effects (Council on Environmental Quality [CEQ] 1978).

I. Use this INRMP as an initial screen for review of projects proposed on the installation from both Navy and outside interests.

II. In order to avoid military mission delay or impairment, consultation should be approached as programmatically and comprehensively as possible.

III. Improve the success of mitigation and enhancement projects based on regulatory, functional, and ecosystem criteria by using: performance work statements (do what and by what standard, by whom and with what money); project lists (one-time projects); and standardized scopes of work for recurring work.

IV. Standard Mitigation Measures. The following mitigation measures should be planned for proposed actions as appropriate:

A. Avoidance and Minimization First. Proposed actions must include impact avoidance and minimization measures. Once avoidance has been implemented to its fullest extent, remaining impacts should be minimized prior to consideration of off-site compensation for damaged resources as a last resort. This must be the first step in the mitigation planning process because regulatory authorizations require demonstration of maximum impact avoidance and minimization before authorization may be given. Possible measures include: worker environmental protection briefings, signs, markers, protective fencing, biological monitoring, erosion and sedimentation prevention, noise baffling, and temporary impact restoration. These should be included as part of the environmental protection plan for all standard operating procedures during planning.

B. Survey Buffers. When making presence/absence determinations relative to a project, buffer areas where indirect effects may affect species must be considered as well. If a habitat is used by a species for some important part of their life cycle, it is considered occupied regardless of the presence of the species at any one time. Corridors for animal movement, such as drainages and roads, are important considerations.

C. Use of a Qualified Biological Monitor. A biological monitor or qualified biologist should be retained, in coordination with the natural resources biologists, to educate workers, oversee and implement impact avoidance and minimization, document impacts, and guide revegetation efforts for all proposed actions that require active avoidance or actually will affect threatened or endangered species, wetlands, require active revegetation, or habitat compensation.

D. Breeding Season Avoidance. On NSA Monterey, all but three birds are covered under the MBTA (rock doves, European starlings, and house sparrows). Planners must review proposed actions with regard to conduct of actions during the active breeding season (can be January - September) and project caused loss of traditionally used nesting/roosting sites. Habitat clearing activities should be timed to avoid the breeding season to maximum extent practicable to avoid damage to active bird nests. All contracts and work orders prepared for NSA Monterey must include provisions in the Environmental Protection section which prohibit harming, damage, or destruction of active bird nests while requiring "work arounds." Navy Contracts Specialists can provide such language.

E. Restoration Plans to be Completed in Advance. All actions that require active habitat restoration, enhancement, and/or compensation must have an appropriate plan developed prior to implementation. Such plans must discuss the site conditions, methods to be implemented, monitoring and maintenance (usually three-five years), success criteria, remedial actions if expected success is not being achieved, and reporting requirements.

F. Seasonal Avoidance Measures for Facilities Projects. During the active growing and breeding season, species and habitats are more sensitive to harm, harassment, or damage. Any seasonal restrictions must be in accordance with mission requirements and compatibility.

G. Phasing of Work. Often, careful planning can show that impacts to the differing resources can be phased or avoided. To assist project planners, a schedule of sensitivity periods will help.

H. Tracking Mitigation. Develop a master list that includes all environmental agreements, including NEPA projects, Army Corps permits, and BOs. This master list should: (1) identify all requirements and restrictions associated with these agreements, and (2) document all progress made to comply with these agreements until project completion.

5.9 Landscaping and Grounds Maintenance

Background

Grounds maintenance for the Main Grounds and Annex is under contract and evaluated periodically using the Functional Assessment Plan for grounds maintenance and landscaping. This is an instrument by which changes can be made to maintenance procedures that would be consistent with this INRMP.

Stewardship requirements of the historical gardens (described in Chapter 2) must be reconciled with legal drivers, including the Sikes Act (as amended), 5090.1C CH-1, NAVFAC P-73, CWA Section 404, EO 13423, and EO 13514. These requirements cover both maintenance of the existing landscape and development of new landscapes. They also intersect with sustainability, storm water runoff and climate change concerns.

Specific Concerns

- Water is the dominate natural resource impacted by landscaping. Monterey is positioned to be a leader in the efficient collection and storage of storm water for re-use as irrigation water. In light of both sustainability and climate change scenarios, water will become an even more pressing concern over the next 20-30 years.
- The golf course is a major consumer of water and chemical inputs. Best practices already published should be monitored regularly. In addition, irrigation delivery systems should be upgraded to the highest level of water conservation.
- NSA Monterey needs to determine responsibility for the forest surrounding La Mesa Village.
- The current maintenance has been described as "mow and blow", a phrase that negatively connotes routine practices implemented with little background knowledge.
- Concern has been expressed about pruning of shrubs vs. shearing.
- Care needs to be taken to tailor irrigation practices with plantings.
- The MBTA restricts certain landscaping and tree maintenance activities during the breeding season for migratory birds.

Current Management

Coast live oaks near the engineering quad, Menneken Loop, and Stanley Grove show signs of stress due to over-irrigation. Stress is manifested by the abundant presence of damage from oak twig borer and powdery mildew on new growth forced during the normally dry season. Over-irrigation may also cause deleterious root diseases that manifest slowly over time. No periodic treatment for the control of sudden oak death syndrome is conducted. Mature Monterey pine and Monterey cypress trees are also present, and are similarly affected by dry season irrigation, whereby fungal growth is promoted by summer heat and enhanced watering.

Ponds on the golf course receive the runoff from irrigation. These ponds are used for water retention only and algaecides are used as needed. Other vegetation is removed as it occurs to maintain a clean bank.

Adequate guidance for maintenance BMPs are already available and provide standards in areas of new landscaping and use of pesticides and fertilizers (SLMP 2007; NAVFAC Southwest 2009; TDI 2010a). This INRMP complements these BMPs and standards and provides guidance on specific problem areas, such as the use of water around mature native trees.

Appendix M: Comprehensive Landscaping Plant List is a comprehensive guide. Specifications for each plant species are listed, as well as habitat preferences, sun exposure and irrigation needs.

Management Strategy

Goal: Landscaping is maximized for efficiency in labor, water, natural resource benefit, and herbicide use.

Objectives for Landscaping and Grounds Maintenance

Objective: Use a smart, integrated approach to better steward the heritage trees and other plants on the Main Grounds and Annex.

I. Reduce or eliminate dry season irrigation of native trees. Mature, local native tree species such as coast live oak, Monterey pine, and Monterey cypress provide an invaluable resource to the landscaped grounds. In addition, they function in an ecological way to provide for stormwater absorption (trees pump water out of the ground and into the canopy through evapotranspiration), habitat for resident and migratory birds, soil conservation and a food source for ground-dwelling and subterranean organisms. They are key to the high value functioning of the ecosystem at NSA Monterey. Native tree species are generally not tolerant of dry season irrigation, and can eventually succumb to a host of problems that may be fatal. Exceptions to this are trees native to riparian or permanently wet sites, such as sycamore, alder and willow.

II. Heritage oak trees should be afforded special care to maintain their high value and ecological function.

A. Irrigation should be eliminated within a five foot perimeter defined by the edge of the drip line of each tree (five feet from the outermost branching and canopy, as opposed to five feet from the trunk).

B. Turf should be removed within this zone to eliminate the possibility of infection by oak-root fungus, a lethal disease. Elimination of summer irrigation will help control powdery mildew, a foliar disease affecting forced new growth during the dry season. Reduction of stress caused by summer water can also control infection of oak-twig canker, which causes dead patches of foliage in the canopy.

C. Coast live oak is susceptible to an apparently new disease organism (*Phytophthora ramorum*) that causes sudden oak death syndrome (Davidson et al. 2002), which is known to be present in Monterey County. Research suggests that the infection can be controlled with twice yearly treatment of the first six feet of trunk with Agrophos, a phosphate-based material that is both prophylactic protection against the disease causing organism and a nutrient source for the tree and thought to boost the tree's immune system (Lee et al. 2011).

D. Establish suitable companion plantings for oaks where possible, based on City of Monterey pamphlet "Preserving Oaks in the Landscape" and other sources.

E. Let oak leaf litter and mulch remain on the ground wherever possible. This is a primary source of nutrition for the tree and critical soil organisms.

III. Develop installation pruning standards. American National Standards Institute materials are the basis of a number of local pruning plans.

A. Prune and remove trees using qualified contractors when possible. If trimming is required and contracted support is not available or practical, PWD personnel shall execute the trimming, following established standards.

B. Pruning of trees and shrubs should enhance the natural growth form of each species.

C. Trim trees to prevent overhang or encroachment on buildings where possible.

D. Eliminate uniform shearing except where a formal hedge is the maintenance objective.

E. Down or dead trees in natural areas may be left in place for habitat if deemed appropriate.

IV. Ensure a sustainable population structure in the Monterey pine forest. Special care should be given to the mature Monterey pine and Monterey cypress canopy that covers significant portions of the Main Grounds. Additional plantings of these two local native/endemic tree species should be encouraged to expand and renew the mature canopy. Both species are relatively short-lived (80-100 years). Use irrigation only to establish new plantings. Understory native plant species may be planted to add interest and seasonal color.

Objective: Reduce water use in the landscape with smart irrigation practices.

I. Continue updating irrigation to systems that control water delivery by zone according to soil moisture conditions. These are controlled by a centralized, modern control system.

II. New plantings of low water use plants should be irrigated with micro-spray irrigation systems. These systems should be designed and installed to be removed or disconnected after two years, when new planting should be established.

III. Xeriscape or fully native vegetation should be employed when renewing landscapes unless special circumstances make it undesirable, such as in historic areas. Minimize irrigated turf in all areas.

Objective: Increase the viability of new plantings.

I. Newly planted trees should be in areas with sufficient space for the mature height and spread.

II. Innoculate new plantings of native species with appropriate mycchorizal bacteria, either by using a commercial mix or transplanting soil from successful plantings.

III. Ensure that planting is done in accordance with the recommendations presented in Appendix M.

IV. Pitch canker-resistant Monterey Pines are available and should be planted whenever possible.

V. Remove or secure irrigation on drought tolerant plants within two years of landscape establishment.

5.10 Training of Natural Resource Management Personnel

Background

The Sikes Act (as amended) requires "sufficient numbers of professionally trained natural resources management and natural resources enforcement personnel to be available and assigned responsibility" to implement an INRMP. Staff should also be provided opportunities and support to receive both comprehensive training specific to their job and supplemental training in a timely manner, as needed, to ensure proper and efficient management of natural resources (DoDI 4715.03; 5090.1C CH-1).

Current Management

There is a dedicated ED at NSA Monterey with professionally trained natural resource management personnel with various specialized skills for managing resources.

Currently, natural resources personnel participate in three organizations and societies, as well as other professional societies. Attending meetings of these societies provides excellent opportunities to communicate with fellow professionals as well as maintain professional standards.

Current opportunities for training and professional development provided to NSA Monterey natural resources staff have been sufficient to adequately implement the INRMP and manage natural resources on the installation. However, with the expanding scope of natural resource management needs in the last few years, including an expansion in the number of properties overseen, there is a need for additional training. In order to support compliance with environmental laws, the following is a topic list for training opportunities, certifications, workshops, conferences and other professional development that NSA Monterey natural resources staff should participate in, as needed:

- Pesticide/Integrated Pest Management training
- USFWS National Conservation Training Center courses on Interagency Consultation for Endangered Species
- Other USFWS National Conservation Training Center webinars and online training
- Wetland management training
- EPA National Enforcement Training Institute's online training
- Naval Civil Engineer Corps Officers School (CECOS) Natural Resources Compliance training
- CECOS Advanced Environmental Law
- CECOS Environmental Negotiation Workshop

- CECOS Environmental GIS/Geostatistics course
- National Military Fisheries and Wildlife Association conference attendance
- California Stormwater Quality Association conference and workshops
- Elkhorn Slough Coastal Training Program courses and workshops
- Management of installation contributions to and expected impacts from Climate Change
- NEPA courses
- Wildlife handling training
- LEED Green Associate or AP certification
- LID certification

NSA Monterey should send at least one person to each of the following annual workshops or professional conferences as appropriate and funding allows: National Military Fish and Wildlife Association annual workshop; California Stormwater Quality Association conference and workshops; PIF national, regional, and state meetings; training in wildlife handling.

5.11 Natural Resources Law Enforcement

Background

Enforcement of laws, primarily aimed at protecting natural resources (and recreation activities that depend on natural resources) shall be an integral part of a natural resources program and shall be coordinated with or under the direction of the natural resources manager for the affected area. Natural resources law enforcement training shall be budgeted for, and each installation with hunting, fishing, or protected species shall ensure trained personnel are available (5090.1C CH-1).

According to DoDI 4715.03 (March 2011), DoD Components shall also coordinate with appropriate agencies to support conservation law enforcement to enforce federal and applicable state laws and regulations pertaining to the management of the natural resources under their jurisdiction.

Management Strategy

Goal: Law enforcement that minimizes the adverse impacts to natural resources.

Objectives for Natural Resources Law Enforcement

Objective: Provide for enforcement of natural resources laws and regulations at the Dune/Research Area by professionally trained personnel, taking proper safety and security measures into account.

I. Commanders shall permit federal and state Conservation Officers access to enforce natural resources laws after taking proper safety and security measures (See also Section 5.5: Public Access). Assistance from federal and state Conservation Officers should be solicited with the proposed Wildlife Law Enforcement Program on the installation.

II. Take steps to discourage and minimize the impacts of unauthorized access, including partnering with adjacent landowners.

6.0 Implementation Strategy

To successfully attain this INRMP's Goals and Objectives, the measures in Chapter 4 and Chapter 5 need to be prioritized, assigned, and prepared for funding. This Chapter lays out an implementation strategy that is a key component of the Navy's adaptive management approach, and is consistent with the budgeting hierarchy of DoD and Navy directives.

6.1 General Considerations

A successfully implemented INRMP will:

- Ensure the sustainability of all ecosystems encompassed by NSA Monterey.
- Ensure no net loss of the capability of NSA Monterey lands to support the DoD mission.

Formal adoption of an INRMP by a Regional Commander or Installation CO constitutes a commitment to seek funding and execute, subject to the availability of funding, all Level 4 projects and activities in accordance with specific timeframes identified in the INRMP. The INRMP is considered implemented if the installation:

1. Actively requests, receives, and uses funds for all Level 4 projects and activities;
2. Ensures that sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by the INRMP;
3. Coordinates annually with all cooperating offices; and
4. Documents specific INRMP action accomplishments undertaken each year.

For a description of Level 4 projects and activities and budget programming hierarchy for this INRMP (both DoD and Navy), see Section 1.5.1.1: Definition of Must Fund Implementation.

Successful implementation of this INRMP will depend upon not only the guidelines set up and projects described, but how well these are translated into performance work statements (who will do what and with what money), project lists and scopes of work, and a workload plan. It must fit into the formal EMS established at NSA Monterey for integrating environmental considerations into day-to-day activities across all levels and functions of Navy enterprise (See Section 1.8.1: Ecosystem Management). Monterey's regionally significant natural resources, and its strong staff and environmental ethic set the stage to help lead resources management in partnership with other agencies. To accomplish this, NSA Monterey will need to take advantage of funding opportunities outside normal program boundaries, consistent with authority to receive and use any such funds.

6.1.1 Responsibility

The responsibility for development, revision, and implementation of INRMPs is shared at every level among many different command elements. The SECNAV Instruction 6240.6E assigns responsibility for establishing, implementing, and maintaining the natural resources programs under the jurisdiction of SECNAV to the CNO/CNIC. Regional command and coordination is provided by the major claimant, Navy Region Southwest, and the Regional Environmental Coordinator. These entities ensure the programming of resources necessary to establish and support an integrated natural resources program consistent with legislative requirements, DoD policy, and stewardship. As the Navy shore infrastructure continues to change through reorganization and regionalization, many natural resources functions that formerly were the responsibility of installation commanders have passed to these regional commanders and area coordinators as part of their responsibilities.

NAVFAC Southwest is responsible for providing technical assistance for both compliance and stewardship obligations, and to evaluate and validate requests for funds for natural resources projects. This engineering activity administers the Navy forestry and agricultural outlease budgets, fish and wildlife/hunting and fishing fee and permit projects, contracts, and cooperative agreements. Upon request from CNO/CNIC, NAVFAC Southwest coordinates natural resources requirements with other federal, state, or local agencies, including the acquisition of INRMP mutual agreements between the Navy, USFWS, and state fish and wildlife agencies. Natural resources program information needed to satisfy reporting requirements, legislative information requests, and to support project requests is also maintained by NAVFAC Southwest. This information is collected in the NAVFAC Natural Resources Data Call Station and applicable GIS programs.

Installation COs or Officers-in-Charge endorse via signature their INRMPs. Their responsibility is to act as stewards of natural resources under their jurisdiction and integrate natural resources requirements into the day-to-day decision-making process. To accomplish this, they involve appropriate tenant, operational, training, or research and development commands in the INRMP review process to ensure no net

loss of the military mission. At their discretion they may bring in Navy Judge Advocate General or Office of the General Counsel Legal Counsel to provide advice and counsel with respect to legal matters related to natural resources management and INRMPs (5090.1C CH-1).

Formal adoption of an INRMP by a CO or Officer-in-Charge constitutes a commitment to seek funding and execute, subject to the availability of funding, all must fund projects and activities in accordance with specific time frames identified in the INRMP. Under the Sikes Act (as amended), any natural resources management activity that is specifically addressed in the INRMP must be implemented (subject to availability of funds). Failure to implement the INRMP is a violation of the Act and may be a source of litigation. Since the Sikes Act (as amended) requires implementation of the INRMP, there is a clear fiscal connection between INRMP preparation, revision, implementation, and funding. Funding to implement natural resources management will largely come from program sources (through CNRSW). Accordingly, it is vital that budget personnel understand and participate in the INRMP process.

Further, a SECNAV memorandum (12 August 1998) stated:

> "All projects essential to fulfill the selected alternative (mix of management objectives) must be implemented within a timeframe indicated in the INRMP. Any deviation or change from achieving the selected alternative may require supplementation to the EA or EIS and an opportunity for public comment."

Adequate training of natural resource personnel is important to the success of military sustainability and land management. The 5090.1C CH-1 requires that Navy commands develop, implement, and enforce the management plan through personnel with professional training in natural resources.

> "Natural resources programs shall support military readiness and sustainability and commands shall assign specific responsibility, provide centralized supervision and assign professionally trained personnel to the program. Natural resources personnel shall be provided an opportunity to participate in natural resource management job-training activities and professional meetings."

The Sikes Act (as amended) (Section 670g) also addresses this need, as well as DoDI 4715.03 (18 March 2011).

6.1.2 Federal Anti-Deficiency Act

NSA Monterey intends to implement recommendations in this INRMP within the framework of regulatory compliance, national Navy mission obligations, anti-terrorism and force protection limitations, and funding constraints. All actions contemplated in this INRMP are subject to the availability of funds properly authorized and appropriated under federal law. Nothing in this INRMP is intended to be nor must be construed to be a violation of the Anti-Deficiency Act (31 USC 1341 *et seq.*).

6.1.3 Staffing

The Sikes Act (as amended) specifically requires that there be "sufficient numbers of professionally trained natural resources management and natural resources enforcement personnel to be available and assigned responsibility" to implement an INRMP.

The ED is responsible for identifying personnel requirements to accomplish INRMP goals and objectives. The ED is also responsible for providing input into this process by allocating existing budgetary and personnel resources and then identifying staffing needs based on any additional current and future projects. Personnel assigned to natural resources management are the core staff responsible for implementing the INRMP. These personnel ensure that a consistent conservation program is carried out by using strategies outlined in this plan to support the Navy mission and achieve INRMP goals and objectives.

6.1.4 Annual Update, Review and Metrics

DoD policy requires installations to review INRMPs annually in cooperation with the two primary parties to the INRMP (USFWS and the state fish and wildlife agency). Annual reviews facilitate "adaptive management" by providing an opportunity for the parties to review the goals and objectives of the plan, as well as establish a realistic schedule for undertaking proposed actions. As a guide for addressing annual INRMP review, the Navy Natural Resources Metrics are used to assess INRMP implementation, measure conservation efforts, ensure no net loss of military testing and training lands, understand the conservation program's installation mission support and indicate the success of partnerships. These Natural Resources Metrics can be used to gather and report essential information required by Congress, EOs, existing U.S. laws, and the DoD. There are seven focus areas that comprise the Natural Resources Metrics to be evaluated during the annual review of the Natural Resources Program/INRMP.

1. Ecosystem Integrity
2. Listed Species and Critical Habitat
3. Fish and Wildlife Management and Public Use
4. Partnership Effectiveness
5. Team Adequacy
6. INRMP Project Implementation
7. INRMP Impact on the Installation Mission

A full copy of the most recent Natural Resources Metrics questions are presented in Appendix O.

Section 101(b)(2) of the Sikes Act (as amended) [16 USC 670a(b)(2)] specifically directs that the INRMPs be reviewed "as to operation and effect" by the primary parties "on a regular basis, but not less often than every five years," emphasizing that the review is intended to determine whether existing INRMPs are being implemented to meet the requirements of the Sikes Act (as amended) and contribute to the conservation and rehabilitation of natural resources on military installations. The OUSD guidance (17 May 2005) states that joint review should be reflected in a memo or letters.

Recent guidance on INRMP implementation interpreted that the five-year review would not necessarily constitute a revision; that this would occur only if deemed necessary. The Annual Review process is broadly guided by the Real Estate Manual (DoDD 4715.DD-R 1996) and by 5090.1C CH-1. Policy memoranda in 2002, supplemented in 2004, clarified procedures for INRMP reviews and revisions:

- DUSD [I&E] Policy Memorandum 10 October 2002, which replaced a 1998 policy memorandum.
- Assistant Deputy Under Secretary of Defense for Environment, Safety and Occupational Health Policy Memorandum (01 November 2004).
- Assistant Deputy Under Secretary of Defense Environment, Safety and Occupational Health Policy (September 2005 Memorandum).

The INRMP Implementation Guidance (10 October 2002 Memorandum) improved coordination external to DoD (USFWS, state agencies, and the public) and internal to DoD (military operators and trainers, cultural resources managers, pest managers). It also added new tracking procedures, called metrics, to ensure proper INRMP coordination occurred and that projects were implemented. These natural resources metrics have been updated, and are available on the Navy Conservation website.

The 2002 guidance also required that each installation provide a notice of intent to prepare or revise the INRMP. Each military installation now must request that USFWS and the state fish and wildlife agency participate in both the development and review of the INRMPs. Current coordination guidelines are that the USFWS field office is the appropriate entry point for military installations, and the USFWS Regional Sikes Act Coordinator is the liaison to facilitate INRMP review.

The Supplemental DoD INRMP Guidance (01 November 2004 Memorandum) further defined the scope of the annual and five-year review, public comment on INRMP reviews, and ESA consultation. A formal review must be performed by the parties at least every five years. Informal annual reviews are mandatory to facilitate adaptive management, during which INRMP goals, objectives, and must fund projects are reviewed, and a realistic schedule established to undertake proposed actions. The outcome of this joint review should be documented in a memorandum or letter summarizing the rationale for the conclusions the parties have reached. This written documentation should be jointly executed or in some other way reflect the parties' mutual agreement.

The Supplemental DoD INRMP Guidance (September 2005) stated that all INRMPs must address resource management on all of the lands for which the subject installation has real property accountability, including lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. Per this memo, installation commanders may require tenants, lessees, permittees, and other parties that request permission to occupy or use installation property to accept responsibility, as a condition of their occupancy or use, for performing appropriate natural resource management actions. This does not, however, obviate the need to address natural resource management on any such lands in the INRMP.

In most cases INRMPs will incorporate by reference the results of an installation's previous species-by-species ESA consultations, including any reasonable and prudent measures identified in an incidental take statement. Neither a separate biological assessment nor a separate formal consultation should be necessary. Nonetheless, because the INRMP may include management strategies designed to balance the potentially competing needs of multiple species, it may be prudent to engage in informal consultation.

Management Strategy

Project Summary	Legal Driver
Provide a notice of the intent to revise the INRMP to the USFWS and CDFW if a revision is found necessary.	Sikes Act (as amended)
Comply with recent CNIC draft guidance on INRMPs and continue to utilize the current INRMP reporting system to assess implementation.	Sikes Act (as amended)

Objective and Strategies for Annual Update, Review, and Metrics

Objective: Improve and refine natural resources management by adaptively adjusting success criteria and priorities based on past accomplishments, new risks and threats, new biological information, and changes in policy (DoDD 4715.DD-R 1996).

I. Provide a notice of intent to revise the INRMP to USFWS Field Office and the CDFW if a revision is found necessary. Ensure that the USFWS Regional Sikes Act Coordinator is notified.

II. Comply with recent CNIC draft guidance (January 2005) on INRMPs and compliance with the Sikes Act (as amended):

A. All INRMPs shall be reviewed annually by the DoD installation with the cooperation of the USFWS and the state fish and wildlife agency, and others with a stake in the outcome of the INRMP at the discretion of the Conservation Program Manager. Annual reviews shall verify that:

1. Current information on all conservation metrics is available.

2. All must fund projects and activities have been budgeted for and implementation is on schedule.

3. All required trained natural resources positions are filled or are in the process of being filled.

4. Projects and activities for the upcoming year have been identified and included in the INRMP. An updated project list does not necessitate revising the INRMP.

5. All required coordination has occurred.

6. All significant changes in the installation's mission requirements or its natural resources have been identified.
    a. Establish a mutually agreed-upon, realistic schedule to undertake proposed actions.
    b. The outcome of this joint review should be documented in a memorandum or letter summarizing the rationale for the conclusions the parties have reached. This written documentation should reflect the parties' mutual agreement.

III. Fulfill the reporting requirements of new measures to promote better understanding of the health of Navy conservation programs, using the current reporting system defined by CNIC. This set of metrics for Navy natural resources programs measure conservation impacts on installation missions and the success of partnerships with the USFWS and state fish and game agencies as required by the Sikes Act (as amended).

A. Conduct a performance measure based self-review annually, based on the Metrics Builder (See Figure 6-1) available on the Navy Conservation website. These tables use the Navy and Marine Corps Natural Resources Metrics Builder Reference Guide (04 May 2005) and were updated based on the NAVFAC metrics website in March 2008.
    1. Add NSA Monterey-specific questions.
    2. Ensure long-term threats to the health of habitats, such as sea level rise and aquatic species invasion, are addressed.
    3. Develop specific questions to support annual review process from the NSA Monterey's perspective.

IV. Track implementation to guide and learn from past experience.

A. Derive the most benefit possible from learning and experience by documenting it and disseminating the information to others.

B. To track the progress of each of the INRMP's strategies, a spreadsheet program (e.g. Paradox, Access) should be constructed and maintained. Fields can be included to help (a) build queries; (b) track progress by location, type, sponsor, year, etc.; and (c) provide different types of reports. This database was developed as part of this INRMP.

C. The GIS database (ArcInfo) established for this INRMP should be maintained to track updates on various implementation activities, such as results of resource inventories, and locations of restoration projects.

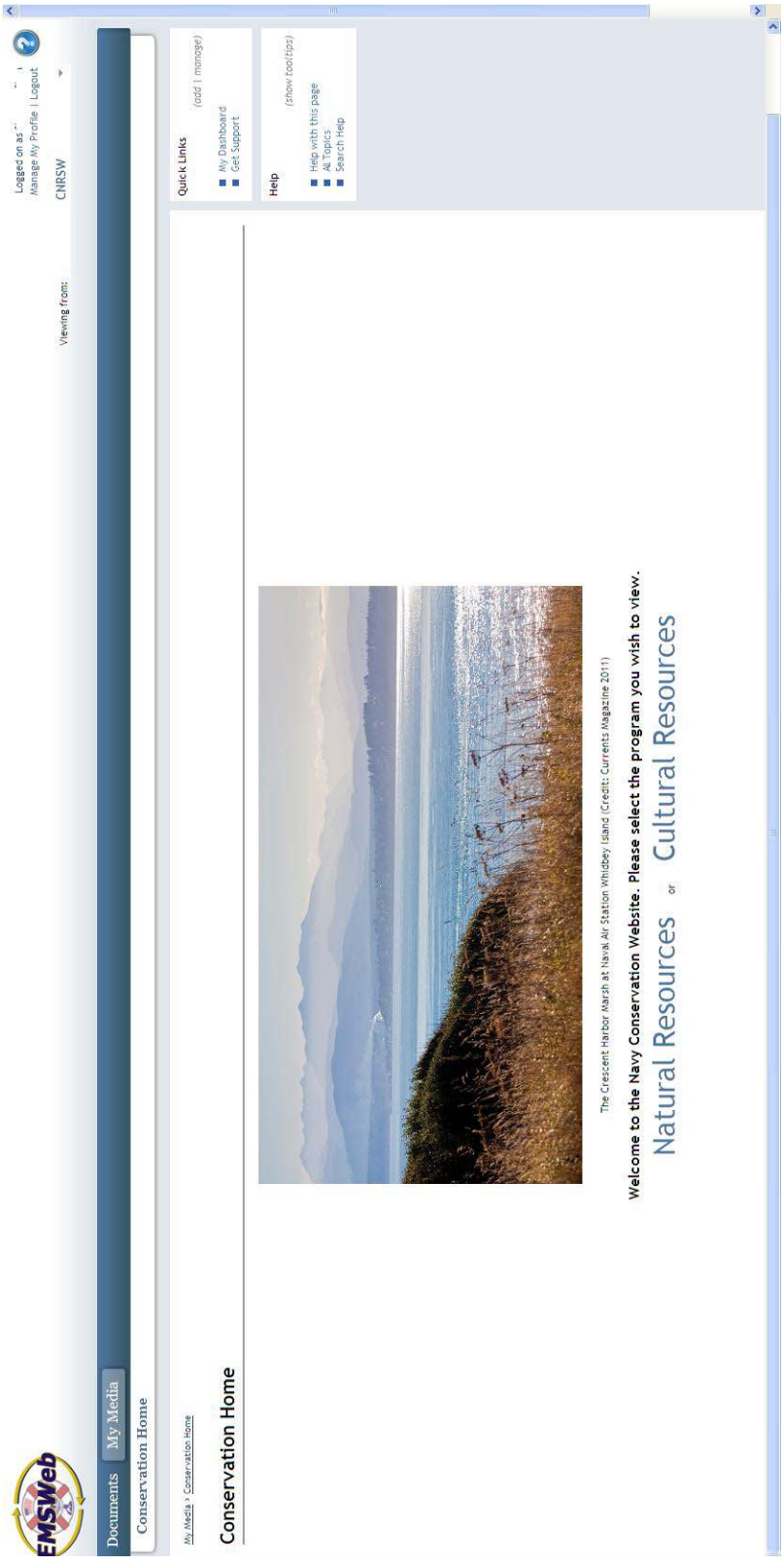

Figure 6-1. Navy Conservation Website, where the metrics builder can be found.

6.2 Funding and INRMP Implementation

The Navy and NSA Monterey intend to implement recommendations in this INRMP within the framework of regulatory compliance, national Navy mission obligations, anti-terrorism and force protection limitations, and funding constraints. Any requirement for the obligation of funds for projects in this INRMP shall be subject to the availability of funds appropriated by Congress, and none of the proposed projects shall be interpreted to require obligation or payment of funds in violation of any applicable federal law, including the Anti-Deficiency Act, 31 USC § 1341, et seq.

For the purposes of this INRMP, the terms stewardship and compliance have specific meanings as criteria for implementing project lists. Project rankings are assigned based on whether an activity is mandatory to comply with a legal requirement such as under the ESA, CWA, or MBTA. Alternatively, a project may be considered good land stewardship but is not considered an obligation for NSA Monterey to be found in compliance with environmental laws. Projects considered necessary to comply with the law are generally funded within budget constraints, whereas stewardship projects are ranked lower for funding consideration when projects are competed among multiple installations. Current policy is, however, that they will eventually be funded.

The funding strategies described here are implemented when projects are defined and prioritized, as for this INRMP in Table 6-4. The budgeting plan for the INRMP is based on programming and budgeting priorities for conservation programs described in 5090.1C CH-1.

6.2.1 Environmental Readiness Program Assessment Database

Environmental Portal and EPR-Web is an optimized online database used to define all programming for the Navy's environmental requirements. EPR-Web records data on project expenditures, and provides immediate, web-based access to requirements entered by the multiple Navy environmental programs, including environmental compliance, pollution prevention, conservation, radiological controls, and range sustainment as related to environmental costs on military ranges. It is the Navy's policy to fully fund compliance with all applicable federal, state and local laws; EOs; and associated implementing rules, regulations, DoDIs and DoDDs, and applicable international and overseas requirements (5090.1C CH-1). All natural resources requirements are entered into the EPR-Web and that they are available for review/approval by the chain of command by the dates specified in the Guidance letter that is provided annually by CNO (N45). This database is the source document for determining all programming and budgeting requirements of the Environmental Quality Program. EPR-Web is also the tool for providing the four ERL capabilities used in producing programming and budgeting requirements for the various processes within the budget planning system.

6.2.2 Navy Assessment Levels for Budget Prioritization

The budget programming hierarchy for this INRMP is based on both DoD and Navy funding level classifications (See Section 1.5.1.1: Definition of Must Fund Implementation). The four programming and budgeting priority levels detailed in DoDI 4715.03 (18 March 2011) Natural Resources Conservation Program, implement policy, assign responsibilities, and prescribe procedures for the integrated management of natural and cultural resources on property under DoD control. Budget priorities are also described in 5090.1C CH-1, Environmental and Natural Resources Program Manual.

Navy Assessment Levels for Assigning Budget Priorities

Four Navy ERLs have been established to enable capability-based programming and budgeting of environmental funding, and to facilitate capability versus cost trade-off decisions. ERL 4 is considered the absolute minimum level of environmental readiness capability required to maintain compliance with applicable legal requirements. Navy policy requires funding of all so-called DoD Recurring Natural Resources Conservation Management Requirements and Non-recurring Current Compliance projects (See Descriptions in Section 6.2.3: DoD Funding Classifications). The Navy funding programming hierarchy of recurring and non-recurring projects consists of four ERLs. The definitions of ERL 4 through ERL 1 follow:

1. **Environmental Readiness Level 4**
   - Supports all actions specifically required by law, regulation, or EO (DoD Non-recurring Current Compliance and Non-recurring Maintenance Requirements projects) just in time.
   - Supports all DoD Recurring Natural Resources Conservation Management Requirements as they relate to a specific statute such as hazardous waste disposal, permits, fees, monitoring, sampling and analysis, reporting and record keeping.
   - Supports recurring administrative, personnel and other costs associated with managing environmental programs that are necessary to meet applicable compliance requirements (DoD Recurring Natural Resources Conservation Management Requirements).
   - Supports minimum feasible Navy executive agent responsibilities, participation in OSD sponsored inter-department and inter-agency efforts, and OSD mandated regional coordination efforts.

2. **Environmental Readiness Level 3**
   - Supports all capabilities provided by ERL 4.
   - Supports existing level of Navy executive agent responsibilities, participation in OSD sponsored inter-department and inter-agency efforts, and OSD mandated regional coordination efforts.
   - Supports proactive involvement in the legislative and regulatory process to identity and mitigate requirements that will impose excessive costs or restrictions on operations and training.

- Supports proactive initiatives critical to the protection of Navy operational readiness.

3. **Environmental Readiness Level 2**
   - Supports all capabilities provided under ERL 3.
   - Supports enhanced proactive initiatives critical to the protection of Navy operational readiness.
   - Supports all Navy and DoD policy requirements.
   - Supports investments in pollution reduction, compliance enhancement, energy conservation and cost reduction.
4. **Environmental Readiness Level 1**
   - Supports all capabilities provided under ERL 2.
   - Supports proactive actions required to ensure compliance with pending/ strong anticipated laws and regulations in a timely manner and/or to prevent adverse impact to Navy mission.
   - Supports investments that demonstrate Navy environmental leadership and proactive environmental stewardship.

Budget priorities for threatened and endangered species management, especially compliance with a BO, receive the highest possible budgeting priority, and supports the NSA Monterey's need to avoid Critical Habitat designations under Section 4(b)(2) of the ESA, or Section 4(a)3 of the ESA (exemption from Critical Habitat designations for national security reasons).

6.2.3 DoD Funding Classifications

Funds will be requested for tasks within this INRMP. The previous classification used Class 0, I, II, and III projects. The guidance has been updated and Enclosure 4 of DoDI 4715.03 defines the four classes of conservation programs. The projects recommended in this INRMP have been prioritized based on compliance and stewardship criteria provided in the hierarchy below.

Recurring Natural Resources Conservation Management Requirements.

These activities are needed to cover the administrative, personnel, and other costs associated with managing the DoD Natural Resources Conservation Program that are necessary to meet applicable compliance requirements in Federal and State laws, regulations, EOs, and DoD policies, or in direct support of the military mission. DoD components shall give priority to recurring natural resources conservation management requirements associated with the operation of facilities, installations, and deployed weapons systems. These activities include day-to-day costs of sustaining an effective natural resources management program, as well as annual requirements, including manpower, training, supplies, permits, fees, testing and monitoring, sampling and analysis, reporting and record keeping, maintenance of natural resources conservation equipment, and compliance self-assessments.

Non-Recurring Current Compliance

These projects and activities are needed to support: an installation currently out of compliance; signed compliance agreements or consent order; meeting requirements with applicable federal or state laws, regulations, standards, EOs, or policies; immediate and essential maintenance of operational integrity or military mission sustainment; and projects or activities that will be out of compliance if not implemented in the current program year.

Non-Recurring Maintenance Requirements

These projects and activities are needed to meet an established deadline beyond the current program year and maintain compliance. Examples include: compliance with future deadlines; conservation, GIS mapping, and data management to comply with federal, state, and local regulations, EOs, and DoD policy; efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives; wetlands enhancement to minimize wetlands loss and enhance existing degraded wetlands; and conservation recommendations in BOs.

Non-Recurring Enhancement Actions Beyond Compliance

These projects and activities enhance conservation resources or the integrity of the installation mission or are needed to address overall environmental goals and objectives, but are not specifically required by law, regulation, or EO, and are not of an immediate nature. Examples include: community outreach activities; educational and public awareness projects; restoration or enhancement of natural resources when no specific compliance requirement dictates a course or liming of action; and management and execution of volunteer and partnership programs.

6.2.4 Implementation Schedule

This INRMP will become effective upon the acceptance and signatory release described in Section 6.1.1: Responsibility. Current projects, activities, and plans have been incorporated into the INRMP, as the plan serves as a formal structuring and integration of the existing natural resources management program.

Future work identified herein will be implemented as funding becomes available. Priorities identified in this INRMP will generally determine the order of implementation. The ED will determine what projects and activities are appropriate to initiate, given funding, at any particular time. The INRMP is meant to be flexible, dynamic, and adaptable to the immediate concerns and needs of natural resources management and the Navy mission.

Program Monitoring

The ED will be responsible for oversight and monitoring of the overall program identified within this INRMP. Cooperative projects among different Navy organizations will be monitored by the originating or controlling office as specified prior to project implementation.

6.2.5 External Assistance

Personnel limits have resulted in the need for outside assistance with natural resources programs on NSA Monterey. The growth of environmental compliance requirements has increased the need for external assistance, including on-the-ground personnel support.

6.2.5.1 INRMP Partners

Cooperative Agreements

Navy guidance on INRMPs states: "Installations are encouraged to work with other organizations, agencies, and individuals both on and off the installation throughout the planning process. Building partnerships with the right organization(s) is essential for ecosystem management." Cooperative Agreements are one means to accomplish this kind of partnership. Indeed, the Sikes Act (as amended in 2010) states that the Secretary of Navy can enter into Cooperative Agreements with states, local governments, nongovernmental organizations, individuals, and with other agencies (interagency agreements) to provide for: (1) the maintenance and improvement of natural resources on, or to benefit natural and historic research on, DoD installations; and (2) the maintenance and improvement of natural resources located off of a DoD installation if the purpose of the Cooperative Agreement or interagency agreement is to relieve or eliminate current or anticipated challenges that could restrict, impede, or otherwise interfere with, whether directly or indirectly, current or anticipated military activities.

In order to use a Cooperative Agreement, substantial involvement is expected between the Navy and the state, local government, or other recipient when carrying out the activity contemplated in the agreement. Cooperative Agreements provide a mutually beneficial means of acquiring, analyzing, and interpreting natural resources data, which can then be used to inform natural resources management decisions. Cooperative Agreements are funded by the Navy and produce information that can be used to help resource managers achieve project-specific compliance with environmental laws.

Cooperative Ecosystem Studies Units

The Cooperative Ecosystem Studies Units program is a working collaboration among federal agencies, universities, state agencies, nongovernmental organizations, and other nonfederal institutional partners. The Cooperative Ecosystem Studies Units National Network provides multidisciplinary research, technical assistance, and education to resource and environmental managers. Although the overall program is overseen by the U.S. Department of the Interior, one of the participating agencies is DoD.

Volunteers

Volunteers are a valuable source of personnel assistance at NSA Monterey. Volunteers contribute many hours of assistance annually to the NSA Monterey ED. Volunteers will continue to be an opportunistic source of assistance.

University Assistance

Universities are an excellent source of research assistance. The NSA Monterey has used several universities in recent years to help with specialized needs, such as the CSUMB and San Jose State University. These remain the most likely sources of assistance with implementation of this INRMP.

Contractor Support

Contractors give NSA Monterey access to a wide variety of specialties and fields. Contractors are involved in projects such as NEPA documentation, vegetation surveys, species surveys, management plans, and similar activities.

6.2.5.2 Planned External Support

External support projects are partitioned into two priorities. Many of these projects will be determined by funding availability.

Management Strategy

Project Summary	Legal Driver
Provide funding and support for research and other studies to further NSA Monterey natural resources management.	Sikes Act (as amended)

Objective and Strategies for External Assistance

Objective: Use external assistance as needed.

I. Provide funding and support for research and other studies to further NSA Monterey natural resources management.

A. Provide personnel to manage certain aspects of the NSA Monterey ED.

B. Provide logistics and administrative support for various NSA Monterey natural resources programs.

6.3 Funding Sources

In order to implement the various research, surveys, and programs necessary to fulfill the mission of the ED, funding must be identified and acquired. There are several avenues of funding available to the ED, beyond the typical Naval operational budget, that allow the inclusion of additional projects to assist the ED in their mission-related and stewardship endeavors. The ED must continually assess the priority and level of budgetary needs to fulfill Navy and regulatory requirements and to sustain overall program goals. These funding sources are discussed below in general terms, as this process is dynamic and is dependent on the INRMP's continuously developing program.

These programs will be implemented using Navy personnel and program resources as much as possible; however, it is likely that contractors will accomplish many projects. The ED will identify projects that would be accomplished using contract vehicles, with existing contracts being used where possible and appropriate.

For large projects that involve different Navy organizations, representatives of these organizations would coordinate budgeting and scheduling to ensure that the project can be accomplished in the planned timeframe. Large-budget projects may not be completely funded in a fiscal year, requiring incremental funding over the term of the project.

In some cases, smaller, lower-priority projects may be conducted using unspent funds from other tasks or year-end fallout funding. Some projects may be accomplished with little or no funding required, such as those requiring only a change of policy or coordination and effort from volunteer labor. These tasks can be implemented virtually as soon as planning is performed.

Fish and Wildlife Fees

Fish and wildlife fees are collected via sales of licenses to hunt or fish. They are authorized by the Sikes Act (as amended) and may be used only for fish and wildlife management on the installation where they are collected. Monterey generates no fish and wildlife fees, and none are anticipated unless security and safety conditions change to allow hunting or fishing on the installation, which is not anticipated.

Legacy Funds

The Legacy Resource Management Program was enacted in 1990 to provide financial assistance to military natural and cultural resources management. The program assists with protection and enhancement of natural resources while supporting military readiness. Legacy projects may involve regional ecosystem management initiatives, habitat preservation efforts, archaeological investigations, invasive species control, and/or monitoring, and predicting migratory patterns of birds and other animals.

The Legacy Resource Management Program has three main components: stewardship, leadership, and partnership. Stewardship projects assist the military in sustaining its natural resources. Leadership initiatives provide programs that serve to guide and often become flagship programs for other military, scientific, and public organizations. Partnerships provide for cooperative efforts in planning, management, and research.

The Legacy Resource Management Program emphasizes five areas:

- Ecosystem approaches to natural resources management to maintain biological diversity and the sustainable use of land and water resources for the military mission and other uses.
- Interdisciplinary approaches that incorporate the often-overlapping goals of natural and cultural resources management. Legacy strives to take advantage of this by sharing management methodologies and techniques across natural and cultural resource initiatives.
- Promoting natural and cultural resources by public and military education and involvement.

- Application of resource management initiatives regionally. The Legacy Resource Management Program supports regional efforts between the military and other governmental and non-governmental organizations.
- Finally, development of innovative new technologies to provide more efficient and effective natural resources management.

Operations and Maintenance Funds

Funding sources for the natural resources program are derived from General and Administrative, Operations and Maintenance Navy (O&MN), and input into the Navy Environmental Program Requirements (EPR) system for funding. This primary budgetary source is the basis for maintaining the personnel and core programs inherent to the natural resources program. These appropriated funds are the primary source of resources to support must-fund, just-in-time environmental compliance (i.e. ERL1 projects). O&MN funds are generally not available for ERL 2-4 projects. It is the responsibility of ED to manage the natural resources program budget and funding. Once O&MN funds are appropriated for core personnel and the program, funding can be justified for other project requirements.

Forestry Revenues and Agricultural Outleasing

Revenues from the sale of forest products and rents on agricultural outleases on Navy lands are a source of funding for natural resource management programs. Funds accumulated through the outleasing of agricultural lands on many installations are directed back into the natural resource program and reallocated throughout the Navy by NAVFAC Headquarters. It should be noted that currently, NSA Monterey does not maintain timber rights on NIROP Santa Cruz, nor would forestry be consistent with ecosystem management at the Monterey Area Properties. Similarly no agricultural outleasing presently occurs on NSA Monterey properties.

Recycling Funds

Installations with a Qualified Recycling Program may use proceeds for some types of natural resource projects.

Special Initiatives

The DoD or Navy may establish special initiatives to fund natural resource projects. Funding is generally available only for a limited number of projects. There are currently two such DoD initiatives:

- Streamside Forests: Lifelines to Clean Water is a DoD streamside restoration small grants program. Funds are available to military installations working in partnership with a local school and/or civic organization to purchase locally native plant material for small streamside restoration projects. Funds are distributed as reimbursements. Up to $5,000 may be awarded per project. This is an ongoing program (no deadline), so proposals can be submitted at any time. Applications and additional information are available on the DENIX website.

- Sustaining Our Forests, Preserving Our Future is funding to ensure that the integrity of DoD forested lands remains intact.

Management Strategy

Project Summary	Legal Driver
Provide documentation to secure appropriate levels of NSA Monterey ED In House funding to support natural resource management programs.	Sikes Act (as amended)
Develop prioritized lists of proposed management efforts to guide development of funding proposals.	Sikes Act (as amended)
Develop plans and documentation to secure external funding and continue to request external funding from other state and federal agencies.	Sikes Act (as amended)
Support scientific, academic, and volunteer efforts to initiate or supplement natural resources management programs.	Sikes Act (as amended)

Objective and Strategies for Funding

Objective: Adequately fund natural resources planning initiatives.

I. Provide documentation to secure appropriate levels of in-house (overhead) funding to support natural resource management programs.

II. Develop prioritized lists of proposed management efforts to facilitate accomplishment of programs required for compliance with legal mandates and support the military mission.

III. Develop long-range plans and supporting documentation to secure off-site funding.

IV. Continue to request funding from other agencies for programs of mutual benefit.

V. Continue to support scientific, academic, and volunteer efforts to initiate or supplement natural resource management programs.

6.3.1 Research Funding Requirements

Environmental program funding within the Navy is primarily based upon federally mandated requirements. Consequently, program managers are encouraged to seek outside funding for projects consistent with the INRMP, such as research, that will benefit natural resources on installations, but that are not directly related to federal mandates.

New funding sources should be sought from federal, state, local, and nonprofit organizations with an interest in achieving the goals and objectives of this INRMP in partnership with NSA Monterey. Any such funding would need to be consistent with authorization to receive and use such funds. These will often require cost-sharing. This funding opportunity should be sought for projects that are not Navy ERL 1 must fund items, tied directly to immediate regulatory compliance. Examples are watershed management, habitat enhancement, or wetland restoration.

6.4 INRMP Implementation Summary and Schedule

The objectives and strategies that support INRMP implementation are identified in this section. Following these objectives and management strategies are Table 6-1, Table 6-2, Table 6-3, and Table 6-4 that summarize various aspects of the implementation of this INRMP.

The purpose of Table 6-4 is to summarize all projects or activities that NSA Monterey intends to implement over the duration of the INRMP time frame. Table 6-4 is organized according to INRMP management topic. Management strategies presented in Chapter 4, Chapter 5, and Chapter 6 identifies the means by which NSA Monterey intends to achieve desired future conditions. Management actions, such as EPR projects, are specific projects or activities that provide NSA Monterey a mechanism to strive towards achieving those desired future conditions. Individual EPR projects may address multiple management strategies encompassing various INRMP management topics. In order to reduce redundancy, management strategies are incorporated by reference in the INRMP Management Strategy column of the table. Management topics that do not appear as a heading in the table are identified in the INRMP Management Strategy column numerically and referenced to an EPR project that may encompass several topic areas. Also, management strategies that pertain to special status species have their own sections rather than including special status species management strategies in the broader sections that pertain to wildlife populations. This Implementation Table parallels the structure of the INRMP as presented in Chapter 4, Chapter 5, and Chapter 6 and all INRMP management strategies presented in these Sections are referenced in the INRMP Management Strategy column in this table.

Table 6-1 identifies the various EPR project codes and descriptions that are referenced in the EPR Project Code column of Table 6-4; these include the EPR number or placeholder for future EPR projects (e.g., 63126-EPR-Dune) if appropriate. Table 6-2 identifies the applicable funding sources for each project; for more information on funding sources refer to Section 6.3: Funding Sources. Table 6-3 identifies the applicable INRMP legal drivers, or compliance requirements, for all of the various INRMP management projects or activities. All projects listed in Table 6-4 support compliance with OPNAVINST 5090.1C CH-1 and DoDI 4715.03.

Management Strategy

Project Summary	Legal Driver
Identify and ensure departments prioritize and allocate funding to support compliance requirements.	Sikes Act (as amended)
Seek awards for natural resource work conducted at NSA Monterey.	Sikes Act (as amended)
Continue to ensure effective communication, adaptive oversight, and policy leadership through the Navy Natural Resources Strategic Plan.	Sikes Act (as amended)

Objectives and Strategies for INRMP Implementation

Objective: Provide the organizational capacity, communication, planning functions, staffing, budgeting, and innovative technology support to ensure compliance with environmental laws, stewardship of natural resources, and continued use of NSA Monterey's lands by the Navy.

Objective: Ensure that all appropriate avenues and partnerships are investigated and sought for achieving the goals and objectives of this INRMP, for the best possible management and most efficient use of funds.

I. Seek a balanced, multiple-use natural resources program through professional management (Navy 2009).

A. Ensure environmental staff receive ongoing training and professional development through attendance at workshops, classes, training, and conferences.

II. Identify and ensure departments prioritize and allocate funding to support compliance requirements.

A. Funds will be requested for tasks within the INRMP, with priority given to ERL 4, ERL 3, ERL 2, and ERL 1 projects, in that order based on guidance in 5090.1C CH-1 and DoDI 4715.03.

B. Must fund conservation requirements are those projects and activities that are required to meet recurring natural and cultural resources conservation management requirements or current compliance (ERL4) needs. Navy must fund projects and actions include those required to:

1. Meet with legislative directive, EOs, and any legal requirement supported by laws and regulations found, but not limited to:
   a. Federally threatened and endangered species surveys.
   b. Baseline wetland delineations.
   c. Mapping of federally threatened and endangered species.
   d. Mapping of Critical Habitat.
2. Meet the USFWS special management criteria for threatened and endangered species management and avoidance of Critical Habitat designation on military bases.
3. Integrally support mission readiness, training requirements, and land sustainability. Examples include:
   a. Prevention of resource loss or degradation (e.g. soil loss, erosion control).
   b. Baseline data collection and long-term trend monitoring efforts.
4. Provide for qualified natural resources personnel.

C. Identify new funding sources from federal, state, local, and nonprofit organizations with an interest in achieving the goals and objectives of this INRMP in partnership with NSA Monterey. These often require cost-sharing with a non-federal organization. This funding opportunity should be sought for projects that are not ERL4 must fund items, tied directly to regulatory compliance. Examples are watershed management, habitat enhancement, or wetland restoration.

D. Support the mutual goals and objectives of this INRMP and the CWAP, as well as a local Natural Community Conservation Planning, through partnership funding.

E. Monitor websites that keep track of funding opportunities for environmental stewardship.

F. Apply for grants in partnership with local non-profits or other agencies.

III. Seek awards for natural resource work conducted at NSA Monterey.

IV. Continue to ensure effective communication, adaptive oversight and policy leadership through the Navy Natural Resources Strategic Plan.

Table 6-1. Integrated Natural Resources Management Plan environmental program requirements, project codes, and descriptions.

EPR Project Code	Description
62271B0022	1 CP SW NSA Monterey - Wetlands Restoration
62271B0068	CHS SW NSA Monterey INRMP
62271NR003	2 BO SW NSA Monterey - Endangered Species Monitoring BO Requirement
62271NR004	2 BO SW NSA Monterey - Endangered Species Protection
62271NR010	CHS SW NSA Monterey - Soil Erosion
62271NR012	SW NSA Monterey Endangered Smith's Blue Butterfly Surveys
62271NR023	1 CP SW NSA Monterey - California Red-Legged Frog
62271NR024	1 SW NSA Monterey - Western Snowy Plover Survey
62271NR025	SW NSA Monterey - NIROP Santa Cruz Wildfire Management Plan

Table 6-2. Integrated Natural Resources Management Plan project funding sources.

Funding Sources	Description
NSA Monterey ED In House	NSA Monterey Environmental Division funding
NSA Monterey Other Navy In-House	NSA Monterey Public Works or other NSA Monterey Department or Division funding
O&MN	Operations and Maintenance Navy funding
Navy Tenant	NSA Monterey Naval tenant funding
Research Institutions	Research institution, non-governmental organization, or volunteer funding
Project Proponent	Project proponent funding

Table 6-3. Integrated Natural Resources Management Plan implementation table management project or activity legal drivers.

Acronyms	Description
BEPA	Bald and Golden Eagle Protection Act
BO 1-8-01-F-29	Biological Opinion for the Invasive Plant Species Control and Vegetation Management Activities at the Naval Postgraduate School, Monterey County, California
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
EO 11988	Floodplain Management
EO 11514	Protection and Enhancement of Environmental Quality
EO 11990	Protection of Wetlands
EO 11991	Protection and Enhancement of Environmental Quality
EO 12342	Environmental Safeguard for Animal Damage Control on Federal Lands
EO 13112	Invasive Species
EO 13423	Strengthening Federal Environmental, Energy, and Transportation Management
EO 13514	Federal Leadership in Environmental, Energy, and Economic Performance
ESA	Endangered Species Act
FNWA	Federal Noxious Weed Act
LRPPA	Legacy Resource Protection Program Act
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
5090.1C CH-1	Environmental Protection and Natural Resources Manual (as amended)
OPPA	Oil Pollution Prevention Act
RCRA-HSWA	Resource Conservation and Recovery Act - Hazardous and Solid Waste Amendments
SCA	Soil Conservation Act
DoDI 4715.03	DoD Natural Resources Conservation Program
DoDI 6055.06	DoD Fire and Emergency Services Program
WPFPA	Watershed Protection and Flood Prevention Act

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
Section 4.0: Natural Resources Management Objectives and Strategies										
Section 4.1: Managing with an Ecosystem Approach										
	NSA Monterey ED In House		Implement a coordinated monitoring program using land health and focal species indicators that can be implemented cost-effectively over time, and that facilitates reporting on natural resource conditions in relation to other central coast areas and annual INRMP program metrics questions. Set habitat objectives based on ecological sites, ecosystem function indicators, and the requirements of focus species. Do it in a manner that can be scaled up to the work of other agencies, in order to report on the health of NSA Monterey lands.		Sikes Act (as amended), EO 13186, EO 13112, DoD guidance on ecosystem approach. DoD Interagency MOU on federal data standards, Navy guidance on annual INRMP program metrics	As needed	TBD	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 4. Partnership Effectiveness 5. Team Adequacy	Sustainable and effective natural resources program that uses an ecosystem approach to management.	
	O&MN	62271B0068	Revise the INRMP to incorporate current resources and management knowledge.	4	Sikes Act (as amended)	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 3. Fish and Wildlife Management and Public Use 4. Partnership Effectiveness 5. Team Adequacy 6. INRMP Project Implementation 7. INRMP Impact on the Installation Mission	Sustainable and effective natural resources program that uses an ecosystem approach to management.	
	NSA Monterey ED In House		Apply sustainability principles to the management of habitats, species, and ecological functions on NSA Monterey by identifying resource specific best practices similar to Sustainable Sites Initiative approaches.		Sikes Act (as amended), NEPA, CWA, EO 13423, EO 11514, EO 11991	Ongoing	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Sustainable and effective natural resources program that uses an ecosystem approach to management.	
Section 4.2: Managing the Physical and Chemical Environment										
Section 4.2.1: Water Resources and Water Quality										
	NSA Monterey ED In House		Review and revise the Del Monte Lake Management Plan.		Sikes Act (as amended), CWA, EOs on Migratory Birds, Invasive Species, Sustainability	Annually	2012	1. Ecosystem Integrity	Diverse and functioning lake ecosystem. Water quality within acceptable limits for California red-legged frog. Compliance with EO 13423.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
	O&MN	62271NR023	Conduct water quality sampling at high value habitat for the California red-legged frog.	4	ESA, CWA	As needed	TBD	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Diverse and functioning lake ecosystem. Water quality within acceptable limits for California red-legged frog. Compliance with EO 13423.	
	NSA Monterey ED In House		Develop management plan and interim goals for 20% reduction of irrigation water use on Monterey area facilities, using FY 2010 as a baseline.		EO 13423, EO 13514	One Time	2012	1. Ecosystem Integrity	Diverse and functioning lake ecosystem. Water quality within acceptable limits for California red-legged frog. Compliance with EO 13423.	
	NSA Monterey ED In House		Develop a management plan for decreasing the impact of saline irrigation water on Annex landscaping		EO 13423, EO 13514	One Time	2012	1. Ecosystem Integrity	Diverse and functioning lake ecosystem. Water quality within acceptable limits for California red-legged frog. Compliance with EO 13423.	
Section 4.2.2: Floodplains										
	NSA Monterey ED In House		Develop a checklist of items to consider during NEPA review that identifies issues relevant to protecting the natural ecological integrity, structure, and functional values of floodplains at NSA Monterey.		Sikes Act (as amended), CWA, CZMA, LRPPA, WPFPA, EO 11990, NEPA	ongoing	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 3. Fish and Wildlife Management and Public Use	Full accounting of the environmental values floodplains provide and the impacts of actions on them.	
Section 4.2.3: Soil Resources										
	O&MN	62271NR010	Develop and implement an erosion control plan.	4	Sikes Act (as amended), SCA, CWA, CZMA, DoDI 4715.03	one time	2014	1. Ecosystem Integrity	Soil conservation is implemented and ecosystem services are fully provided in support of the military mission and ecosystem integrity.	
Section 4.2.4: Wildland Fire Management										
	O&MN	62271NR025	Develop and implement a WFMP for NIROP Santa Cruz.	4	Sikes Act (as amended), DoDI 6055.6	Five Years	2014	1. Ecosystem Integrity	Forests are managed such that they minimize the potential for, and the negative impacts of, wildfire.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
Section 4.3: Management of Habitats and Plant Communities										
Section 4.3.1: Terrestrial Vegetation Communities and Habitats										
	O&MN	62271NR004	Restore degraded vegetation communities.	4	ESA, Sikes Act (as amended), EO 11990, EO 13186, CWAP, DoD MOU on Ecosystem Approach (partnerships), BO (1-8-01-F-29), DoDI 4715.03	Ongoing	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Terrestrial vegetation communities have high native species diversity and support populations of special status species.	
	O&MN	62271NR004	Continue to limit public access to sensitive species habitat.	4	ESA, Sikes Act (as amended), EO 11990, EO 13186, CWAP, DoD BO (1-8-01-F-29), DoDI 4715.03	Ongoing	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Terrestrial vegetation communities have high native species diversity and support populations of special status species.	
	O&MN	62271NR004	Monitor all federally listed plant populations.	4	ESA, Sikes Act (as amended), EO 11990, EO 13186, CWAP, DoD MOU on Ecosystem Approach (partnerships), BO (1-8-01-F-29)	Annual	2012	2. Listed Species and Critical Habitat	Terrestrial vegetation communities have high native species diversity and support populations of special status species.	
	O&MN		Develop a vegetation management plan for Del Monte Lake that considers, among other issues, marine and aquatic invasives.		ESA, CWA, Sikes Act (as amended)	One Time	2012	1. Ecosystem Integrity	Terrestrial vegetation communities have high native species diversity and support populations of special status species.	
	NSA Monterey ED In House	N/A	Develop a map and database for invasive species and update the vegetation map when appropriate.		ESA, Sikes Act (as amended), EO 11990, EO 13186, CWAP, DoD BO (1-8-01-F-29), DoDI 4715.03	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 4. Partnership Effectiveness	Terrestrial vegetation communities have high native species diversity and support populations of special status species.	
	O&MN		Conduct base-wide flora surveys.		ESA, Sikes Act (as amended)	5 years	2015	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Terrestrial vegetation communities have high native species diversity and support populations of special status species.	
Section 4.3.1.1: Specific Issues for Coast Live Oak/Monterey Pine										
	O&MN	62271NR003	Conduct focused surveys annually for Yadon's rein orchid in coast live oak and Monterey pine habitat.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Coast live oak and Monterey pine forests are protected from wildfire, have a diverse understory, and support native and species status species.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
	O&MN	62271NR004	Restore coast live oak and Monterey pine habitat for the Yadon's rein orchid.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Coast live oak and Monterey pine forests are protected from wildfire, have a diverse understory, and support native and species status species.	
	O&MN	62271NR004	Protect coast live oak and Monterey pine habitat for Yadon's rein orchid using fencing, signage, and educational materials.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Coast live oak and Monterey pine forests are protected from wildfire, have a diverse understory, and support native and species status species.	
	NSA Monterey ED In House		Develop revised protocols for weeding and landscaping in coast live oak and Monterey pine stands.		Sikes Act (as amended)	One time.	2012	1. Ecosystem Integrity	Coast live oak and Monterey pine forests are protected from wildfire, have a diverse understory, and support native and species status species.	
Section 4.3.1.2: Specific Issues for Central Maritime Chaparral										
	O&MN	62271NR004	Protect federally listed species on Central Maritime Chaparral using fencing, signage and educational materials.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Central maritime chaparral communities have high native species diversity and continue to support populations of Yadon's rein orchid, Monterey gilia, and Monterey spineflower.	
	O&MN	62271NR003	Conduct focused surveys annually or semi-annually for federally listed species in Central Maritime Chaparral.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Central maritime chaparral communities have high native species diversity and continue to support populations of Yadon's rein orchid, Monterey gilia, and Monterey spineflower.	
	O&MN	62271NR004	Restore habitat for federally listed species in Central Maritime Chaparral.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Central maritime chaparral communities have high native species diversity and continue to support populations of Yadon's rein orchid, Monterey gilia, and Monterey spineflower.	
Section 4.3.1.3: Specific Issues for Dune Scrub										
	O&MN	62271NR004	Protect federally listed species on the Dunes using fencing, signage and educational materials.	4	ESA, NDAA 2004, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Dune scrub communities are protected from public trespass to the greatest extent possible, have high native species diversity, and continue to support populations, and hosts plants of, special status species.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
	O&MN	62271NR003	Conduct focused surveys annually for federally listed species at the Dunes.	4	ESA, NDAA 2004, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Dune scrub communities are protected from public trespass to the greatest extent possible, have high native species diversity, and continue to support populations, and hosts plants of, special status species.	
	O&MN	62271NR004	Restore habitat for federally listed species at the Dunes.	4	ESA, NDAA 2004, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Dune scrub communities are protected from public trespass to the greatest extent possible, have high native species diversity, and continue to support populations, and hosts plants of, special status species.	
	O&MN	62271NR010	Continue to investigate soil erosion and control plan for the dunes.	4	Sikes Act (as amended), SCA, CWA, CZMA, DoDI 4715.03	One Time	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 4. Partnership Effectiveness	Dune scrub communities are protected from public trespass to the greatest extent possible, have high native species diversity, and continue to support populations, and hosts plants of, special status species.	
Section 4.3.1.4: Specific Issues for Mixed Evergreen Forest and Redwood Forest										
	O&MN	62271NR025	Develop a NIROP Santa Cruz WFMP in conjunction with an overall forest management plan.	4	ESA, DoDI 6055.6	One Time	2014	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 4. Partnership Effectiveness	Mixed evergreen and redwood forests are protected from wildfire and yet remain healthy in terms of forest diversity and ecosystem function.	
Section 4.3.1.5: Specific Issues for Chaparral and Grasslands at NIROP Santa Cruz										
	O&MN	62271NR025	Develop and implement a WFMP for NIROP Santa Cruz that includes chaparral and grasslands.	4	ESA, DoDI 6055.6	One Time	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 4. Partnership Effectiveness	Chaparral and grassland communities have high native species diversity and are protected from inadvertent degradation and wildfire.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
Section 4.3.1.6: Specific Issues for Riparian/Wetland Habitat										
	O&MN	62271B0022	Establish mitigation conceptual goals, success criteria, and a restoration approach using historical reference conditions and a watershed approach. Riparian and wetland restoration at Point Sur, NIROP Santa Cruz, and the Main Grounds. LID technology implementation on all properties. Riparian monitoring for streambank condition, sedimentation, and invasive species.		CWA Sec. 404, 401; Sikes Act (as amended); CZMA; MBTA; EO 11990; EO 13186; USFWS-DoD MOU Migratory Birds; Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management, 62565 - 62572 Vol. 65, FR; Soil Conservation (16 USC 590a-590q3); Navy CNO LID Policy for Storm Water Management (16 Nov. 2007); EO 13423; EO 13547; North American Wetlands Conservation Act, PL 101-233 (16 USC §§ 4401 - 4414); EISA section 438	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	There is no net loss to wetlands. Wetland diversity and function is improved through efficiencies in irrigation and reductions in stormwater runoff.	
Section 4.3.2: Coastal and Marine Habitats										
			There are no projects planned for Coastal and Marine Habitats.							
Section 4.4: Fish and Wildlife Management										
	O&MN		Continue to conduct baseline inventories and develop maps of high habitat value to manage focus species to help avoidance, minimization, and conservation of resources and reduce potential for conflict with the military mission.		Sikes Act (as amended), DoD partnership, DoDI 4715.03	5 years.	2015,	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Native fish and wildlife populations are maintained and special status species are supported.	
Section 4.4.1: Invertebrates										
	O&MN	62271NR012	Conduct Smith blue butterfly surveys.	4	ESA, Sikes Act (as amended)	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Major taxa of invertebrate populations are identified and native species are protected through habitat protection.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
Section 4.4.2: Pollinators										
	NSA Monterey ED In House, NSA Monterey Other Navy In House, Research Institutions		Establish pollinator-friendly landscapes and gardens where feasible at NSA Monterey, potentially as part of habitat enhancement activities and in coordination with construction and/or facility maintenance activities.		DoD partnership	When feasible	2012	1. Ecosystem Integrity	Populations of pollinators species are abundant and proactively supported through habitat protection and enhancement.	
	O&MN, NSA Monterey ED In House, Research Institutions		Conduct a baseline pollinator survey at NSA Monterey and monitor pollinator populations at regular intervals. Pay special focus to the pollination requirements of threatened and endangered species.		DoD partnership, ESA	As needed	TBD	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Populations of pollinators species are abundant and proactively supported through habitat protection and enhancement.	
Section 4.4.3: Reptiles and Amphibians										
	NSA Monterey ED In House		Participate in DoD Partnership on Herptile Conservation (DoD Partners in Amphibian and Reptile Conservation) when it becomes established.		DoD partnership	When possible	TBD	1. Ecosystem Integrity 4. Partnership Effectiveness	Populations of reptiles and amphibians are identified, maintained, and special status species are supported by habitat protection.	
Section 4.4.4: Birds										
	NSA Monterey ED In House		Migratory and resident bird inventory and restoration management activities to conserve bird population and develop and maintain information on status and trend of population and habitats.		MBTA, BEPA	Ongoing	2012	1. Ecosystem Integrity	The diversity of avifauna is supported and special status species are protected.	
	NSA Monterey ED In House		Implement bird conservation principles, measures, and practices through avoidance and minimization measures to protect resident and migratory bird populations.		MBTA, BEPA	Ongoing	2012	1. Ecosystem Integrity	The diversity of avifauna is supported and special status species are protected.	
	NSA Monterey ED In House		Participate in regional avian monitoring initiatives.		MBTA, BEPA	Annual	2012	1. Ecosystem Integrity 4. Partnership Effectiveness	The diversity of avifauna is supported and special status species are protected.	
Section 4.4.5: Terrestrial Mammals										
	O&MN		Terrestrial mammal surveys as part of base-wide flora and fauna surveys every five years.		Sikes Act (as amended), ESA	5 years	2015	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Populations of terrestrial mammals are identified and native species are supported by protection of their habitat.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
Section 4.4.5.1: Bats										
	O&MN		Inventory and monitor bat populations on NSA Monterey as part of base-wide fauna surveys to adapt management strategies based on current population status.		Sikes Act (as amended)	5 years.	2015	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Populations of bats are proactively supported while ensuring that they do not become a nuisance.	
	NSA Monterey ED In House		Continue to use educational events like earth day for the promotion, restoration, and creation of bat habitat.		Sikes Act (as amended)	Annual	2012	1. Ecosystem Integrity 4. Partnership Effectiveness	Populations of bats are proactively supported while ensuring that they do not become a nuisance.	
Section 4.4.6: Marine Mammals										
	NSA Monterey ED In House		Educate staff on proper measures regarding sick, injured, or dead marine mammals.		ESA, Sikes Act (as amended), CZMA, MMPA, National Marine Sanctuary Program Regulations, Title 15 of the CFR, Part 922.132	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat	Marine mammals that may occupy NSA Monterey coastal habitats are managed according to regulations.	
Section 4.5: Special Status Species Protection										
Section 4.5.1: Threatened and Endangered Species and Critical Habitat										
	Navy Tenant Funding		Ensure that land use plans and activities in or near threatened or endangered species habitats are accomplished in accordance with the ESA in accordance with current BOs and with ESA Section 7 Consultation Handbook (USFWS and NMFS 1998).		ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Full compliance with all requirements and protection of special status species.	
Section 4.5.1.1: California Red-Legged Frog - Federally Threatened										
	O&MN	62271NR004	Conduct focused surveys annually for the red-legged frog, and assess high value habitat at that time.	4	ESA, Sikes Act (as amended)	Annual	2012	2. Listed Species and Critical Habitat	Determine the status and condition of the species at NSA Monterey; provide adequate and protected habitat.	
	O&MN	62271B0022, 62271NR004	Restore/enhance habitat where suitable.	4	ESA, Sikes Act (as amended)	Annual	2012	2. Listed Species and Critical Habitat	Determine the status and condition of the species at NSA Monterey; provide adequate and protected habitat.	
Section 4.5.1.2: Western Snowy Plover - Federally Threatened										
	O&MN	62271NR024	Conduct focused surveys annually for the western snowy plover	4	ESA, Sikes Act (as amended)	Annual	2012	2. Listed Species and Critical Habitat	Determine the status and condition of the species at NSA Monterey; provide adequate and protected habitat.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
	O&MN	62271NR024	Restore/enhance habitat where suitable.	4	ESA, Sikes Act (as amended)	Annual	2012	2. Listed Species and Critical Habitat	Determine the status and condition of the species at NSA Monterey; provide adequate and protected habitat.	
Section 4.5.1.3: Smith's Blue Butterfly - Federally Endangered										
	O&MN	62271NR012	Conduct focused surveys annually for the Smith's blue butterfly.	4	ESA, Sikes Act (as amended)	Annual	2012	2. Listed Species and Critical Habitat	Determine the status and condition of the species at NSA Monterey; provide adequate and protected habitat.	
	O&MN	62271NR012	Restore/enhance habitat where suitable.	4	ESA, Sikes Act (as amended)	Annual	2012	2. Listed Species and Critical Habitat	Determine the status and condition of the species at NSA Monterey, provide adequate habitat, and facilitate the eventual delisting of the species.	
Section 4.5.1.4: Yadon's Rein Orchid - Federally Endangered										
	O&MN	62271NR003	Conduct focused surveys annually for Yadon's rein orchid.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Populations of Yadon's rein orchid supported and protected in full compliance with BO.	
	O&MN	62271NR004	Restore habitat for the Yadon's rein orchid.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Populations of Yadon's rein orchid supported and protected in full compliance with BO.	
	O&MN	62271NR004	Protect habitat for Yadon's rein orchid using fencing, signage, and educational materials.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Populations of Yadon's rein orchid supported and protected in full compliance with BO.	
Section 4.5.1.5: Monterey Spineflower - Federally Threatened										
	O&MN	62271NR003	Conduct focused surveys annually for the Monterey spineflower.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Populations of the Monterey spineflower are supported and protected in full compliance with BO.	
	O&MN	62271NR004	Restore habitat for the Monterey spineflower.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Populations of the Monterey spineflower are supported and protected in full compliance with BO.	
	O&MN	62271NR004	Protect habitat for the Monterey spineflower using fencing, signage, and educational materials.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Populations of the Monterey spineflower are supported and protected in full compliance with BO.	
Section 4.5.1.6: Monterey Gilia - Federally Endangered										
	O&MN	62271NR003	Conduct focused surveys annually for the Monterey gilia.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Populations of the Monterey gilia are supported and protected in full compliance with BO.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
	O&MN	62271NR004	Restore habitat for the Monterey gilia.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Populations of the Monterey gilia are supported and protected in full compliance with BO.	
	O&MN	62271NR004	Protect habitat for the Monterey gilia using fencing, signage, and educational materials.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Populations of the Monterey gilia are supported and protected in full compliance with BO.	
Section 4.5.2: Other Special Status Species										
	NSA Monterey ED In House		Provide for the conservation, enhancement, and protection of species warranting Navy stewardship, as a proactive strategy to prevent federal listings and continue to resolve baseline biological data gaps.		ESA, Sikes Act (as amended)	Annual	2012	2. Listed Species and Critical Habitat	Native plant and animal populations are maintained and species status species are supported.	
Section 4.5.3: Invasive Species										
	O&MN	62271NR004	Restore habitat for federally listed species that is degraded due to occupation by invasive species.	4	ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Invasive species' populations are controlled and reduced across NSA Monterey.	
	NSA Monterey ED In House		Develop a map that depicts all invasive species concerns on NSA Monterey.		ESA, Sikes Act (as amended), BO 1-8-01-F-29	Annual	2012	2. Listed Species and Critical Habitat	Invasive species' populations are controlled and reduced across NSA Monterey.	
Section 4.6: Prevention and Control of Wildlife Damage										
Section 4.6.1: Feral Animals and Pests										
	NSA Monterey ED In House		Ensure pests and feral animals are managed according the IPMP.		Sikes Act (as amended), EO 12342, DoDI 4715.03	Annual	2012	1. Ecosystem Integrity	Elimination of pest species according to IPMP guidelines.	
Section 4.6.2: Bird/Animal Strike Hazard Program										
Section 4.6.3: Game Species										
Section 4.7: Data Integration, Access, and Reporting										
	NSA Monterey ED In House		Ensure GIS data and products that pertain to NSA Monterey natural resources are available to staff via a dedicated CITRIX share drive folder. Data and products that would be of general interest, such as listed species habitat areas, should be made available via GeoReadiness Explorer.		Sikes Act (as amended), EO 13423	Annual	2012	6. INRMP Project Implementation	Up-to-date and organized data are available to natural resources managers.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder	Goal	Cost Estimate
						Frequency	Year			
Section 5.0: Sustainability and Compatible Use at NSA Monterey										
Section 5.1: Sustainability of the Military Mission in the Natural Environment										
Section 5.1.1: Integrated Military Mission and Sustainable Land Use Decisions										
	NSA Monterey ED In House		Ensure long term and accurate data is available for adaptive management and reporting.		Sikes Act (as amended), EO 13186, EO 13112, DoDI 4715.03, DoD Interagency MOU on federal data standards, 5090.1C CH-1	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 3. Fish and Wildlife Management and Public Use 4. Partnership Effectiveness 5. Team Adequacy 6. INRMP Project Implementation	Healthy and resilient natural resources and no net loss of current or future military value.	
	NSA Monterey ED In House		Apply sustainability principles to the management of habitats, species, and ecological functions on NSA Monterey.		Sikes Act (as amended), NEPA, CWA, EO 13423, EO 11514, EO 11991	Annual	2012	6. INRMP Project Implementation	Healthy and resilient natural resources and no net loss of current or future military value.	
Section 5.1.2: Adapting to Effects of Climate Change and Regional Growth										
	NSA Monterey ED In House		Adapt and mitigate the adverse impacts of climate change through annual goal setting based on science-based scenarios, targets, collaborative planning, and adaptive management.		5090.1C CH-1, Sikes Act (as amended), EO 13423			1. Ecosystem Integrity 2. Listed Species and Critical Habitat 4. Partnership Effectiveness	A rigorous and iterative climate change management framework that maintains core ecosystem functions.	
Section 5.1.3: Sustainability in the Built Environment										
	NSA Monterey Other Navy In House, O&MN, Navy Tenant, Project Proponent		Sustain natural resources and the NSA Monterey mission by supporting innovation in planning, design, project management, and implementation for development projects affecting the built environment.		Sikes Act (as amended), EO 11514, EO 11991, EO 13423	Annual	2012	1. Ecosystem Integrity 7. INRMP Impact on the Installation Mission	All major facilities and landscaping designed or retrofitted using sustainability principles.	
	NSA Monterey Other Navy In House, O&MN, Navy Tenant, Project Proponent		Conduct construction and facility maintenance in a way that allows for protection of sensitive environmental resources and the timely, cost-effective completion of environmental documentation requirements, while ensuring full accomplishment of the military mission.					1. Ecosystem Integrity 7. INRMP Impact on the Installation Mission	All major facilities and landscaping designed or retrofitted using sustainability principles.	

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation Frequency	Implementation Year	Natural Resources Metrics Builder	Goal	Cost Estimate
Section 5.2: Beneficial Partnerships and Collaborative Resources Planning										
	NSA Monterey ED In House		Be proactive in cooperative resources planning partnerships to create regional conservation, ecosystem-based solutions of mutual benefit while protecting the military mission.		Sikes Act (as amended), ESA, MBTA, DoDI 4715.03, CWA	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 3. Fish and Wildlife Management and Public Use 4. Partnership Effectiveness 6. INRMP Project Implementation 7. INRMP Impact on the Installation Mission	Participation in collaborative planning efforts with relevant state and federal agencies.	
Section 5.3: Outdoor Recreation										
	NSA Monterey ED In House, NSA Monterey Other Navy In House		Promote compatible, sustainable outdoor recreation opportunities to enhance quality of life for military personnel and the visiting public while conserving natural resources and without compromising the military mission.		Sikes Act (as amended), EO 11514, EO 11991, EO 13423	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 3. Fish and Wildlife Management and Public Use 6. INRMP Project Implementation 7. INRMP Impact on the Installation Mission	Recreational opportunities are routinely used and match user preferences.	
Section 5.4: Environmental Education and Public Outreach										
	NSA Monterey ED In House		Promote an environmental awareness and resource conservation ethic through natural resource education programming, volunteer opportunities, and distribution of NSA environmental and sustainability information for the public and installation personnel.		Sikes Act (as amended)	Annual	2012	4. Partnership Effectiveness	Effective public outreach and environmental education program.	
Section 5.5: Public Access										
	NSA Monterey ED In House		Provide opportunities for public engagement via public access to NSA Monterey properties such that it does not conflict with the military mission, safety and security, and sensitive natural and cultural resource management.		Sikes Act (as amended), DoDI 4715.03, 5090.1C CH-1	Annual	2012	2. Listed Species and Critical Habitat 3. Fish and Wildlife Management and Public Use	Efficient public access at the Dune/Research Area and Lab/Rec Area that also protects natural resources.	
Section 5.6: Integrating Other Plans										
Section 5.6.1: Integrated Cultural Resource Management Plan										
Section 5.6.2: Integrated Pest Management Plan										
Section 5.6.3: Stormwater Management Plan										
Section 5.6.5: Installation Restoration Plan										

Table 6-4. Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on legal driver behind each project.

INRMP Management Strategy	Funding Source	EPR Project Code	Project Description	ERL	Legal Driver	Implementation Frequency	Implementation Year	Natural Resources Metrics Builder	Goal	Cost Estimate
Section 5.7: NEPA Compliance										
Section 5.8: Natural Resources Consultation Planning										
	NSA Monterey ED In House		Streamline natural resources consultation through clear communication of regulatory requirements. Collaborate with project proponents to plan mitigation and conservation measures to avoid or minimize effects on natural resources first, then "rectify, reduce, eliminate, or compensate for the impact" of unavoidable effects (CEQ 1978).		ESA	Annual	2012	1. Ecosystem Integrity 2. Listed Species and Critical Habitat 4. Partnership Effectiveness 6. INRMP Project Implementation 7. INRMP Impact on the Installation Mission		
Section 5.9: Landscaping and Grounds Maintenance										
	NSA Monterey ED In House		Use a smart, integrated approach to better steward the heritage trees and other plants on the Main Grounds and Annex.		DoDI 4150.07, OPNAVINST 6250.4B, and 5090.1C CH-1	Annual	2012	6. INRMP Project Implementation	Landscaping is maximized for efficiency in labor, water, natural resource benefit, and herbicide use.	
	NSA Monterey ED In House		Reduce water use in the landscape with smart irrigation practices.		DoDI 4150.07, OPNAVINST 6250.4B, and 5090.1C CH-1	Annual	2012	6. INRMP Project Implementation	Landscaping is maximized for efficiency in labor, water, natural resource benefit, and herbicide use.	
	NSA Monterey ED In House		Increase the viability of new plantings.		DoDI 4150.07, OPNAVINST 6250.4B, and 5090.1C CH-1	Annual	2012	6. INRMP Project Implementation	Landscaping is maximized for efficiency in labor, water, natural resource benefit, and herbicide use.	
Section 5.10: Training of Natural Resource Management Personnel										
Section 5.11: Natural Resources Law Enforcement										
	NSA Monterey ED In House		Provide for enforcement of natural resources laws and regulations by professionally trained personnel, taking proper safety and security measures into account.		DoDI 4150.07, OPNAVINST 6250.4B, and 5090.1C CH-1	Annual	2012	6. INRMP Project Implementation	Law enforcement that minimizes the adverse impacts to natural resources.	

6.5 Implementation Funding

Table 6-5 summarizes the supporting INRMP management strategies discussed in Chapters 4-6, the EPR funding code, project name, and potential funding source for implementing all natural resources projects identified in this INRMP. The Sikes Act (as amended) requires implementation of this INRMP; however, INRMP implementation is also subject to the provisions of the Federal Anti-Deficiency Act. Some INRMP projects are accomplished with installation staff; others involve contracting work to specialists. The implementation schedule identified in Table 6-4 INRMP Implementation Summary is suggested for long-term planning purposes; however, the schedule may be modified based on need, resources, and seasonal requirements.

Table 6-5. Integrated Natural Resources Management Plan Environmental Program Requirements project codes and descriptions.

INRMP Management Strategy	EPR Project Code	Funding Source	Description
Section 4.3.1.6: Specific Issues for Riparian/Wetland Habitat, Section 4.5.1.1: California Red-Legged Frog - Federally Threatened	62271B0022	O&MN	1 CP SW NSA Monterey - Wetlands Restoration
Section 4.1: Managing with an Ecosystem Approach	62271B0068	O&MN	CHS SW NSA Monterey INRMP
Section 4.3.1.1: Specific Issues for Coast Live Oak/Monterey Pine, Section 4.3.1.2: Specific Issues for Central Maritime Chaparral, Section 4.3.1.3: Specific Issues for Dune Scrub, Section 4.5.1.4: Yadon's Rein Orchid - Federally Endangered, Section 4.5.1.5: Monterey Spineflower - Federally Threatened, Section 4.5.1.6: Monterey Gilia - Federally Endangered	62271NR003	O&MN	2 BO SW NSA Monterey - Endangered Species Monitoring BO Requirement
Section 4.3.1: Terrestrial Vegetation Communities and Habitats, Section 4.3.1.1: Specific Issues for Coast Live Oak/Monterey Pine, Section 4.3.1.2: Specific Issues for Central Maritime Chaparral, Section 4.3.1.3: Specific Issues for Dune Scrub, Section 4.5.1.1: California Red-Legged Frog - Federally Threatened, Section 4.5.1.4: Yadon's Rein Orchid - Federally Endangered, Section 4.5.1.5: Monterey Spineflower - Federally Threatened, Section 4.5.1.6: Monterey Gilia - Federally Endangered, Section 4.5.3: Invasive Species	62271NR004	O&MN	2 BO SW NSA Monterey - Endangered Species Protection
Section 4.2.3: Soil Resources, Section 4.3.1.3: Specific Issues for Dune Scrub	62271NR010	O&MN	CHS SW NSA Monterey - Soil Erosion
Section 4.4.1: Invertebrates, Section 4.5.1.3: Smith's Blue Butterfly - Federally Endangered	62271NR012	O&MN	SW NSA Monterey Endangered Smith's Blue Butterfly Surveys Emergent
Section 4.2.1: Water Resources and Water Quality	62271NR023	O&MN	1 CP SW NSA Monterey - California Red-Legged Frog
Section 4.5.1.2: Western Snowy Plover - Federally Threatened	62271NR024	O&MN	1 SW NSA Monterey - Western Snowy Plover Survey
Section 4.2.4: Wildland Fire Management, Section 4.3.1.4: Specific Issues for Mixed Evergreen Forest and Redwood Forest, Section 4.3.1.5: Specific Issues for Chaparral and Grasslands at NIROP Santa Cruz	62271NR025	O&MN	SW NSA Monterey - NIROP Santa Cruz Wildfire Management Plan

7.0 References

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